

NCERT

LINE BY LINE

CHAPTERWISE TOPICWISE

BOTANY

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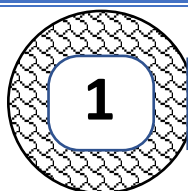
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CLASS – XII-th

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Living world

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BOTANY

What is living?

1. The characteristics of growth include
Pg-3, Easy

A) increase in mass
B) increase in number
C) increase in length
D) both A. and B.

2. Unicellular organisms grow by
Pg-4, Easy

A) cell elongation
B) cell division
C) accumulation of material on the surface
D) none of these

3. Mountains, boulders and sand mounds also grow, but they are not considered as living organisms because they grow by
Pg-4, Easy

A) Accumulation of material on their inner surface.
B) the division of their particles.
C) accumulation of material on their outer surface.
D) both A. and B.

4. Choose the correct statement about growth in plants.

Pg-4, Easy

A) Growth occurs continuously throughout their lifespan by cell division.
B) The growth is seen only upto a certain age.
C) Growth occurs by the accumulation of material on the upper surface of their cells.
D) Growth occurs only in certain cells.

5. In yeast and Hydra, reproduction occurs by

Pg-4, Easy

A) conjugation B) sporulation
C) budding D) none of these

6. The organism(s) that can multiply by fragmentation is/are

Pg-4, Easy

A) fungi
B) filamentous algae
C) protonema of moss
D) all of these

7. In Amoeba, reproduction is synonymous with

Pg-4, Easy

A) digestion B) growth
C) locomotion D) none of these

8. Living organisms that do not reproduce are
Pg-4, Easy

A) mule
B) worker bees
C) infertile human couples
D) all of these

9. Match Column-I with Column-II and choose the correct option from the codes given below.

Pg-4, Medium

	Column-I (Organism)		Column-II (Method of reproduction)
a	Planaria	(1)	Fragmentation
b	Hydra	(2)	Regeneration
c	Fungi	(3)	Binary fission
d	Amoeba	(4)	Budding

Codes

	a	b	c	D
A)	2	4	1	3
B)	4	2	3	1
C)	3	1	4	2
D)	1	3	2	4

10. The sum total of all the chemical reactions occurring in our body is

Pg-5, Easy

A) anabolism B) catabolism
C) metabolism D) none of these

11. An isolated metabolic reaction outside the body of an organism, performed in a test-tube is

Pg-5, Easy

A) living
B) non-living
C) neither living nor non-living
D) sometimes living and sometimes non-living depending upon environmental factors

12. Choose the incorrect statement from the following:

Pg-5, Easy

A) All living organisms exhibit metabolism.
B) Metabolism is the sum total of all chemical reactions occurring in our body.
C) Metabolism is a defining feature of all living organisms.

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- D) Metabolic reactions cannot be demonstrated outside the body in cell-free systems.
13. Isolated metabolic reactions occurring in-vitro are not living things, but surely living reactions. It proves that 'A' of the body is the defining feature of life forms. Here 'A' is

Pg-5, Easy

- A) reproduction
B) cellular organization
C) metabolic reactions
D) growth
14. Identify the defining characteristics of living organisms from the following.

Pg-5, Easy

- A) Growth
B) Ability to make sound
C) Reproduction
D) Response to external stimuli

15. Photoperiod affects

Pg-5, Easy

- A) reproduction
B) metabolism
C) growth
D) cellular organization
16. Living organisms respond to environmental stimuli which could be

Pg-5, Easy

- A) physical B) chemical
C) biological D) all of these
17. Match Column-I with Column-II and choose the correct option from the codes given below:

Pg- 3-5, Easy

	Column-I		Column-II
a	Growth	(1)	Production of progeny
b	Reproduction	(2)	Sum of all chemical reactions occurring in body
c	Metabolism	(3)	Sense and respond to environmental stimuli
d	Consciousness	(4)	Increase in mass and number

Codes

	a	b	c	d
A)	3	2	4	1
B)	4	1	2	3
C)	1	3	2	4
D)	2	4	3	1

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18. All living organisms are linked to each other because

Pg-5, Easy

- A) they show a common cellular organization.
B) they possess common genetic material of the same type.
C) they share common genetic material but to varying degrees.
D) all of these.
19. Assertion: Non-living objects also grow.
Reason: They grow by accumulation of material on the surface.

Pg-3, Medium

- A) Both assertion and reason are true and reason is the correct explanation of assertion.
B) Both assertion and reason are true but reason is not the correct explanation of assertion.
C) Assertion is true but reason is false.
D) Both assertion and reason are false.
20. Assertion: Reproduction is not a defining property of living organisms.
Reason: Mules do not reproduce.

Pg-4, Medium

- A) Both assertion and reason are true and reason is the correct explanation of assertion.
B) Both assertion and reason are true but reason is not the correct explanation of assertion.
C) Assertion is true but reason is false.
D) Both assertion and reason are false.
21. Assertion: Non-living objects also exhibit metabolism.
Reason: Isolated metabolic reactions occurring, invitro are living things.

Pg-5, Medium

- A) Both assertion and reason are true and reason is the correct explanation of assertion.
B) Both assertion and reason are true but reason is not the correct explanation of assertion.
C) Assertion is true but reason is false.
D) Both assertion and reason are false.

Diversity in the living World

22. The process of naming of living organisms is called

Pg-4, Easy

23. Identification of an organism means
 A) systematics B) taxonomy
 C) nomenclature D) none of these

Pg-4, Easy

- A) its correct description
 B) its correct classification
 C) its correct nomenclature
 D) all of these

24. ICBN stands for

Pg-4, Easy

- A) International Code for Biological Naming
 B) International Centre for Botanical Nomenclature
 C) Indian Code for Biological Nomenclature
 D) International Code for Botanical Nomenclature

25. Choose the correct statement about scientific names.

Pg-4, Easy

- A) They ensure that each organism has only one name.
 B) Description of any organism should enable the people to arrive at the same name.
 C) They ensure that such a name has not been used for any other organism.
 D) All of these.

26. The system of providing a name with two components is called

Pg-4, Easy

- A) trinomial nomenclature
 B) binomial nomenclature
 C) uninominal nomenclature
 D) none of these

27. The naming system, which is practised by biologists all over the world, was given by -

Pg-4, Easy

- A) Carolus Linnaeus
 B) Whittaker
 C) Haeckel
 D) Woese

28. Match the Column-I with Column-II and choose the correct option from the codes given below.

Pg-6, Difficult

	Column-I		Column-II
a	Biodiversity	(1)	Correct description of an organism
b	Nomenclature	(2)	The variety of living organisms

c	Identification	(3)	A system of providing a name with two components
d	Binomial nomenclature	(4)	Naming of living organisms

Codes -

	a	b	c	d
A)	2	4	1	3
B)	4	3	2	1
C)	1	2	4	3
D)	3	1	4	2

29. Select correctly written scientific name of mango which was first described by Carolus Linnaeus.

Pg-7, Easy

- A) *Mangifera indica* Car Linn.
 B) *Mangifera indica* Linn.
 C) *Mangifera indica*
 D) *Mangifera Indica*

30. In *Mangifera indica* Linn., the specific epithet is

Pg-7, Easy

- A) *Mangifera* B) *indica*
 C) Linn. D) Both A. and B.

31. Choose the incorrect statement about rules of nomenclature.

Pg-7, Easy

- A) Biological names are generally given in Latin.
 B) The first word in biological name represents the genus while the second component denotes the specific epithet.
 C) When hand written, both words of biological names are separately underlined.
 D) Both the words of biological name start with capital letter.

32. Which of the following is against the rules of ICBN?

Pg-7, Easy

- A) Handwritten scientific names should be underlined.
 B) Every species should have a generic name and a specific epithet.
 C) Scientific names are in latin and should be italicized.
 D) Generic and specific names should be written starting with small letters.

33. Biological names are generally written in

Pg-7, Easy

34. The process by which organisms are grouped into convenient categories based on some easily observable characters, is called
- A) Greek language B) Latin language
C) English language D) Hindi language

Pg-7, Easy

35. The scientific term used for the categories of organisms to study them is
- A) taxonomy B) identification
C) classification D) nomenclature

Pg-7, Easy

36. The process of classification is called
- A) taxa B) biological name
C) systematics D) none of these
37. The modern taxonomic studies are based on

Pg-8, Easy

- A) cell structures
B) external and internal structure
C) development process
D) all of these
38. Among the following process which one is not the basic to taxonomy?

Pg-8, Easy

- A) Identification
B) Classification
C) Collection of specimen
D) Nomenclature
39. Systematics refers to

Pg-8, Easy

- A) diversities of different kinds of organisms and their relationship.
B) identification and study of organ systems of organisms.
C) identification and preservation of organisms.
D) study of habitat of organisms and their classification.
40. Match Column-I with Column-II and choose the correct option from the codes given below.

Pg-8, Difficult

	Column-I		Column-II
a	Mammalia	(1)	Specific epithet
b	<i>Mangifera</i>	(2)	Branch of study
c	<i>indica</i>	(3)	Taxa
D	Systematics	(4)	Generic name

Codes -

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	a	b	c	d
A)	3	4	1	2
B)	2	1	3	4
C)	1	2	4	3
D)	4	3	2	1

41. Assertion: Binomial nomenclature given by Linnaeus is being practiced by biologists all over the world.

Reason: Each name of this system has two components, the generic name and the specific epithet.

Pg-8, Medium

- A) Both Assertion and Reason are true and Reason is correct explanation of Assertion.
B) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.
C) Assertion is true, but Reason is false.
D) Assertion is false, but Reason is true.

42. Assertion: The process of classification of organisms is taxonomy.

Reason: It is merely based on the external features of organisms.

Pg-7, Medium

- A) Both Assertion and Reason are true and Reason is correct explanation of Assertion.
B) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.
C) Assertion is true, but Reason is false.
D) Assertion is false, but Reason is true.

43. Assertion: Systematics is the study of organisms, their diversities but not the relationships among them.

Pg-7, Medium

Reason: Systematics is derived from a English word 'systema'.

- A) Both Assertion and Reason are true and Reason is correct explanation of Assertion.
B) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.
C) Assertion is true, but Reason is false.
D) Assertion is false, but Reason is true.

Taxonomic Categories

44. All the taxonomic categories together constitute the

Pg-8, Easy

- A) taxon B) family
C) kingdom D) hierarchy
45. The lowest taxonomic category is

Pg-8, Easy

46. The basic requirement for placing an organism in various categories is the knowledge of
- A) agenus B) species
C) class D) family

Pg-9, Easy

47. *Solanum* includes species
- A) characters of an individual
B) characters of group of organisms
C) binomial nomenclature
D) both A and B

Pg-9, Easy

48. The taxonomic category, genus represents
- A) nigrum B) melongena
C) tuberosum D) all of these

Pg-9, Easy

49. Match Column-I and Column-II and choose the correct option from the codes given below.
- A) an individual organism
B) a collection of organisms
C) a group of closely related species of organisms
D) none of these

Pg-9, Medium

	Column-I (Organism name)		Column-II (Scientific name)
a	Lion	(1)	<i>Panthera tigris</i>
b	Leopard	(2)	<i>Panthera leo</i>
c	Tiger	(3)	<i>Solanum nigrum</i>
d	Potato	(4)	<i>Panthera pardus</i>

Codes -

	a	b	c	d
A)	2	4	1	3
B)	4	2	1	3
C)	1	2	4	3
D)	3	4	2	1

50. 'Suffix' used for a unit of classification in plants to indicate 'family' taxonomic category is

Pg-9, Easy

51. The taxonomic category 'order' lies between
- A) -ales B) -onae
C) -aceae D) ae

Pg-10, Easy

- A) Genus and species
B) Genus and family
C) Family and class
D) Class and phylum

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52. Choose the incorrect statement from the following.

Pg-9, Easy

- A) Each genus may have one or more than one specific epithets representing different organisms.
B) Potato and brinjal are two different species but both belong to the genus *Solanum*.
C) 'Families' are characterized on the basis of merely reproductive features of plant species.
D) 'Order' is a higher taxonomic category and is identified on the basis of aggregates of characteristics.
53. Fishes, amphibians, reptiles and birds represent which taxonomic category?

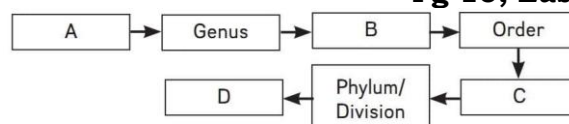
Pg-9, Easy

- A) Class B) Phylum
C) Order D) Kingdom
54. The 'phylum' taxon of animal classification is equivalent to which taxon of plant classification?

Pg-10, Easy

- A) Class B) Division
C) Order D) Family
55. Refer to the given figure showing hierarchical arrangement of taxonomic categories in the ascending order. In the figure some taxa are labeled as A, B, C and D. Which taxon will show maximum similar characters among its members? Identify it.

Pg-10, Easy



- (a) B (b) A
(c) C (d) D
- A) B B) A
C) C D) D
56. The kingdom that comprises all plants from various divisions is

Pg-10, Easy

- A) Plantae B) Animalia
C) Chordata D) Mammal
57. Match the Column-I with Column-II and choose the correct option from the codes given below:

Pg-9-10, Difficult

	Column-I		Column-II
a	Order	(1)	<i>Solanum</i>
b	Kingdom	(2)	Solanaceae

c	Family	(3)	Plantae
d	Genus	(4)	<i>tuberosum</i>
e	Species	(5)	Polymoniales

Codes

	a	b	c	d	e
A)	5	3	2	1	4
B)	4	2	5	3	1
C)	1	5	3	4	2
D)	3	4	1	5	2

58. In a taxonomic hierarchy, on moving from species to kingdom, the number of common characteristics **Pg-9-10, Medium**

- A) will increase
- B) remain same
- C) will decrease
- D) may increase or decrease

59. Choose the correct statements from the following:

Pg-9-10, Easy

- I. In case of plants, classes with a few similar characters are aligned to a higher category called phylum.
- II. Sub-categories have also been developed in the taxonomic hierarchy to facilitate more sound and scientific placement of various taxa.
- III. Class includes related orders.
- IV. Convolvulaceae family is included in polymoniales order on the basis of its floral characters.

Select the correct option.

- A) I and IV
- B) II and III
- C) II, III and IV
- D) All of these

60. Match Column-I with Column-II for housefly classification and select the correct option using the codes given below.

Pg-9-10, Medium

	Column-I		Column-II
a	Family	(1)	Diptera
b	Order	(2)	Arthropoda
c	Class	(3)	Muscidae
d	Phylum	(4)	Insecta

Codes

	a	b	c	d
A)	4	3	2	1
B)	4	2	1	3
C)	3	1	4	2
D)	3	2	4	1

61. Assertion: Genus may have one or more than one species epithets.

Reason: Genus comprises a group of related species. **Pg-9, Medium**

A) Both Assertion and Reason are true and Reason is correct explanation of Assertion.

B) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.

C) Assertion is true, but Reason is false.

D) Assertion is false, but Reason is true.

62. Assertion: Order is the assemblage of families which exhibit a few similar characters.

Reason: Plant family polymoniales is included in the order solanaceae based on the floral characters. **Pg-9, Medium**

A) Both Assertion and Reason are true and Reason is correct explanation of Assertion.

B) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.

C) Assertion is true, but Reason is false.

D) Assertion is false, but Reason is true.

63. Assertion: Wheat belongs to the family poaceae.

Reason: Wheat is a member of order poales. **Pg-9, Medium**

A) Both Assertion and Reason are true and Reason is correct explanation of Assertion.

B) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.

C) Assertion is true, but Reason is false.

D) Assertion is false, but Reason is true.

64. Which of the following options represents the correct classification for the given animal? **Pg-11, Difficult**



	Phylum	Class	Order	Family	Genus	Species
A)	Chordata	Vertebrata	Chiroptera	Felidae	Canis	Tigris

B)	Chord ata	Mamm alia	Carniv ora	Felida e	Panth era	Tigri s
C)	Verte brata	Mamm alia	Carniv ora	Felida e	Panth era	Tigri s
D)	Mam malia	Felidae	Carniv ora	Feliac eae	Panth era	Leo

Taxonomical Aids

65. Taxonomic studies of various organisms are useful in **Pg-11, Easy**

- A) agriculture B) forestry
C) industry D) all of these

66. Taxonomic studies require **Pg-11, Easy**

- A) correct classification
B) correct identification of organisms
C) intensive laboratory and field studies
D) all of these

67. A store house of collected plant specimens that are dried, pressed and preserved on sheets is a **Pg-11, Easy**

- A) herbarium B) botanical garden
C) zoological park D) catalogue

68. Among the following, which information is not provided by the herbarium sheet about a plant? **Pg-12, Easy**

- A) Collector's name
B) Place of collection
C) Economic importance of plant species
D) Botanical name of the plant

69. The specialized gardens having collections of living plants for reference are **Pg-12, Easy**

- A) Herbarium
B) Botanical gardens
C) Zoological parks
D) Museum

70. Match the Column-I and Column-II and choose the correct option from the codes given below: **Pg-12, Easy**

	Column-I		Column-II
a	Kew Botanical Garden	(1)	Dehradun
B	Indian Botanical Garden	(2)	Lucknow
c	National Botanical Research Institute	(3)	England
d	Forest Research Institute	(4)	Howrah

Codes -

	a	b	c	d
A)	3	4	2	1
B)	4	2	3	1
C)	1	3	4	2

D)	2	1	3	4
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71. National Botanical Research Institute is situated at **Pg-12, Easy**

- A) Howrah B) Lucknow
C) Dehradun D) Delhi

72. Choose the incorrect statement from the following: **Pg-12, Easy**

- A) Herbarium is a storehouse of collected plant specimens that are dried, pressed and preserved on sheets.
B) Herbaria serve as quick referral systems in taxonomical studies.
C) Botanical gardens have collection of preserved plant materials also.
D) Indian Botanical Garden is situated at Howrah, India.

73. Biological museums have collection of **Pg-12, Easy**

- A) preserved plant specimens
B) preserved animal specimens
C) live plants and animals
D) both A and B

74. Insects are preserved in insect boxes **Pg-12, Easy**

- A) in preservative solutions
B) after stuffing
C) after collecting, killing and pinning
D) as skeletons

75. Match Column-I with Column-II and choose the correct option from the codes given below: **Pg- 11-12, Difficult**

	Column-I (Organism)		Column-II (Method of preservation)
a	Birds	(1)	Skeleton
b	Human	(2)	Preservative solution
c	Insects	(3)	Stuffing
d	Small animals	(4)	In boxes after killing and pinning

Codes -

	a	b	c	d
A)	3	1	4	2
B)	4	3	2	1
C)	1	2	3	4
D)	2	4	1	3

76. The place where wild animals are kept in protected environment is **Pg-13, Easy**

- A) botanical garden B) zoological park
C) museum D) herbarium

77. Zoological parks are commonly known as
Pg-13, Easy

- A) museum B) garden
C) zoo D) none of these

78. Zoological parks and botanical gardens have a collection of
Pg- 12-13, Easy

- A) exotic living species only
B) endemic living species only
C) both A and B
D) only local plants and animals

79. Plants and animals are identified by key on the basis of their
Pg-13, Easy

- A) morphology
B) anatomy
C) similarities and dissimilarities
D) all of these

80. The keys are based on contrasting characters generally in a pair called
Pg-13, Easy

- A) couplet B) doublet
C) triplet D) all of these

81. The contrasting characteristics generally in a pair used for identification of animals in Taxonomic key are referred to as
Pg-13, Easy

- A) Lead B) Couplet
C) Doublet D) Alternate

82. Taxonomic key is used in the preparation of the
Pg-14, Easy

- A) monographs B) flora
C) both A and B D) none of these

83. Each statement of the key is called a
Pg-13, Easy

- A) couplet B) lead
C) monograph D) none of these

84. Match items given in Column-I with those in Column-II and select the correct option given below.

Pg- 12-14, Difficult

	Column-I		Column-II
a	Herbarium	(1)	It is a place having a collection of preserved plants and animals.
b	Key	(2)	A list that enumerates methodically all the species found in an area with brief description aiding identification.
c	Museum	(3)	It is a place where dried and pressed plant specimens mounted on sheets are kept.
d	Catalogue	(4)	A booklet containing a list of characters and their alternates which are helpful in identification of various taxa.

Codes –

	a	b	c	d
A)	1	4	3	2
B)	3	2	1	4
C)	2	4	3	1
D)	3	4	1	2

85. Choose the correct statements about taxonomic keys.
Pg- 13-14, Easy

- I. It is used for the identification of only plants.
II. Each statement in the key is called a lead.
III. No separate taxonomic keys are required for different taxonomic categories.

- A) II and III B) I and II
C) III and I D) II only

86. Among the following which one is not a taxonomic aid?
Pg-14, Easy

- A) Flora B) Manual
C) Taxon D) Key

87. Among the following which one contains information on any one taxon?
Pg-14, Easy

- A) Flora B) Monograph
C) Manual D) Catalogue

88. Assertion: Herbarium is a storehouse of collected plant specimens that are dried, pressed and preserved on sheets.
Reason: Herbaria serve as quick referral systems in taxonomical studies.

Pg-14, Medium

- A) Both Assertion and Reason are true and Reason is correct explanation of Assertion.
B) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.
C) Assertion is true, but Reason is false.
D) Assertion is false, but Reason is true.

89. Assertion: Museums have collection of live plants and animals.

Reason: In museums, as far as possible, conditions similar to their natural habitat are provided.
Pg-14, Medium

- A) Both Assertion and Reason are true and Reason is correct explanation of Assertion.
B) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.
C) Assertion is true, but Reason is false.
D) Assertion is false, but Reason is true.

90. Assertion: The taxonomical keys are based on the contrasting characters.

Reason: Each statement in the key is called a couplet.

Pg-14, Medium

A) Both Assertion and Reason are true and Reason is correct explanation of Assertion.

B) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.

C) Assertion is true, but Reason is false.

D) Assertion is false, but Reason is true.

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ANSWER KEY

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LIVING WORLD

Q	1	2	3	4	5	6	7	8	9	10
Ans	D	B	C	A	C	D	B	D	A	C
Q	11	12	13	14	15	16	17	18	19	20
Ans	B	D	C	D	A	D	B	C	A	A
Q	21	22	23	24	25	26	27	28	29	30
Ans	D	C	D	D	D	B	A	A	B	B
Q	31	32	33	34	35	36	37	38	39	40
Ans	D	D	B	C	A	B	D	B	A	A
Q	41	42	43	44	45	46	47	48	49	50
Ans	A	C	D	D	B	D	D	C	A	C
Q	51	52	53	54	55	56	57	58	59	60
Ans	C	C	B	B	B	A	A	C	B	A
Q	61	62	63	64	65	66	67	68	69	70
Ans	A	C	B	B	D	D	A	C	B	A
Q	71	72	73	74	75	76	77	78	79	80
Ans	A	C	D	C	C	B	C	C	C	A
Q	81	82	83	84	85	86	87	88	89	90
Ans	B	C	B	B	D	C	B	D	C	C

2

Biological Classification

TG: @Chalnaayaaar

1. Choose the correct with respect to earliest for scientific basis of classification
(Pg. 16, E)
 - A) It was proposed by Aristotle
 - B) Plants were divided as trees, shrubs & herbs on the basis of their morphological characters
 - C) Animals were classified into two groups that are those which have red blood and those that did not
 - D) All of these
2. Linnaeus system of classification did not deal with – (Pg. 16, E)
 - A) Eukaryotes and prokaryotes
 - B) Unicellular & multicellular
 - C) Photosynthetic & non – photosynthetic
 - D) All of these
3. How many kingdom according to five kingdom classification and Linnaeus system of classification is/are dedicated for prokaryotes exclusively (Pg. 16, E)
 - A) 1, 0
 - B) 1, 1
 - C) 2, 0
 - D) 3, 1
4. Moneran cell wall is composed by- (pg. 17, E)
 - A) Polysaccharide (Non cellulose) only
 - B) Polysaccharide (cellulose)
 - C) Polysaccharide (chitin)
 - D) Amino acid and Non cellulosic polysaccharide
5. Chemosynthetic mode of nutrition is found in – (Pg. 17, E)
 - A) Monera
 - B) Protist
 - C) Plantae
 - D) Fungi
6. R.H Whittaker classification is/are based upon – (Pg. 17, E)
 - A) Cell structure & body organisation
 - B) Mode of nutrition & reproduction
 - C) Phylogentic relationship
 - D) All of these
7. Five kingdom classification was proposed in – (Pg. 17, E)
 - A) 1969
 - B) 1996
 - C) 1699
 - D) None of these
8. Choose the correct about 3 – domain system (Pg. 17, E)
 - A) Two domain are dedicated for prokaryotic while one domain is dedicated for eukaryotic
 - B) One domain is dedicated for prokaryotic while two domains are for eukaryotic
 - C) It has seven kingdom which are categorised in 3 – domain
 - D) It has six kingdom of which one kingdom is in first and third domain while 5 – kingdom is second domain.
9. Earlier classification system included bacteria, BGA (blue green algae) fungi, mosses, ferns under 'Plants' on basis of- (Pg. 17, E)
 - A) Mode of nutrition
 - B) Body organisation & nuclear structure
 - C) Presence of cell wall
 - D) Nature of cell wall.
10. How many of following are prokaryotes: (Pg. 17, E)

Bacteria, Mosses, ferns, fungi, pteridophyta, blue green algae, gymnosperms angiosperm

 - A) 1
 - B) 2
 - C) 3
 - D) More than 4
11. Fungi has cell wall composed of- (Pg. 17, E)
 - A) Cellulose
 - B) Non – cellulosic + amino acid
 - C) Chitin
 - D) Absence of cell wall
12. How many kingdom from R.H. Whittaker system does have exclusive autotrophic mode of nutrition (Pg. 17, E)
 - A) Zero
 - B) One
 - C) Two
 - D) Three
13. Unicellular eukaryotic are categorised in- (Pg. 17, E)
 - A) Monera
 - B) Protista
 - C) Plantae
 - D) Animalia
14. How many of the following does belong to Protista (Pg. 18, E)

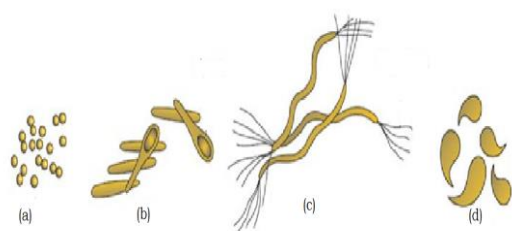
Amoeba, Spirogyra, Chlamydomonas, Chlorella, Paramecium

 - A) 5
 - B) 4
 - C) 3
 - D) 2
15. In five kingdom classification multicellularity began from – (Pg. 18, E)
 - A) Animalia
 - B) Plantae
 - C) Protista
 - D) Fungi

Paragraph – 2.1

Kingdom Monera

16. Identify shape of bacteria (Pg. 18, E)



- A) a = cocci, b = rod – shaped, c = bacilli, d = comma – shaped
 B) a = spherical coccus, B = Bacilli, c = spirilla, d = vibrio
 C) a = cocci, b = spirilla, c = vibrio, d = Bacilli
 D) a = vibrio, b = spirilla, c = bacilli, d = coccus
17. choose the correct statement: **(Pg. 18, E)**
 A) Bacteria are sole members of kingdom monera.
 B) Bacteria are abundant macro – organism
 C) Bacteria occurrence is limited to some area.
 D) Bacteria can't live in extreme habitat like desert
18. On the basis of shape; bacteria are grouped under_____ categories **(Pg. 18, E)**
 A) Four B) Five
 C) Three D) None of these
19. Choose the correctly stated statement **(Pg. 19, E)**
 A) Bacterial structure and behaviour are complex.
 B) Bacterial structure and behaviour are simple
 C) Bacterial structure is complex while behaviour is simple
 D) Bacterial structure is simple while behaviour is complex
20. Synthesis of own food from inorganic substrate is occur in – **(Pg. 19, E)**
 A) Autotrophic nutrition
 B) Chemosynthetic autotroph
 C) Photosynthetic autotroph
 D) All of these

Paragraph – 2.1.1 Archaeobacteria

21. Match the column – I & column – II **(Pg. 19, M)**

Column – I

- (i) Halophiles
 (ii) Thermoacidophiles
 (iii) Methanogens

Column – II

- (a) Marshy area
 (b) Salty area
 (c) Hot springs

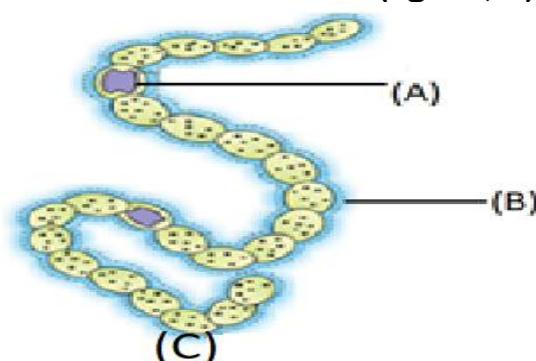
- A) i) – c, ii) – b, iii – a
 B) i) – c, ii) – a, iii – b
 C) i) – b, ii) – c, iii – a
 D) i) – b, ii) – a, iii – c
22. Archaeobacteria differ from other bacteria in having **–(Pg. 19, E)**
 A) Definite nuclear structure
 B) Cell wall structure
 C) Adaptability cytoplasmic concentration
 D) Some membranous cell organelles
23. Survival of archaeobacteria in extreme condition is achieved by **–(Pg. 19, E)**
 A) Cell wall structure
 B) Some membranous cell organelles
 C) Adaptability & cytoplasm
 D) All of these
24. Which of following statement is/are false **(Pg. 19, M)**
 A) Methanogens are present in alimentary canal of several ruminant animals like cow & buffaloes
 B) Methanogens are responsible for production of biogas from dung of ruminant animals
 C) Methanogens are present in gut of several non – ruminant like cow & buffaloes
 D) A & B

Paragraph – 2.1.2

Eubacteria

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25. Label A , B and identify organism (c) **(Pg. 19, E)**



- A) A = Heterocyst B = Mucilagenous sheath C = Nostoc, an archaebacteria
 B) A = Heterocyst B = Mucilagenous sheath C = Nostoc
 C) A = Mucilagenous, B = Heterocyst, C = Nostoc
 D) A = heterocyst, B = Mucilagenous sheath, C = Nostoc, a filamentous algae
26. Choose the correct about blue green algae **(Pg. 19, M)**
- Also known as cyanobacteria
 - Presence of chlorophyll a, b similar to green plants
 - Photosynthetic autotroph
 - May be unicellular, colonial or filamentous
 - Occur in aquatic as well as terrestrial
- A) i), iii), iv), v) B) i), ii), iii), iv), v)
 C) i), ii), iv), v) D) None of these
27. Nitrogen fixation is done by – **(Pg. 19, E)**
- A) Specialised vegetative cell i.e. Heterocyst of Nostoc & Anabaena
 B) Specialised reproductive cell i.e. Heterocyst of Nostac & Anabaena
 C) Specialised vegetative as well as reproductive cell i.e. Heterocyst of Nostoc & Anabaena
 D) None
28. Choose the wrong statement for chemosynthetic autotroph bacteria **(Pg. 19, E)**
- A) They oxidise various inorganic substrate such as nitrates, nitrites & ammonia and use the released energy for their ATP production
 B) They play great role in recycling nutrient like nitrogen phosphorous, iron & sulphur
 C) For their energy production they utilize solar energy
 D) They can prepare their food from inorganic substrate.
29. Citrus canker is – **(Pg. 20, E)**
- A) Plant disease cause by bacteria
 B) Human disease cause by bacteria
 C) Pet disease cause by bacteria
 D) None of these
30. Which of following is not economic importance of heterotrophic bacteria **(Pg. 19, E)**
- A) Making curd from milk
 B) Antibiotic production
 C) N₂ fixing in legumes root

- D) N₂ fixing in Anabaena
31. Choose the incorrect option about bacterial reproduction – **(Pg. 19, E)**
- A) Bacteria reproduce mainly by fission
 B) Under unfavourable condition they produce spores
 C) They also reproduce by sexual reproduction
 D) They show a sort of sexual reproduction
32. Here are few statement given below, Identify organism on basis of statement **(Pg. 20, M)**
- Lack cell wall
 - Smallest living cell known
 - Can survive without oxygen
 - Pathogenic in animal & plants.
- A) Nostoc
 B) Anabaena
 C) Mycoplasma
 D) Chlorella

Paragraph – 2.2

Kingdom Protista-Introduction

33. Protista includes - **(Pg. 20, E)**
- A) Unicellular prokaryotes
 B) Bacteriophages
 C) Unicellular eukaryotes
 D) B.G.A
34. Which of the following kingdoms has no well defined boundaries? **(Pg. 20, E)**
- A) Monera
 B) Protista
 C) Fungi
 D) Metaphyta and Metazoa
35. Members of Protista are primarily **(Pg. 20, E)**
- A) Parasites B) Terrestrial
 C) Aquatic D) Photosynthetic
36. Nearly all protists are – **(Pg. 20, E)**
- A) Aerobic
 B) Anaerobic
 C) Aerobic or anaerobic
 D) Photosynthetic
37. Nutritionally, protists are- **(Pg. 20, E)**
- A) Photoautotrophs
 B) Heterotrophs
 C) Saprotrophs
 D) Photoautotrophs, heterotrophs or autotrophs
38. Based upon the modes of nutrition, protists are grouped into – **(Pg. 20, E)**

- A) Plant-like protists (algae) and ingestive, animal-like protists (protozoa); and absorptive, fungus like protists
 B) Chrysophytes, Dinoflagellates and Euglenoids only
 C) Slime moulds and fungi only
 D) Flagellated protozoans and sporozoans only
39. Which of the following are placed under Protista-? **(Pg. 20, E)**
 A) Chrysophytes and Dinoflagellates
 B) Euglenoids
 C) Slime moulds and protozoans
 D) All
40. Locomotory structures in protists are – **(Pg. 20, E)**
 A) Flagella B) Cilia
 C) Pseudopodia D) All
41. Protista form a link with – **(Pg. 20, E)**
 A) Plants only
 B) Animals only
 C) Fungi only
 D) Plants, animals and fungi

Paragraph – 2.2.1

Chrysophytes

42. Chrysophytes include – **(Pg. 20, E)**
 A) Diatoms and desmids (golden algae)
 B) Euglenoids
 C) Dinoflagellates
 D) Slime moulds
43. Which of the following modes of reproduction can be found in at least some protists? **(Pg. 20, E)**
 A) Binary fission
 B) Sexual reproduction
 C) Spore formation
 D) All
44. Select the following statement that does not apply to diatoms – **(Pg. 20, E)**
 A) Diatom cell wall may be impregnated with silicon
 B) Cell wall is made up of 2 half-shells fit tightly together
 C) Diatom is a chrysophyte
 D) Diatom is multflagellate
45. Silica gel (Keiselghur)/Diatomite/Diatomaceous earth is obtained by – **(Pg. 20, E)**
 A) Diatoms B) Dinoflagellates
 C) Euglenoids D) Brown algae
46. The diatoms do not easily decay like most of the other algae because – **(Pg. 20, E)**
 A) They have highly siliceous wall

- B) They have water proof cells
 C) Their cell wall are mucilaginous
 D) Cell wall is virus-resistant
47. Diatomaceous earth is used for all except – **(Pg. 20, E)**
 A) Polishing
 B) Filtration of oils and syrups
 C) Sound and fire proof room
 D) Biogas
48. Chrysophytes are – **(Pg. 20, E)**
 A) Planktons B) Nektons
 C) Benthonic D) Active swimmers
49. Chief producers in ocean are – **(Pg. 20, E)**
 A) Dinoflagellates B) Diatoms
 C) Euglenoids D) Green algae
50. Photosynthetic protists are – **(Pg. 20, E)**
 A) Euglenoids, Diatoms and Dinoflagellates
 B) Euglenoids and slime moulds
 C) Diatoms and Zooflagellates
 D) Desmids +Ciliates

Paragraph – 2.2.2

Dinoflagellates

51. Dinoflagellates are mostly- **(Pg. 21, E)**
 A) Marine B) Fresh water
 C) terrestrial D) Saprophytes
52. Red tides in warm coastal water develop due to super abundance of- **(Pg. 21, E)**
 A) Dinoflagellates
 B) Euglenoid forms
 C) Diatoms and desmids
 D) *Chlamydomonas nivalis*
53. Red tide is caused by – **(Pg. 21, E)**
 A) Ceretium B) Noctiluca
 C) Gonyaulax D) All of these
54. Dinoflagellates have – **(Pg. 21, E)**
 A) A single flagellum in the transverse groove between the cell plates
 B) A single flagellum in the longitudinal groove between the cell plates
 C) Two flagella one lies longitudinally and the other transversely in a furrow between the wall plates
 D) No flagella
55. In which of the following the cell wall has stiff cellulose plate on the outer surface – **(Pg. 21, E)**
 A) Dinoflagellates B) Desmids
 C) Diatoms D) Euglenoids

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56. Which of the following releases toxins that may even kill other marine animals like fishes –
(Pg. 21, E)

- A) Gonyaulax B) Paramecium
C) Euglenoids D) Sporozoans

Paragraph – 2.2.3

Euglena

57. Euglenoids e.g. *Euglena* are found –
(Pg. 21, E)

- A) In fresh running water
B) In fresh stagnant water
C) In marine environment
D) In both fresh and marine water

58. Which of the following statements about *Euglena* is true?
(Pg. 21, E)

- A) Euglenoids are flagellates
B) *Euglena* placed in continuous darkness loses their photosynthetic activity and die
C) The pigments of *Euglena* are quite different from those of green plants
D) *Euglena* is a marine protist

59. Which of the following statement is true about *Euglena*?
(Pg. 21, E)

- A) They show flagellar locomotion
B) They have a rigid cell wall
C) They have no chloroplast
D) They are obligate autotroph

60. (Pg. 21, E)

- i. Instead of a cell wall they have a protein rich pellicle making their body flexible.
- ii. They have 2 flagella, a short and a long one.
- iii. They have mixotrophic nutrition
- iv. In light they are photosynthetic, but act as heterotroph (predating other smaller organism) when they are in dark.
- v. They are connecting link between plants and animals.

The above statements are assigned to –

- A) Dinoflagellates
B) Slime mould
C) Desmids and Diatoms
D) *Euglena*

Paragraph – 2.2.4

Slime Moulds

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61. Slime moulds –
(Pg. 21, E)

- A) Are parasite

- B) Do not produce fruiting bodies
C) Do not produce spores
D) Saprophytic protists

62. The slimy mass of protoplasm with nuclei forms the body of slime moulds is called –
(Pg. 21, E)

- A) Plasmodium
B) Myxamoeba
C) Sporocytes
D) Periplasmodium

63. Which of the following is correct about the slime mould?
(Pg. 21, E)

- I. Its thalloid body, plasmodium, has pseudopodia for locomotion and engulfing organic matter
- II During unfavourable conditions plasmodium differentiates and produces fruiting bodies, sporangium
- III. Spores possess no true cell wall.
- IV. They are dispersed by air current.
- V. Being extremely resistant, spores survive for many years
- VI. Plasmodium can grow upto several feet.

- A) I, II, IV, V, VI B) I, II, III
C) I, II, III, VI D) II, III, VI

Paragraph – 2.2.5

Protozoans

64. Protozoans are not included in kingdom Animalia because –
(Pg. 22, E)

- A) Mostly asymmetrical
B) Unicellular eukaryotes
C) Heterotrophic nature
D) Multicellular prokaryotes

65. All protozoans are –
(Pg. 22, E)

- A) Saprophytes only
B) Parasites only
C) Predators only
D) Heterotrophs (parasites or predator) only

66. Which of the following is considered to be primitive relatives of animals -?
(Pg. 22, E)

- A) Dinoflagellates B) Slime moulds
C) Protozoa D) Protochordata

67. How many major groups protozoan have?
(Pg. 22, E)

- A) 3 B) 4
C) 2 D) 8

68. Which of the following are protozoans?
(Pg. 22, E)

- A) Diatoms, flagellates, ciliates
B) Desmids, flagellates, ciliates

- C) Amoeboid, flagellates, ciliates, sporozoans
D) Amoeba, Paramecium, dinoflagellates, Plasmodium
69. Which of the following statements is wrong about the amoeboid protozoans? **(Pg. 22, M)**
A) They live in freshwater, sea water or moist soil
B) Amoeba has pseudopodia for locomotion and capture prey
C) Entamoeba show holozoic nutrition
D) Marine forms are shelled with silica
70. Flagellated protozoans are – **(Pg. 22, E)**
A) Free living
B) Parasites
C) Either free living or parasites
D) Pseudopodia
71. Which one is correct about *Trypanosoma*?
A) They are flagellated protozoan
B) They are parasite
C) They cause sleeping sickness
D) All
72. *Paramecium* – **(Pg. 22, E)**
A) Is a ciliated protozoan
B) Shows water current movement by cilia which helps the food to be steered into gullet
C) Has a cavity (gullet) that opens to the outside of the cell surface
D) All
73. Plasmodium (malarial parasite) **(Pg. 22, E)**
A) Is a ciliated protozoan
B) Shows water current movement by cilia which helps the food to be steered into gullet
C) Causes malaria
D) All
74. Which of the following always produce an infectious spore like stage in their life cycles?
A) Ciliated protozoans
B) Flagellated protozoans
C) Sporozoans
D) None
75. Mode of nutrition in fungi is not – **(Pg. 22, E)**
A) Parasitic
B) Saprophytic
C) Autotrophic
D) Heterotrophic
76. All of the following are fungi except – **(Pg. 22, E)**
A) Yeast
B) Penicillium
C) Plasmodium
D) Puccinia
77. Which of the following is odd? **(Pg. 22, E)**
A) Toad stool
B) Puccinia
C) Alternaria
D) Mushroom
78. Cell walls of all fungi consist of the polysaccharide – **(Pg. 22, E)**
A) Chitin
B) Cellulose
C) Silica
D) Pectin
79. The body of multicellular fungus is called a – **(Pg. 22, E)**
A) Monokaryon
B) Hyphae
C) Rhizoids
D) Dikaryon
80. The cells of the body of a multicellular fungus are organised into rapidly growing individual filaments called – **(Pg. 22, E)**
A) Mycelium
B) Rhizoids
C) Hyphae
D) Dikaryon
81. Which one is unicellular fungus? **(Pg. 22, E)**
A) Puccinia
B) Toad stool
C) Penicillium
D) Yeast
82. Coenocytic hypha is – **(Pg. 22, E)**
A) Uninucleate hypha
B) Multicellular hypha
C) Multinucleate hypha without septae
D) Hypha in coelom
83. Many fungi are in ____ association with photosynthetic organisms to form mycorrhizae or lichens – **(Pg. 22, E)**
A) Parasitic
B) Symbiotic
C) Photosynthetic
D) Saprobic
84. Fungi can be parasites on – **(Pg. 22, E)**
A) Animals
B) Human being
C) Plants
D) All
85. Fungi prefer to grow in – **(Pg. 22, E)**
A) Cold and dry places
B) Hot and dry places
C) Sea water
D) Warm and humid places
86. Fungi occur – **(Pg. 22, E)**
A) In air and soil
B) In water
C) On plants and animals
D) All
87. Fungi show a great diversity in – **(Pg. 22, E)**
A) Morphology
B) Habitat
C) Both a and b

Paragraph – 2.3

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Kingdom Fungi - Introduction

88. Reproduction in fungi can take place by all of the following vegetative methods except-
(Pg. 22, E)

A) Gemmae B) Fragmentation
C) Fission D) Budding

89. Fungi show asexual reproduction by all of the following spores except- (Pg. 23, E)

A) Conidia B) Oospore
C) Sporangiospore D) Zoospores

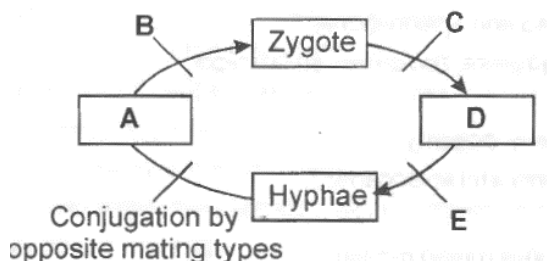
90. Sexual reproduction in fungi is by all of the following except- (Pg. 23, E)

A) Oospores B) Ascospores
C) Zoospores D) Basidiospores

91. Select the correct statements below that correctly apply to the Kingdom Fungi-
(Pg. 23, E)

A) Some fungi form beneficial interrelationships with plants
B) Certain fungi are natural sources of antibiotics
C) The fungal life cycle typically includes a spore stage
D) All

92.



93. The above diagram shows a generalized life cycle of a fungus. The appropriate terms for A to E are-
(Pg. 23, H)

A) Spores are absent in air
B) Spores are present in the bread
C) Spores are in the air
D) The bread gets decomposed

94. Which of the following is the correct sequence of 3 steps in the sexual cycle of fungi-
(Pg. 23, E)

A) Mitosis ----. Meiosis ----. Fertilization
B) Plasmogamy----. Karyogamy----. Meiosis
C) Meiosis ----. Plasmogamy ----. Karyogamy
D) Karyogamy----. Plasmogamy----. Meiosis

95. Fungi are classified on the basis of -

(Pg. 23, E)

A) Morphology of mycelium
B) Development of fruiting bodies
C) Mode of spore formation
D) All

96. Dikaryophase I Dikaryon formation is a specific characteristic of- (Pg. 23, E)

A) All fungi
B) Phycomycetes and ascomycetes
C) Only basidiomycetes
D) Ascomycetes and basidiomycetes

97. Coenocytic, multinucleate and branched mycelial habit is found in-

(Pg. 23, E)

A) Basidiomycetes
B) Phycomycetes
C) Ascomycetes
D) Deuteromycetes

98.

	Column I		Column II
A.	Phycomycetes	I.	Sac fungi
B.	Ascomycetes	II.	Algal fungi
C.	Basidiomycetes	III.	Fungi imperfecti
D.	Deuteromycetes	IV.	Club fungi

The correct matching is - (Pg. 23, H)

A) A-II, B-I, C-IV, D-III
B) A-II, B-IV, C-I, D-III
C) A-IV, B-I, C-II, D-III
D) A-IV, B-III, C-II, D-I

Paragraph - 2.3.1

Phycomycetes

99. Members of phycomycetes are found-
(Pg. 23, E)

I. In aquatic habitat
II. On decaying wood
III. On moist and damp places
IV. As obligate parasite on plants
A) None of the above
B) I and IV
C) II and III
D) All of the above

100. In phycomycetes asexual reproduction occurs by-
(Pg. 23, E)

A) Zoospores (motile)
B) Aplanospores (non-motile)
C) Both
D) Aplanogamete

101. Which of the following spores are produced endogenously?
(Pg. 23, E)

A) Zoospores and Conidia
B) Conidia and aplanospores
C) Aplanospores and zoospores
D) Aplanospore, zoospores and conidia

102. In Phycomycetes sexual reproduction occurs by **(Pg. 23, E)**

- A) Isogamy and anisogamy
- B) Isogamy, oogamy
- C) Isogamy, anisogamy and oogamy
- D) Oogamy and anisogamy

103. All the following belong to phycomycetes except – **(Pg. 23, E)**

- A) Penicillium
- B) Rhizopus (bread mould)
- C) Mucor
- D) Albugo

104. Which of the following is parasite on mustard? **(Pg. 23, E)**

- A) Albugo
- B) Puccinia
- C) Yeast
- D) Ustilago

Paragraph – 2.3.2

Ascomycetes

105. Which of the following is false about ascomycetes? **(Pg. 23, E)**

- A) Mode of nutrition saprophytic, decomposer, coprophilous (growing on dung) and parasitic
- B) Includes unicellular (e.g. yeast) and multicellular forms
- C) Mycelium is coenocytic
- D) Aspergillus, Claviceps, Neurospora are important members of Ascomycetes

106.

- I. It includes unicellular as well as multicellular fungi
- II. In multicellular forms hyphae are branched and septate
- III. Conidiophore produces conidia (spores) exogenously in chain
- IV. Sexual spores are ascospores produced endogenously in Ascus
- V. Fruiting body is called ascocarp

Which of the above characters are show by –? **(Pg. 23, E)**

- A) Phycomycetes
- B) Sac fungi
- C) Club fungi
- D) Fungi imperfecti

107. Which of the following are edible ascomycete's delicacies? **(Pg. 24, E)**

- A) Morels+ Mushroom
- B) Truffles+ Toadstool
- C) Morels+ Truffles
- D) Puffball+ Mushroom

108. Which of the following is used extensively in biochemical and genetical work? **(Pg. 24, E)**

- A) Agaricus
- B) Alternaria
- C) Neurospora
- D) Mucor

109. Which of the following ascomycetes is the source of antibiotic? **(Pg. 24, E)**

- A) Neurospora
- B) Penicillium
- C) Claviceps
- D) None

Paragraph – 2.3.3

Basidiomycetes

110. Basidiomycetes include - **(Pg. 24, E)**

- A) Mushroom, Toadstool, Puffball and bracket fungi
- B) Smut fungi and rust fungi
- C) Both a and b
- D) Bread mould, sac fungi and algal fungi

111. Which of the following are common parasite basidiomycetes **(Pg. 24, E)**

- A) Puccinia (rust) and Ustilago (smut)
- B) Sac fungi
- C) Puffballs
- D) Agaricus (mushroom)

112. Where does meiosis occur in mushroom?

- A) Basidiospore
- B) Basidium
- C) Basidiocarp
- D) Ascus mother cell

113.

- I. Mycelium is branched and septate
- II. No asexual spores are generally formed
- III. Vegetative reproduction by fragmentation is common
- IV. Sex organs are absent but sexual reproduction takes place by somatogamy
- V. Karyogamy and meiosis occur in basidium to form haploid exogenous 4 basidiospores
- VI. Basidia are arranged in basidiocarp.

The above characters are assigned to –

- A) Sac fungi **(Pg. 24, E)**
- B) Club fungi
- C) Algal fungi
- D) Fungi imperfect

114. Plasmogamy in fungi is the fusion of- **(Pg. 24, E)**

- A) Two haploid gamete cells and their nuclei at once
- B) Two haploid nuclei
- C) Two haploid gamete cells
- D) Two diploid vegetative cells with nuclei

115. Karyogamy is - **(Pg. 24, E)**

- A) Fusion of two protoplasts

- B) Fusion of two nuclei
C) Fusion of two plasma membranes
D) All of these

Paragraph – 2.3.4

Deuteromycetes

116. Which of the following is false about deuteromycetes? **(Pg. 24, E)**
A) They reproduce only by asexual spores (conidia)
B) Mycelium is branched and septate
C) They have only parasitic forms
D) They have no sexual stage (perfect stage)
117. Which of the following is correct about class Deuteromycetes? **(Pg. 24, E)**
A) Some members are saprophytes or parasites
B) A large number of members are decomposers of litter and help in mineral cycling
C) Alternaria, Colletotrichum and Trichoderma are deuteromycetes
D) All
118. Sexual reproduction is found in all except – **(Pg. 24, E)**
A) Deuteromycetes
B) Ascomycetes
C) Phycomycetes
D) Basidiomycetes
119. If sexual stage is discovered in a member of deuteromycetes, it is moved to- **(Pg. 24, E)**
A) Phycomycetes
B) Basidiomycetes
C) Ascomycetes
D) Both band c

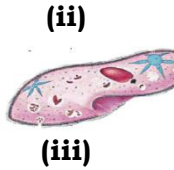
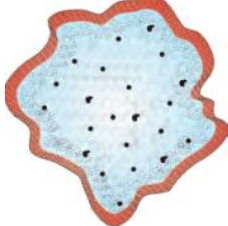
Diagram Based Questions

120. Identify the diagram. **(Pg. 23, E)**



(A)	(i) Mucor	(ii) Aspergillus	(iii) Agaricus
(B)	(i) Aspergillus	(ii) Mucor	(iii) Agaricus
(C)	(i) Agaricus	(ii) Aspergillus	(iii) Mucor
(D)	(i) Agaricus	(ii) Mucor	(iii) Aspergillus

121. Identify the diagram. **(Pg. 21, E)**

				
A)	(i) Dinoflagellates	(ii) Euglena		
B)	(i) Dinoflagellates	(ii) Paramecium		
C)	(i) Euglena	(ii) Dinoflagellates		
D)	(i) Slime mould	(ii) Paramecium		

122. Kingdom plantae includes- **(Pg. 25, E)**
i. All eukaryotic chlorophyllous organisms
ii. Some prokaryotic chlorophyllous organisms
iii. Few eukaryotic partial heterotrophic plant
iv. Few prokaryotic partial heterotrophic plant
A) i, iii
B) ii, iv
C) i, ii, iii
D) i, iii, iv
123. Plantae does not includes how many of following- **(Pg. 25, E)**
Algae, Fungi, Bryophyte, Bladderwort, Pteridophyta, Gymnosperm, Angiosperm
A) Zero
B) One
C) Two
D) Three
124. Life cycle of angiosperms plant have- **(Pg. 25, E)**
A) Diploid sporophyte & diploid gametophyte

- B) Diploid gametophyte & haploid sporophyte
 C) Diploid sporophyte & haploid gametophyte
 D) Haploid sporophyte & haploid gametophyte
125. How many of following enlisted are correct about plantae- **(Pg. 25, E)**
 I. Cells have eukaryotic structure
 II. Prominent chloroplast
 III. Cellulosic cell wall
 IV. Life cycle has three distinct phase
 V. Show alteration of generation
 A) One B) Two
 C) Three D) Four

Paragraph – 2.5

Kingdom Animalia

126. Kingdom Animalia are characterized by- **(Pg. 25, E)**
 A) Heterotrophic eukaryotic unicellular & multicellular organism that lack cell wall
 B) Holozoic, digest food in an internal cavity and store food as complex carbohydrates or fat
 C) Higher as well as lower forms show elaborate sensory mechanisms
 D) All of the above
127. How many of following term is correct about Animalia- Heterotroph, eukaryotic, prokaryotic, unicellular, multicellular, store food as glycogen, presence of elaborated neuromotor mechanism without any exception, embryological development **(Pg. 25, E)**
 A) 6 B) More than 6
 C) 5 D) Less than 3

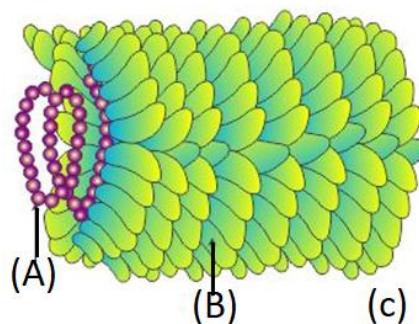
Paragraph – 2.6

Viruses, viroids, prions, & lichens

128. In R.H Whittaker system, viroids, prions & lichens are grouped into- **(Pg. 25, E)**
 A) Monera B) Protista
 C) Protista and fungi D) None of these
129. Viruses did not place in classification due to-
 A) Lack in study of viruses
 B) They are not considered truly 'living'
 C) Lack of genetic material
 D) All of these

130. Viruses are not- **(Pg. 25, E)**
 A) Non-cellular organism
 B) Inert crystalline structure outside the living cell
 C) Active crystalline structure outside the living cell
 D) Once they infect a cell they take over the machinery of host cell to replicate themselves, killing the host
131. The name viruses-
 A) which means venom was given by Dmitri Ivanowsky
 B) which means venom was given by M.W. Beijerinck
 C) which means venom was given by Stanley
 D) which means venom was given by Pasteur

132.



Identify a, b & organism(c)

- A) a=DNA, b=capsid, c=TMV
 B) a=RNA, b=capsid, c=TMV
 C) a=capsid, b=DNA, c=bacteriophage
 D) a=capsid, b=RNA, c=bacteriophage
133. choose the correct statement –
 A) genetic material of mosaic disease of tobacco causing organism is DNA
 B) Viruses were found to be smaller than bacteria but they can pass through bacteria proof filters
 C) M.W Beijerinck (1898) demonstrated that the extract of infected plant of tobacco could cause infection in healthy plants
 D) Viruses were found to be smaller than bacteria and they can pass through bacteria proof filters.
134. Contagium vivum fluidum was stated by – **(Pg. 26, E)**
 A) Dmitri Iwanowsky (1898)
 B) M.W. Beijerinck (1892)
 C) W.M. Stanley (1935)
 D) None of these

135. Who showed that viruses could be crystallized & crystals outside host-
 A) W.M. Stanley(1935)
 B) M.W.Beijerinck (1898)
 C) Dmitri Ivanowsky (1892)
 D) M.W. Stanley (1898)

136. Which of following is major constituent in crystalline virus structure – **(Pg. 26, E)**
 A) Carbohydrate B) Protein
 C) Fat D) Nucleic acid

137. Viruses are **(Pg. 26, E)**
 A) Autotroph
 B) Obligate parasite
 C) Saprotroph
 D) Holozoic

138. Genetic material of viruses are/is – **(Pg. 26, E)**
 A) DNA
 B) RNA
 C) DNA and RNA both in an individual virus
 D) DNA or RNA in an individual virus

139. The infection material of viruses is/are **(Pg. 26, E)**
 A) Protein coat
 B) Genetic material
 C) Nucleoprotein
 D) All of these

140. In general viruses that infect plants have- **(Pg. 26, E)**
 A) ds RNA B) ss RNA
 C) ds DNA D) ss DNA

141. Animal infection viruses are not generally – **(Pg. 26, E)**
 A) ss RNA B) ds RNA
 C) ds DNA D) ss DNA

142. genetic material of bacteriophage is – **(Pg. 26, E)**
 A) ds DNA B) ss RNA
 C) ds RNA D) ss DNA

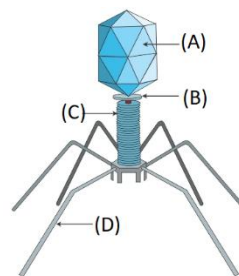
143. bacteriophage is – **(Pg. 26, E)**
 A) bacteria that infect virus
 B) virus that infect bacteria
 C) bacteria that infect cellular organism
 D) virus that infect other than bacteria

144. The protein coat called ____ (A) ____ made of small subunit called ____ (B) ____ that protect ____ (C) ____ of virus **(Pg. 26, E)**
 A) A = capsomere, B = capsid, C = genetic material

- B) A = capsid, B = capsomere, C = genetic material
 C) A = capsid, B = capsomere, C = enzyme and mineral
 D) A = capsomere, B = capsid, C = enzyme and mineral

145. Head of bacteriophage is – **(Pg. 26, E)**
 A) Helical B) Polyhedral
 C) Icosahedral D) A & B

146.



- (Pg. 26, E)**
 A) A = head B = sheath, C = tail fibers, D = Collar
 B) A = head B = collar C = sheath, D = tail fibers
 C) A = collar B = head C = tail fibers D = sheath
 D) A = tail fibers B = sheath C = head D = collar

147. Viroid was discovered by – **(Pg. 27, E)**
 A) T.O. Diener (1971)
 B) W.M. Stanley (1935)
 C) T.O diener (1935)
 D) W.M. Stanley (1971)

148. Choose the correct on basis of size : **(Pg. 27, E)**
 A) Bacteria<virus<viroid
 B) Viroid<virus<bacteria
 C) Viroid>bacteria<virus
 D) Bacteria>viroid>virus

149. Given below are statement (i-vi) choose correct set **(Pg. 27, E)**
 i. Viroid=virus-capsid
 ii. Potato spindle disease cause by prions
 iii. Viroid have free DNA
 iv. Viroid have free RNA
 v. DNA of viroid was of low molecular weight
 vi. RNA of viroid was of light molecular weight
 A) i,iv only B) i, vi, iii
 C) i, iv, vi D) i, iii, v

150. Prion cause- **(Pg. 27, E)**
 A) BSE in cattle and CJD in human
 B) BSE in human and CJD in cattle
 C) BSE and CJD cause in cattle

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- D) BSE and CJD cause in human
151. Prions are- **(Pg. 27, E)**
 A) Smaller than virus
 B) Larger than virus
 C) Smaller than viroid
 D) Similar in size to viruses
152. Choose the incorrect about BSE **(Pg. 27, E)**
 A) It expanded as Bovine spongiform encephalopathy
 B) Caused by prion
 C) Its analogous variant is CJD
 D) Its homologous variant is CJD
153. Lichen are – **(Pg. 27, E)**
 A) Saprotroph only
 B) Symbiotic
 C) Parasitic only
 D) A & C
154. Lichen are mutual association of- **(Pg. 27, E)**
 A) Mycobiont (fungal) and phycobiont (algae)
- B) Gymnosperm root & fungi
 C) Algae & gymnosperm root
 D) All of these
155. Mycobiont and phycobiont are ____ & ____ respectively **(Pg. 27, E)**
 A) Autotrophic & heterotrophic
 B) Autotrophic & autotrophic
 C) Heterotrophic & autotrophic
 D) Heterotrophic & heterotrophic
156. The function of fungal part in lichen is/are – **(Pg. 27, E)**
 A) Water absorption
 B) Mineral absorption
 C) Provide shelter
 D) All of these
157. Lichen cannot grow in – **(Pg. 27, E)**
 A) Polluted area
 B) Area where there is no pollution
 C) Association between fungi and algae in unpolluted region
 D) All of these

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Answer Key**BIOLOGICAL CLASSIFICATION**

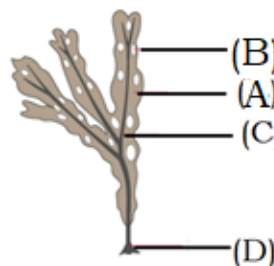
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Ans	C	D	B	A	D	B	A	A	D	D
Q	21	22	23	24	25	26	27	28	29	30
Ans	C	C	A	D	D	A	A	C	B	D
Q	31	32	33	34	35	36	37	38	39	40
Ans	C	C	C	B	C	A	D	A	D	D
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Ans	D	A	A	B	D	C	B	C	D	A
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Q	81	82	83	84	85	86	87	88	89	90
Ans	D	C	B	D	D	D	C	A	B	C
Q	91	92	93	94	95	96	97	98	99	100
Ans	D	B	C	D	D	B	A	A	D	C
Q	101	102	103	104	105	106	107	108	109	110
Ans	C	C	A	A	C	B	C	C	B	C
Q	111	112	113	114	115	116	117	118	119	120
Ans	A	B	B	C	D	D	A	D	C	B
Q	121	122	123	124	125	126	127	128	129	130
Ans	A	C	C	C	C	D	C	A	C	C
Q	131	132	133	134	135	136	137	138	139	140
Ans	A	B	D	B	A	B	B	D	B	B
Q	141	142	143	144	145	146	147	148	149	150
Ans	D	A	B	B	D	B	A	B	C	A
Q	151	152	153	154	155	156	157			
Ans	C	D	D	A	C	D	A			

3

Plant Kingdom

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- Artificial classification system is based on – **(Pg29, E)**
 - Mainly on vegetative character and on the androecium structure
 - Ultrastructure, anatomical, embryological characters
 - External and internal features
 - Chromosome number.
- George Bentham and Joseph Dalton Hooker gave **(Pg30, E)**
 - Artificial classification system
 - Phylogenetic classification
 - Natural classification system
 - A and B respectively
- Choose incorrectly match option **(Pg30, E)**
 - Numerical taxonomy – Number and code are assigned to all the character and the data are then processed
 - Cytotaxonomy – Based on cytological information
 - Chemotaxonomy – Based on phytochemistry
 - Natural classification – Linnaeus
- Phylogenetic classification – **(Pg30, E)**
 - Based on evolutionary relationship
 - This assume that organism belonging to some taxa haven't a common ancestor
 - Gave equal weightage to vegetative & sexual character but not on evolutionary relationship
 - A and B both
- C) Kelp D) *Spirogyra*
- Zoospore is – **(Pg30, E)**
 - Sexual spore in algae
 - Asexual spore in algae
 - Develop in zoosporangium in number of four
 - Non flagellated spore
- Fusion between one large static female gametes and smaller motile male gamete is termed as ___ as seen is ___ **(Pg30, E)**
 - Isogamous, *Spirogyra*
 - Oogamous, *Volvox*
 - Anisogamous, *Fucus*
 - Oogamous, *Ulothrix*
- Eudorina* show – **(Pg30, E)**
 - Fusion of flagellate similar size gamete
 - Fusion of non – flagellate similar size gamete
 - Oogamous
 - Anisogamous
- How many of following is an example of isogamous *Ulothrix*, *Spirogyra*, *Volvox*, *fucus*, *Polysiphonia* **(Pg31, M)**
 - 1
 - 2
 - 3
 - 4
- Identify organism and label A, B, C, D **(Pg31, M)**

**Paragraph – 3.1****Algae**

- Blue – green algae placed in which kingdom according to R.H. Whittaker **(Pg30, E)**
 - Monera
 - Protista
 - Fungi
 - Plantae
- Choose the correct statement algae: **(Pg30, E)**
 - Algae are chlorophyllous, autotrophic member of Plantae
 - Some algae occur in association with fungi and on sloth bear
 - The plant body of algae lack root, stem, leaf
 - All of these
- Colonial form alga is – **(Pg30, E)**
 - Ulothrix*
 - Volvox*
- A) Laminaria A = leaf B = air bladder C = stripe D = holdfast
- B) *Fucus* A = frond B = air bladder C = stripe D = Hold fast
- C) *Fucus* A = air bladder B = frond, C = midrib D = holdfast
- D) *Laminaria* A = leaf C = midrib D = petiole
- Algae are useful to man in – **(Pg32, M)**
 - Fixation of almost half of total CO₂ on earth
 - Primary producer
 - Increase level of oxygen
 - All of these
- Hydrocolloids are produced by – **(Pg32, M)**
 - Brown algae (algin), carrageen (red algae), Agar (brown algae)

- B) Brown algae (algin), Red algae (carrageen)
 C) Brown algae (algin, agar), Red algae (carrageen)
 D) None of these
15. Choose correct statement – **(Pg32, E)**
 A) *Chlorella*, a multicellular alga rich in protein
 B) *Chlorella* & *Spirulina* are astronaut food because of their high carbohydrate, vitamin mineral but less protein
 C) The product obtained by *Gracilaria* are used to grow microbes
 D) *Laminaria*, *Sargassum* a member of Rhodophyceae are among 70 species of marine algae used as food

Paragraph – 3.1.1

Chlorophyceae

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16. Chlorophyceae are commonly called as- **(Pg32, E)**
 A) Green algae
 B) Blue – green algae
 C) Brown algae
 D) Red algae
17. Major pigment of *Chlamydomonas* – **(Pg32, E)**
 A) Chlorophyll a, b
 B) Chlorophyll a, c
 C) Chlorophyll a, d
 D) Fucoxanthin, phycoerythrin
18. Choose incorrect statement about green alga- **(Pg32, E)**
 A) The chlorophyll localised in definite chloroplast
 B) *Spirogyra* have spiral chloroplast
 C) Most member have one or more storage bodies i.e. pyrenoid localised in chloroplast
 D) The cell wall is made of outer layer that is of cellulose and inner layer of pectose
19. Reproduction in green algae is/are – **(Pg32, E)**
 A) Isogamous B) Anisogamous
 C) Oogamous D) All of these
20. *Chara* is **(Pg32, E)**
 A) Common stonewort
 B) Marine green algae
 C) Unisexual algae
 D) None of these
21. Flagellation in green algae is – **(Pg32, E)**
 A) 2 – 8, equal, apical
 B) 2, unequal, lateral
 C) 2 – 8, unequal, lateral
 D) Absent

Paragraph – 3.1.2

Phaeophyceae

22. Phaeophyceae is commonly named as – **(Pg32, E)**
 A) Green alga B) Brown alga
 C) Red algae D) None
23. Choose the correct statement from following – **(Pg32, M)**
 A) *Ectocarpus* is filamentous forms while kelps is profusely branched from
 B) Kelps may reach a height of average 100cm
 C) The plant body of brown algae is attached to substratum by stripe
 D) Leaf – like photosynthetic organ of brown algae is stripe
24. Major pigment found in *Fucus* is/are **(Pg32, E)**
 A) Chlorophyll a, c
 B) Chlorophyll a, d
 C) Chlorophyll a, b
 D) Fucoxanthin and phycoerythrin
25. The color of brown algae depend upon **(Pg32, E)**
 A) Amount of xanthophyll
 B) Fucoxanthin present in them
 C) Phycoerythrin and fucoxanthin ratio
 D) A & B both
26. Choose the correct about cell of brown algae – **(Pg32, E)**
 A) Cellulosic cell wall cover outside by algin
 B) Cellulosic cell wall with pectin and polysulphate esters
 C) They have two flagella, equal sized and laterally inserted
 D) A and C both
27. *Dictyota* is member of – **(Pg33, E)**
 A) Same member of *Ectocarpus*, *Gelidium*, *fucus*
 B) Same member those having *Caminaria* or mannitol as stored food
 C) Same member of *Laminaria*, *Porphyra*, *fucus*
 D) Same member those having phycoerythrin as accessory pigment
28. Gametes of *Sargassum* are- **(Pg 33, E)**
 A) Pyriform B) Cup – shaped
 C) Ribbon – shaped D) Discoid

Paragraph – 3.1.3

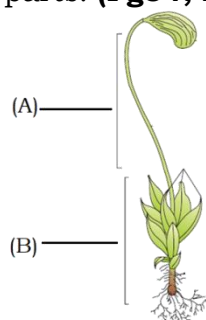
Rhodophyceae

29. Rhodophyceae is called red algae because of – **(Pg33, E)**
 A) Predominance of red pigment
 B) Abundance of d – phycoerythrin
 C) A & B both
 D) None of these
30. The stored food in *Polysiphonia* is ____A____ which is very similar to ____B____ and ____C____ in structure **(Pg33, E)**
 A) A = floridean starch B = amylopectin C = glycogen
 B) A = floridean starch B = chitin C = glycogen
 C) A = mannitol B = floridean starch C = amylopectin
 D) None of these
31. Member of Rhodophyceae reproduce by– **(Pg33, E)**
 A) Non – motile asexual spore and motile sexual gametes
 B) motile asexual spore and motile sexual gametes
 C) Non – motile asexual spore and non – motile sexual gametes
 D) motile asexual spore and non – motile sexual gametes
32. *Porphyra* show – **(Pg34, E)**
 A) Isogamous B) Anisogamous
 C) Oogamous D) All of these

Paragraph – 3.2

Bryophyta

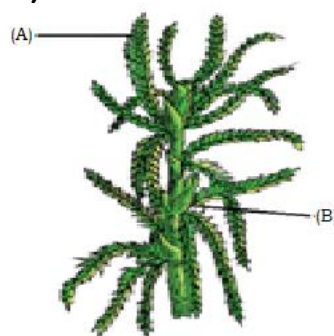
33. Bryophyta include – **(Pg34, E)**
 A) Hornwort B) Liverwort
 C) Mosses D) All of these
34. Identify given plant diagram and label its parts: **(Pg34, E)**



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- A) *Funaria*, A = gametophyte B = sporophyte
 B) *Sphagnum*, A = gametophyte B = sporophyte
 C) *Funaria*, A = sporophyte B = gametophyte
 D) *Sphagnum*, A = sporophyte B = gametophyte

35. Bryophytes are – **(Pg35, E)**
 A) Amphibians of plant kingdom
 B) Reptilians of plant kingdom
 C) First vascular bundles containing plant
 D) A & C both
36. The body organization of bryophytes have – **(Pg35, E)**
 A) Unicellular or multicellular rhizoid
 B) Less differentiation than algae
 C) They have true root stem and leaves
 D) A & C both
37. The main plant body of bryophyte is ____A____ that produce ____B____ **(Pg35, E)**
 A) A = diploid B = gametes
 B) A = haploid B = gametes
 C) A = haploid B = spores
 D) A = diploid B = spores
38. Choose the correct statement
 A) Sex organs in bryophytes are unicellular and jacketed
 B) Male sex organ is antheridium that produce flagellate (four flagella) antherozoids
 C) Female sex organ is archegonium i.e. flask – shaped and produce single egg
 D) Water is required for travelling of egg from archegonium to antheridium
39. In bryophyta, meiosis occur – **(Pg35, E)**
 A) During development of gametes
 B) Immediately after zygote formation
 C) After sometime of zygote formation
 D) In gameophytic stage
40. Identify the given diagram and label **(Pg34, E)**



- A) *Sphagnum*, a liverwort A = archegonia branch B = antheridial branch
 B) *Sphagnum*, a moss A = archegonia branch B = antheridial branch
 C) *Funaria*, a moss A = antheridial branch B = archegonia branch
 D) *Sphagnum*, a liverwort A = antheridial branch B = archegonia branch
41. Choose the correct statement with regard to bryophyta **(Pg35, E)**

- A) Sporophyte is free – living but attached to photosynthetic gametophyte derives nourishment from it
 B) Sporophyte is not free – living but attached to photosynthetic gametophyte and derives nourishment from it
 C) Gametophyte is not free – living but attached to photosynthetic sporophyte and derives nourishment from it
 D) Gametophyte is free living but attached to photosynthetic sporophyte and derives nourishment from it
42. First organism to colonize rock are –
(Pg35, E)
 A) Mosses B) Lichen
 C) Liverwort D) A & B both
43. For trans – shipment of living material which of following is more suitable to use
(Pg35, E)
 A) *Marchantia* B) *Funaria*
 C) *Sphagnum* D) Riccia
44. Which of the following is obtained from *Sphagnum* as coal:
(Pg35, E)
 A) Bituminous B) Peat
 C) Lignite D) Anthracite

Paragraph – 3.2.1

Liverwort

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45. Choose the correct statement : **(Pg35, E)**
 A) The thalloid plant body of liverwort is dorsiventrally appressed closely to substrate
 B) The leafy members have tiny true leaf in two rows on the stem like structure
 C) The leafy membrane have tiny leaf like appendage in four rows on the stem like structure
 D) The thalloid plant body of liverwort is isobilaterally appressed closely to substrate
46. Asexual reproduction in bryophytes is not take place by – **(Pg35, E)**
 A) Fragmentation
 B) Gemmae
 C) Budding in secondary protonema
 D) Oogamous
47. Gemmae are – **(Pg35, E)**
 A) Green, unicellular, asexual bud, develop in small receptacles i.e. gemma cup
 B) Green, multicellular, asexual bud develop in small receptacles i.e. gemma cup

- C) Non – green unicellular, asexual bud, develop in small receptacles i.e. gemma cup
 D) Green, multicellular, sexual bud develop in small receptacles i.e. gemma cup n
48. In *Marchantia* **(Pg35, E)**
 A) Male and Female sex organs are produced on same thalli
 B) Male and female sex organs are produced on different thalli
 C) Gametophytes is differentiated into foot seta and capsule
 D) Spores geminates to form free – living sporophyte

Paragraph – 3.2.2

Mosses:

49. The predominant stage of life cycle of a moss is- **(Pg36, E)**
 A) Gametophytes
 B) Sporophytes
 C) Protonema stage
 D) Frothallus stage
50. The gametophyte of moss is divided into- **(Pg36, E)**
 A) Two stage, first protonema stage which develops directly from gamete.
 B) Two stage, second leafy stage which develop from secondary protonema as a lateral bud.
 C) Two stage, first leafy stage and second protonema stage
 D) Two stage, first protenema stage which develops directly from spore and second leafy stage which develop from spore germination as terminal bud.
51. Protonema stage is – **(Pg36, E)**
 A) Creeping, green unbranched and frequently filamentous stage
 B) Prostate, green, branched and frequently filamentous stage
 C) Creeping, green, branched and frequently filamentous stage
 D) Prostate, non – green, unbranched and frequently stage
52. Choose the correct statement about leafy stage of mosses **(Pg36, E)**
 A) They consist, upright, slender axes bearing spirally arranged leaves.
 B) They are attached to soil through multicellular and branched rhizoid
 C) This stage bear sex organ
 D) All of these

53. In sexual reproduction which of following is not seen in mosses **(Pg36, E)**
 A) Sex organ are produced at apex of leafy stage
 B) After fertilization zygote develop into sporophyte
 C) Development of embryo
 D) All of these
54. The sporophyte of mosses – **(Pg36, E)**
 I) Is more elaborate than that is liverwort
 II) Consisting of foot, seta and capsule
 III) Spores present in capsule
 IV) Spore produce after meiosis
 V) Elaborate mechanism of spore dispersal
 VI) Presence of peristomic teeth.
 A) All are correct
 B) I), II), III) only
 C) IV), V), VI) only
 D) I), III), V) only
55. Choose incorrect matched **(Pg36, M)**

	Column – A		Column – B
A)	Hornwort	i)	<i>Marchantia</i>
B)	Bryopsida	ii)	<i>Polytrichum</i>
C)	Liverwort	iii)	<i>Marchantia</i>
D)	Mosses	iv)	<i>Sphagnum</i>

Paragraph – 3.3

Pteridophytes

TG: @Chalnaayaaar

56. Pteridophytes includes – **(Pg36, E)**
 A) Horsetail B) Ferns
 C) Polytrichum D) A & B both
57. First terrestrial vascular plant is – **(Pg36, E)**
 A) Algae
 B) Bryophyta (liverwort & hornwort)
 C) Pteridophyta
 D) Bryophyta (Mosses)
58. Choose the correct statement from following **(Pg36, E)**
 A) The plant body is differentiated into true root, only true prostrate stem as in *Selaginella* and true leaf
 B) The leaves of pteridophytes are small as in *Selaginella* or macrophyll in ferns.
 C) Pteridophytes possess xylem, phloem
 D) All of these
59. In pteridophyta – **(Pg36, E)**
 A) The main plant body is a sporophyte
 B) The main plant body is a gametophyte
 C) The main plant body is a gametophyte on which sporophytic phase is partially dependent
 D) A & C
60. Choose the correct with regard to reproduction in pteridophyte **(Pg36, E)**
 A) Sporophyte bear sporangia that are subtended by sporophyll
 B) Gametophyte bear sporangia that are subtended by sporophyll
 C) Sporophyll compact to form strobili as in fern
 D) The sporangia produce spores by mitosis in spore mother cell
61. Gametophyte of pteridophyte is – **(Pg36, E)**
 A) Small but multicellular, free living, mostly photosynthetic, differentiated into root, stem and leaf
 B) Small inconspicuous but multicellular dependent mostly photosynthetic thalloid body
 C) Small but multicellular, free living mostly photosynthetic thalloid structure
 D) Small inconspicuous but multicellular free – living mostly non – photosynthetic thalloid body
62. Water needed for fertilization in – **(Pg36, E)**
 A) *Eucalyptus* B) Bryophytes
 C) Pteridophytes D) B & C both
63. Sex organ bear on – **(Pg36, E)**
 A) Sporophytes
 B) Gametophyte
 C) On both gametophytes & sporophyte
 D) None
64. Heterosporous pteridophytes is/are- **(Pg36, E)**
 A) *Selaginella* B) *Salvinia*
 C) *Psilotum* D) A & B both
65. Pteridophytes with all similar kind of spores is in **(Pg36, E)**
 A) *Terror of Kashmir*
 B) *Psilotum*
 C) *Selaginella*
 D) A & B both
66. Seed habit reported for first time is **(Pg36, E)**
 A) Blue – green algae
 B) Pteridophyte
 C) Angiosperm
 D) Bryophyta
67. Pteridophyte classification into – **(Pg36, E)**
 A) 4 classes B) 4 orders
 C) 4 families D) All of these
68. *Adiantum* is member with – **(Pg36, E)**
 A) *Pteris* B) *Equisetum*
 C) *Lycopodium* D) *Selaginella*
69. Match the following: **(Pg36, M)**

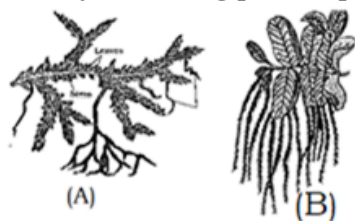
Column – I

Column – II

- i) Sphenopsida A) *Dryopteris*
 ii) Lycopsidea B) *Selaginella*
 iii) Psilopsida C) *Psilotum*
 iv) Pteropsida D) *Equisetum*

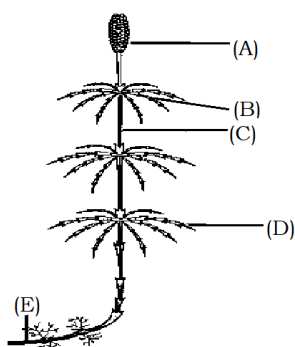
- A) A – iv, B – ii, C – iii, D – i
 B) A – iii, B – ii, C – iv, D – i
 C) A – ii, B – iii, C – i, D – iv
 D) A – i, B – iv, C – ii, D – iii

70. Identify following pteridophytes – (Pg37, E)



- A) A = *Salvinia*, B = horsetail, C = fern, D = *Selaginella*
 B) A = *Selaginella*, B = *Salvinia*, C = fern, D = horsetail
 C) A = *Equisetum*, B = fern, C = *Selaginella*, D = horsetail
 D) A = *Selaginella*, B = *Salvia*, C = *Dryopteris*, D = *Equisetum*

71. Label A, B, C, D, E in following diagram: (Pg37, E)



- A) A = strobilus, B = rhizome,
 B) A = cone, C = Node, D = internode
 C) A = strobilus, B = rhizome, C = node, D = internode, E = branch
 D) None of these

Paragraph - 3.4

Gymnosperm:

TG: @Chalnaayaaar

72. Gymnosperms are plants in which –

(Pg38, E)

- A) Ovules are enclosed by any ovary wall both before and after fertilization
 B) Ovules are not enclosed by any ovary wall both before and after fertilization
 C) Ovules are enclosed by any ovary wall before fertilization but not after fertilization
 D) Ovules are not enclosed by any ovary wall before fertilization but after fertilization

73. Tallest tree species belongs to – (Pg38, E)

- A) Angiosperm B) Gymnosperm
 C) Pteridophyte D) Algae

74. Fungi show symbiotic association with gymnosperm in form of – (Pg38, E)

- A) Mycorrhiza in *Pinus*
 B) Mycorrhiza in *cycas*
 C) Coralloid rest in *Pinus*
 D) Coralloid rest in *cycas*

75. The stem of – (Pg38, E)

- A) *Cycas* is unbranched
 B) *Pinus* is branched
 C) *Cedrus* is branched
 D) All of these

76. Needle-like leaves, thick cuticle, sunken stomata are character of – (Pg38, E)

- A) *Cycas* B) *Pinus*
 C) *Gnetum* D) *Ginkgo*

77. Gymnosperms are – (Pg38, E)

- A) Heterosporous, haploid microspores and haploid megaspore
 B) Homosporous, both spores are haploid
 C) Heterosporous, both spores (microspores & megaspores) are diploid
 D) None of these

78. Choose the correct statement – (Pg38, E)

- A) The male and female cones borne on same plant as in *Cycas*
 B) The male and female cones borne on different plant as in *Cycas*
 C) The male and female cones borne on same plant as in *Pinus*
 D) Both A & C

79. Choose the correct about female cone of gymnosperm: (Pg38, E)

- A) The nucleus is protected by bitegmic structure
 B) The megaspore mother cell divides mitotically to form four megaspores
 C) One of four megaspores, enclosed within the megasporangium which develop into a multicellular female gametophyte that bear one archegonia
 D) Ovule is unitegmic

80. Statement-I : The cones bearing megasporophyll with ovules are female cone
Statement-II : The strobili bearing microsporangia are called male cone
(Pg38, E)

- A) Both stated statement are correct
B) Both stated statement are incorrect
C) Statement-I is correct while statement-II is incorrect
D) Statement-I is incorrect while statement-II is correct

81. Identify given plant diagram and choose correct response (Pg39, E)



- A) *Ginkgo*, a living fossil
B) *Cycas*, a living fossil
C) *Taxus*
D) *Gnetum*

82. What is difference between bryophytic and gymnospermous & gametophytes (Pg39, M)

- A) Bryophytic gametophytes is independent free-living structure while gametophytes of gymnosperm is dependent
B) Gametophyte of gymnosperm remain within the sporangia retained on sporophytes
C) Both A & B
D) None of these

83. Choose the correct set about given figure: (Pg39, E)



- i) Pinnate leaves
ii) Palmate leaf
iii) Branched stem
iv) Branching is same as in Cedrus
v) Unbranched

- vi) Bear male cone and female cone on same plant
vii) Bear male cone & female cone on different plant
viii) It is living fossil along with Ginkgo
A) i, iii, vi, viii
B) i, v, vii, viii
C) ii, v, vi
D) i, iv, vii, viii

84. *Anthoceros* thallus and coralloid root of *Cycas* are (Pg39, E)

- A) Similar in morphological structure
B) Performing N_2 -fixing
C) Presence of vascular bundle
D) B & C

85. Gametophytes is parasitic over sporophytes is (Pg39, E)

- A) Cycadales
B) Coniferales
C) Monocot
D) All of these

86. The endosperm of gymnosperm represent (Pg39, E)

- A) Female gametophyte
B) Triploid structure
C) Diploid structure
D) A & C

87. Read the following statements and choose the incorrect response with respect to gymnospermous reproduction (Pg39, E)

- A) Pollen grains are carried by air currents
B) Pollen tube carries the male gametes to archegonia
C) Following fertilization, zygote develop but embryo stage is lacking
D) Ovule develops into seed

88. All the given structure of *Pinus* and *Cycas* are haploid, except (Pg39, E)

- A) Pollen grain
B) Egg
C) Nucellus
D) Endosperm

89. Gymnosperm is example of – (Pg39, E)

- A) Vascular, embryophyte with ovule enclosed is ovary
B) Vascular, non-embryophyte
C) Non-vascular, non-embryophyte
D) Vascular, embryophyte

90. Vascular archegoniates with diplontic lifecycle are – (Pg39, E)

- A) Bryophytes
B) Gymnosperm
C) Pteridophytes
D) B & C

Paragraph - 3.5

Angiosperm:

91. Tallest and smallest plant species belonging to angiosperm is – (Pg40, E)

- A) Sequoia and Wolffia
B) Eucalyptus and Wolffia
C) Sequoia and duck-weed

- D) None of these
92. Dicotyledons and monocotyledons are two _____ of angiosperm **(Pg40, E)**
 A) Family B) Class
 C) Order D) Division
93. How many of following is correct about dicotyledons and monocotyledons respectively **(Pg40, E)**
 Seed with two cotyledons, trimerous, pentamerous, parallel venation
 Seed with one cotyledons, tetramerous, reticulate venation
 A) 4, 3 B) 3, 4
 C) 2, 5 D) 5, 2
94. A group of plant flower with having three members in each whorl is placed is- **(Pg40, E)**
 A) Monocot B) Dicot
 C) Tetramerous D) Both B & C
95. Choose the correct statement **(Pg40, M)**
 A) Embryo sac develop from one functional megaspore(diploid) which result from mitosis and degeneration of megaspore mother cell
 B) Embryo sac of consist of one egg apparatus, three antipodal cell and two polar nuclei
 C) Polar nuclei, antipodal cells, egg are diploid structure of embryo sac of angiosperm
 D) Secondary nuclei is haploid
96. Secondary nuclei result from fusion is **(Pg40, E)**
 A) Polar nuclei and 1st male gamete
 B) Polar nuclei and 2nd male gamete
 C) Both nuclei of polar nuclei
 D) Egg apparatus and polar nuclei
97. Choose the correct sequence **(Pg40, M)**
 A) Gamete formation → pollination → fertilization → embryo → new plant
 B) Gamete formation → transfer of gamete → fertilization → pollination → embryo → new plant
 C) Pollination → gametogenesis → fertilization → embryo → new plant
 D) None of these
98. Microspore of angiosperm represent- **(Pg40, E)**
 A) Sporophytic phase
 B) Gametophytic phase
 C) Both A & B
 D) Female gamete
99. Pollen tube in angiosperm discharge- **(Pg40, E)**
 A) One male gamete is embryo sac
 B) Two male gamete is embryo sac
 C) Three male gamete is embryo sac
 D) More than one option is correct
100. Syngamy is- **(Pg41, E)**
 A) Fusion of egg and 1st male gamete
 B) Fusion of egg and 2nd male gamete
 C) Fusion of polar nuclei & 1st male gamete
 D) Both B & C
101. Zygote is result of- **Pg 41, E)**
 A) Syngamy
 B) Double fertilization
 C) Triple fusion
 D) Both A & C
102. Fusion of 2nd male gamete with diploid secondary nucleus result in formation of- **(Pg41, E)**
 A) PEN B) Embryo
 C) Both A & B D) Sporophyte
103. Double fertilization is- **(Pg 41, E)**
 A) Fusion of two nuclei of polar nuclei
 B) Fusion of male gamete with egg
 C) Fusion of male gamete with secondary nuclei
 D) Both B & C
104. PEN provide- **(Pg 41, E)**
 A) Protection of embryo
 B) Nourishment to embryo
 C) Anchorage to embryo
 D) None of these
105. Which of following structure degenerate after fertilization- **(Pg 41, E)**
 A) Synergid B) Antipodal cell
 C) A & B D) Embryo
106. Angiosperm differ with gymnosperm- **(Pg 41, E)**
 A) In presence of true root, stem & leaf
 B) Seed enclosed in fruit
 C) Ovary enclosed in ovule
 D) Both B & C
107. Ovule develop into _____ and ovaries develop into _____ of angiosperm **(Pg 41, E)**
 A) Seed, fruit B) Fruit, seed
 C) Fruit, fruit D) Seed, seed
108. Pistil is- **Pg 41, E)**
 A) Female sex organ of flower
 B) Male sex organ of flower
 C) Non-reproductive organ of flower
 D) Divided into two part that are anther and filament.

Paragraph - 3.5

Angiosperm:

109. Kelp, Polysiphonia, *Ectocarpus*, *Fucus*, Wolffian, *Volvox*

How many of following are show haplontic, haplodiplontic and diplontic life cycle respectively **(Pg42, E)**

- A) 1, 3, 2 B) 3, 1, 2
C) 1, 2, 3 D) 2, 3, 1

110. Mitosis is observed in- **(Pg42, E)**

- A) Haploid plant cell
B) Diploid plant cell
C) Both A & B
D) Only vegetative cell

111. Choose correct statement about haplontic life cycle- **(Pg42, E)**

- i) Sporophytic generation is represented by single cell zygote
ii) Free-living sporophyte
iii) Sporophyte is parasite on gametophyte
iv) Gametophyte arise from gametes after mitotical division
v) Example are Spirogyra and some species of Chlamydomonas
vi) Gametophyte arise from meiosis occur in spore-

- A) i, ii, v, vi B) i, iii, v, vi
C) iii, iv, v D) i, iii, iv

112. *Eucalyptus* show- **(Pg42, E)**

- A) Diploid dominant sporophyte that is photosynthetic and independent phase
B) Gametophyte is represent by few diploid cell
C) Dominant phase is gametophyte
D) All of these

113. Gymnosperms are- **(Pg42, E)**

- A) Haplontic B) Diplontic
C) Haplo-diplontic D) Diplo-haplontic

114. Bryophytes and Pteridophyte exhibit- **(Pg42, E)**

- A) Multicellular sporophyte
B) Multicellular gametophyte
C) Unicellular sporophyte
D) A & B both

115. Bryophytes and pteridophytes differ in their - **(Pg42, E)**

- A) Stage of meiosis
B) Dominant phases
C) Stage of syngamy
D) Stage of gametogenesis

116. In bryophytes - **(Pg42, E)**

- A) Sporophyte totally or partially dependent on the gametophyte for its anchorage and nutrition
B) Gametophyte totally or partially dependent on the sporophyte for its anchorage and nutrition
C) A dominant, independent, photosynthetic, thalloid haploid Sporophyte alternate with gametophyte

D) A & C both

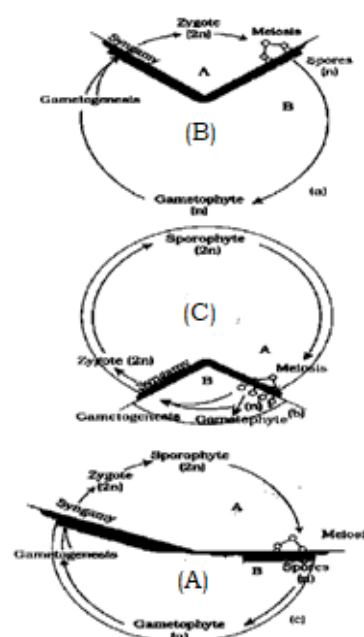
117. Choose the correct response with respect to pteridophyte lifecycle **(Pg42, E)**

- A) Diploid gametophyte alternate with sporophyte
B) Sporophyte and gametophyte are independent
C) Sporophyte show saprophytic
D) Meiosis occur in gametophyte

118. The sporophyll of gymnosperms arranged ____ on axis to from cones **(Pg42, E)**

- A) Spirally B) Alternately
C) Decussate D) Superposed

119. Identify life cycle pattern **(Pg42, E)**



- A) A = haplontic, B =haplo – diplontic, C = diplontic
B) A = haplontic, B = diplontic, C = haplo – diplontic
C) A = haplo – diplontic, B =haplontic, C = diplontic
D) A = as in *Volvox* and angiosperm, B = as in *Ectocarpus*, C = as in gymnosperm

120. Bryophyte attached to substratum by - **(Pg42, E)**

- A) Holdfast B) Rhizoid
C) Root D) A & C

121. Brown algae focus attached to substratum by - **(Pg42, E)**

- A) Holdfast B) Stipe
C) Frond D) Rhizoid

122. The plant body of liverwort is ____A____ whereas mosses have ____B____ bearing ____C____ arranged leaves **(Pg42, E)**

- A) A = dorsiventral, B = upright, slender axes, C = alternately
 B) A = isobilateral, B = upright, slender axes, C = spirally
 C) A = dorsiventral, B = isobilateral axes, C = alternately
 D) A = dorsiventral, B = upright, slender axes, C = spirally

123. Embryophytes doesn't includes

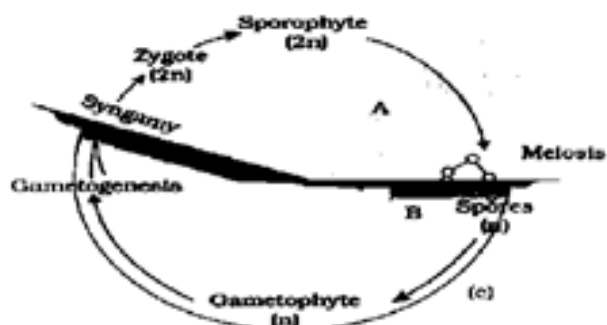
- A) Algae, Bryophytes (Pg42, E)
 B) Bryophyte, Pteridophytes
 C) Gymnosperm, angiosperm
 D) Algae only

124. Double fertilization does not occur in –

- (Pg42, E)
 A) Pteridophyte, some gymnosperm,
 B) Monocot, dicot
 C) Dicot, some gymnosperm
 D) Bryophytes, pteridophyte, some gymnosperm & monocot

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125. Identify following life cycle pattern and that pattern shown in (Pg42, E)



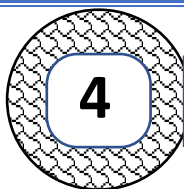
- A) Haplontic life cycle eg: Volvox
 B) Haplodiplontic lifecycle eg: Ectocarpus, Psilotum
 C) Haplodiplontic lifecycle eg: Fucus, Marchantia
 D) Diplontic lifecycle eg: Bryophytes, Pteridophytes

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Answer key

PLANT KINGDOM

Q	01	02	03	04	05	06	07	08	09	10
Ans	A	C	D	D	A	D	B	B	B	D
Q	11	12	13	14	15	16	17	18	19	20
Ans	B	B	D	B	D	A	A	D	D	A
Q	21	22	23	24	25	26	27	28	29	30
Ans	A	B	A	A	D	D	B	A	A	A
Q	31	32	33	34	35	36	37	38	39	
Ans	C	C	D	C	A	A	B	C	C	
Q	40	41	42	43	44	45	46	47	48	49
Ans	B	B	D	C	B	A	D	B	B	A
Q	50	51	52	53	54	55	56	57	58	59
Ans	B	C	D	C	A	A	D	C	D	A
Q	60	61	62	63	64	65	66	67	68	69
Ans	A	C	D	B	D	D	B	A	A	A
Q	70	71	72	73	74	75	76	77	78	79
Ans	B	D	B	B	A	D	B	A	B	D
Q	80	81	82	83	84	85	86	87	88	89
Ans	A	A	C	B	B	D	D	C	C	D
Q	90	91	92	93	94	95	96	97	98	99
Ans	B	B	B	A	A	B	C	A	B	B
Q	100	101	102	103	104	105	106	107	108	109
Ans	A	A	A	D	B	C	B	A	A	A
Q	110	111	112	113	114	115	116	117	118	119
Ans	C	B	A	B	D	B	A	B	A	C
Q	120	121	122	123	124	125				
Ans	B	A	D	A	A	B				



Morphology of flowering plants

BOTANY

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Unit-2

- Curly top virus spreads a plant via-
(Pg. 64, E)
A) Xylem B) Phloem
C) Vascular bundle D) None of these
- The book 'Plant Anatomy' was published by Esau in -
(Pg. 64, E)
A) Same year as she did her doctorate
B) 1960
C) 1954
D) 1957
- Which of referred as 'Webster's of plant biology' – an encyclopedia (Pg. 64, E)
A) Plant anatomy
B) Anatomy of angiospermic plant
C) Anatomy of seed plants
D) A & B both
- Esau was _____ woman to receive 'National Academy of science' (Pg. 64, E)
A) 7th B) 6th
C) 5th D) 1th
- Statement – I: Esau got National Academy of Science in 1957
Statement – II: In 1989, Esau received National Medal of Science in 1989.
(Pg. 64, E)
A) Statement – I & statement – II are both correct
B) Statement – I & statement – II are both incorrect
C) Statement – I is correct and statement – II is incorrect
D) Statement – I is incorrect and statement – I is correct
- Morphology is study of (Pg. 65, E)
A) External structure of an organism
B) Internal structure of an organism
C) Systematics
D) A & B booth

Paragraph – 5.1

The Root

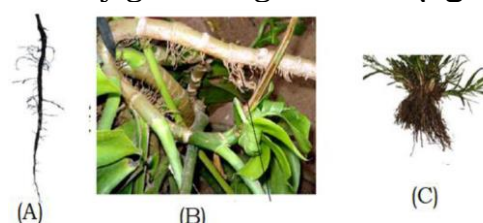
- Radical form- (Pg. 65, E)
A) Root system of plant
B) Floral part of plant
C) Shoot system of plant
D) A & B both
- The lateral roots arise from primary root is- (Pg. 65, E)
A) Primary root B) Secondary root
C) Tertiary root D) A & B both

- Choose the given statement which is suitable for following figure (Pg. 66, E)



Figure: Tap root system

- It comprises of primary & secondary root
 - Such roots are observed in mustard
 - These roots are replace by large number root
 - A & B both
- From given set of example choose, how many of following are example of fibrous root and adventitious root respectively. Sweet potato, carrot, turnip, wheat, grass, *Monstera*, banyan tree (Pg. 66, E)
A) 1, 4 B) 1, 3
C) 2, 3 D) 3, 2
 - Adventitious roots arise from- (Pg. 66, E)
A) Radicle
B) Base of stem in tuft as in wheat
C) Part of plant other than radicle as in mustard
D) Secondary root
 - Root is characterized by (Pg. 66, E)
A) Presence of node & internode
B) Mainly (-ve) phototropism
C) Mainly (-ve) geotropism
D) Mainly (-ve) hydrotropism
 - Which of the following is not the main function of root system is/are (Pg. 66, E)
A) Absorption of sap from soil
B) Providing proper anchorage to plant parts.
C) Synthesis of plant growth regulators
D) None of these
 - Identify given diagram (Pg. 66, M)



	A)	B)	C)
A)	Tap root	Fibrous root	Adventitious root
B)	Tap root	Adventitious root	Fibrous root
C)	Adventitious root	Fibrous root	Tap root
D)	Fibrous root	Tap root	Adventitious root

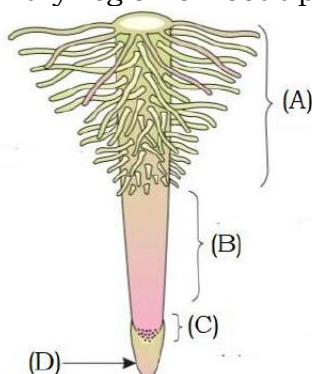
- A) Region of - Small thin wall meristematic dense
- B) Region of - Responsible for elongation growth of root in length
- C) Region of - Proximal to region of maturation elongation
- D) Root hair - Differentiated and mature cell proximal to region of maturation

Paragraph-5.1.1

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Regions of the Root

15. In aquatic plant the apex of root is covered by (Pg. 67, E)
 A) Thimble parenchymatous root cap
 B) Root pocket
 C) Coleorhiza
 D) Coleoptile
16. Identify region of root tip (Pg. 67, M)



- A) A = Region of maturation, B = Region of elongation, C = Region of meristematic activity, D = Root cap
- B) A = Region of elongation, B = Region of meristematic activity, C = Root cap, D = Protective covering
- C) A = Region of meristem, B = Region of maturation, C = Region of elongation, D = Root cap
- D) A = Region of growing cell, B = Region of mature cell, C = Region of dividing cell, (D = Protective covering
17. Root hair arise from – (Pg. 67, E)
 A) Cortical cell of region of maturation
 B) Epidermal cell of region of maturation
 C) Cortical cell of region of elongation
 D) Epidermal cell of region of elongation
18. Choose mismatch pair (Pg. 67, H)

Column – I - Column – II

Paragraph-5.1.2

Modification of Root:

19. Pneumatophores are helpful in- (Pg. 67, E)
 A) Transpiration
 B) Getting oxygen for respiration
 C) Absorption of water
 D) Assimilation of food
20. Silt roots and pneumatophores are observed in- (Pg. 67, E)
 A) Maize, *Rhizophora*
 B) Maize, *Rhizopus*
 C) Sugarcane *Rhizopus*
 D) A & B both
21. Mechanical root observed in – (Pg. 67, E)
 A) Sugarcane B) Maize
 C) Banyan tree D) All of these
22. For food storage root get modified in – (Pg. 67, E)
 A) Potato B) Sweet potato
 C) Ginger D) A & B both
23. Match the following – (Pg. 67, H)

	Column – I		Column – II
A)	Conical root	(I)	Raddish
B)	Napiform root	(II)	Turnip
C)	Tuberous root	(III)	Sweet potato
D)	Fusiform root	(IV)	carrot

	a	b	c	d
A)	IV	II	III	I
B)	IV	III	II	I
C)	III	IV	I	II
D)	III	IV	I	II

24. Modification of root *Asparagus* is meant for – (Pg. 67, E)
 A) Storage of food
 B) Mechanical support

- C) Respiration
D) Climbing support
25. Slit root arise from – **(Pg. 67, E)**
A) Lower nodes of *Zea mays*
B) Lower internode of sugarcane
C) Lower internode of *Zea mays*
D) Upper node of sugarcane
26. Pneumatophores are **(Pg. 67, E)**
i) Positive geotropism
ii) Negative geotropism
iii) Grown in marshy area
iv) Found in mangroves
v) Positive phototropism
vi) Negative phototropism
A) i, iii, iv, vi B) ii, iii, iv, v
C) i, iii, v D) ii, iv, vi

Paragraph-5.2

Stem:

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27. Stem distinguish from root in – **(Pg. 68, E)**
A) Presence of node & internode
B) Absence of node & internode
C) Presence of hairs for water absorption
D) Absence of bud
28. Stem are develop from – **(Pg. 68, E)**
A) Radicle of germinating seed
B) Plumule of germinating seed
C) Cotyledons of germinating seed
D) Coleoptile
29. The region of stem where leaves are born are _____ **(Pg. 68, E)**
A) Nodes
B) Internode
C) Both node & internode
D) Floral bud
30. Stems are generally – **(Pg. 68, E)**
A) (+ve) geotropism, (-ve) hydrotropism, (+ve) phototropism
B) (-ve) geotropism, (-ve) hydrotropism, (+ve) phototropism
C) (+ve) geotropism, (+ve) hydrotropism, (+ve) phototropism
D) (+ve) geotropism, (-ve) hydrotropism, (-ve) phototropism

Paragraph-5.2.1

Modification of stem:

31. Underground modified stem of potato is known as- **(Pg. 68, E)**
A) Tuber B) Rhizome
C) Corm D) Bulb
32. Stem store food for- **(Pg. 68, E)**
A) Favourable condition growth

- B) Unfavourable condition growth
C) Flowering condition
D) A & C both
33. Choose odd on with respect to stem modification – **(Pg. 68, E)**
A) *Zaminkand* B) *Colocasia*
C) *Bougainvillea* D) *Turmeric*
34. How many of following stem modification does develop from axillary buds **(Pg. 68, M)**
Colocasia, grapevines, cucumber, pumpkin, *Opuntia*, Citrus, Watermelon, *Bougainvillea*
A) 7 B) 6
C) 5 D) 4
35. Ginger and turmeric are example of – **(Pg. 68, E)**
A) Rhizome B) Rhizoid
C) Corm D) Roots
36. Photosynthetic green flattened modified stem xerophyte is in – **(Pg. 68, E)**
A) *Acacia* B) *Euphorbia*
C) *Opuntia* D) *Hydrilla*
37. Stem is modified for protection in – **(Pg. 68, E)**
A) Citrus thorn
B) *Bougainvillea* spine
C) *Opuntia* thorn
D) A and C
38. Statement – I: Some plants of arid region modify their stems into fleshy cylindrical structure as in *Euphorbia*
Statement – II: In grapevines, stem tendrils are for help plant to climb **(Pg. 68, M)**
A) Statement – I and Statement – II are correct.
B) Statement – I is correct while statement – II is not correct
C) Statement – I is incorrect while statement – II is correct
D) Statement – I and statement – II are incorrect
39. Stem tendrils of pumpkin develop from- **(Pg. 68, E)**
A) Accessory bud
B) Axillary bud
C) Extra – axillary bud
D) Floral bud
40. Choose the correct statement about stem modification of mint **(Pg. 69, E)**
A) A slender lateral branch arises from base of main axis and after growing underground for some time arch upward to touch the ground.

- B) A slender lateral branch arises from base of main axis and after growing aerially for some time arch downwards to touch the ground.
C) Stem modification is same as in strawberries
D) Stem modification mint is known as sucker

41. Match the following: (Pg. 69, H)

	Column - I		Column - II
I)	Strawberry	A.	Sucker
II)	Jasmine	B.	Offset
III)	<i>Pistia</i>	C.	Runner
IV)	Pineapple	D.	Stolon

- A) I - C, II - D, III - B, IV - A
B) I - B, II - C, III - A, IV - D
C) I - C, II - A, III - B, IV - D
D) I - A, II - B, III - C, IV - D

42. Choose odd one with respect to stem modification- (Pg. 69, E)

- A) Chrysanthemum
B) Banana
C) Pineapple
D) Strawberry

43. In pineapple - (Pg. 69, E)

- A) The lateral branches originate from basal and underground portion of main stem, grow horizontally beneath the soil and then come out obliquely upward giving rise to leafy shoot.
B) The lateral branch arises time arch downward to touch the ground growing aerially for some time arch downward to touch the ground
C) A lateral branch with short internode and each node bearing a rosette of leaves and a tuft of roots.
D) None of these

44. In *Oxalis* stem is modified for - (Pg. 69, E)

- A) Storage
B) Support
C) Protection
D) Vegetative propagation

45. Lateral branch with short internode & each node bearing a rosette of leaves and a tuft of root found in - (Pg. 69, E)

- A) *Pistia*
B) *Eichhornia*
C) Grasses
D) A & B both

Paragraph-5.3

The leaf

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46. Choose the correct response: (Pg. 69, E)

- A) Leaf develop at the node and bears a bud in its axile
B) Leaves originate from SAM are arranged in acropetal orders.
C) Leaf is lateral generally flattened vegetative structure for photosynthesis
D) All of these

47. Stipules are - (Pg. 70, E)

- A) Two lateral small leaf like structure
B) Four lateral small leaf like structure
C) One lateral small leaf like structure
D) Many lateral small leaf like

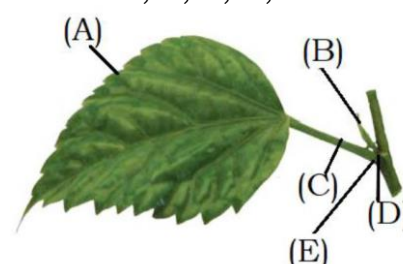
48. The leaf base expanded into a sheath crossing the stem partially or wholly in- (Pg. 70, E)

- A) Monocot
B) Dicot
C) All angiosperms plant
D) Gymnosperms

49. Pulvinus is - (Pg. 70, E)

- A) Swollen leaf base of legume
B) Swollen petiole of legume and china Rose
C) Swollen lamina
D) Swollen stipule

50. Label - A, B, C, D, E (Pg. 70, M)



	A	B	C	D	E
A)	Lamina	Stipule	Petiole	Axillary bud	Leaf base
B)	Lamina	Stipule	Petiole	Axillary bud	Leaf base
C)	Lamina	Pulvinus	Pedicel	Axillary bond	Leaf base
D)	Lamina	Stipule	Pedicel	Extra-axillary bond	Leaf base

Paragraph-5.3.1

Venation

51. Arrangement of vein & veinlet in lamina of leaf (Pg. 70, E)

- A) Venation
B) Phyllotaxy
C) Aestivation
D) None of these

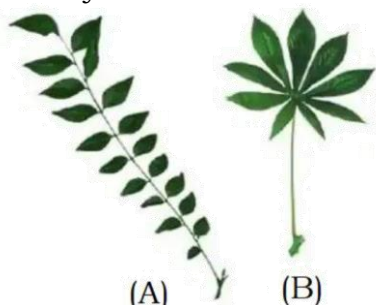
52. Leaves of dicotyledonous plants generally characterized by - **(Pg. 70, E)**
 A) Presence of parallel venation
 B) Veins which are parallel to each other within a lamina.
 C) Presence of reticulate venation
 D) A & B both
53. Identify the leaf venation and type of leaf. **(Pg. 70, E)**



- A) Parallel venation; monocot mainly
 B) Parallel venation; dicot mainly
 C) Reticulate venation; dicot mainly
 D) Reticulate venation; monocot mainly

Paragraph-5.3.2 Types of leaves:

54. A leaf is simple **(Pg. 70, E)**
 A) When its lamina is entire
 B) When its lamina is incised, the incision do not touch the midrib
 C) A & B both
 D) None of these
55. When the incisions of lamina reach to midrib breaking leaf into a number of leaflet is not- **(Pg. 70, E)**
 A) Compound leaf
 B) Simple leaf
 C) Pinnate leaf
 D) Palmate leaf
56. Identify A and B **(Pg. 70, M)**

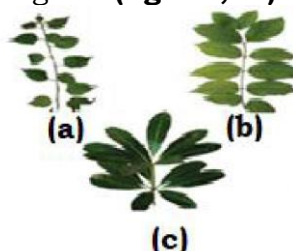


- A) A = pinnately compound leaf; Neem B = palmately compound leaf; Silk cotton
 B) A = palmately compound leaf; Silk cotton B = pinnately compound leaf; Neem
 C) A = pinnately compound leaf; Silk cotton B = palmately compound leaf; Neem

- D) A = palmately compound leaf; Neem B = pinnately compound leaf; Silk cotton
57. Midrib of pinnately compound leaf is - **(Pg. 70, E)**
 A) Mid-vein B) Rachis
 C) Petiole D) None of these
58. Leaflet of pinnately compound leaf arise on- **(Pg. 70, E)**
 A) Common point i.e. at tip of petiole
 B) Common axis
 C) Common point i.e. at tip of rachis
 D) A & C both
59. Leaflet of _____ arise on common point i.e. at tip of petiole **(Pg. 71, E)**
 A) Pinnately compound leaf
 B) Palmately compound leaf
 C) Simple leaf
 D) All of these

Paragraph-5.3.3 Phyllotaxy

60. Phyllotaxy is pattern of arrangement of _____ on the _____. **(Pg. 71, E)**
 A) Leaf, stem B) Phloem, stem
 C) Vein, leaf D) None of these
61. Identify types of phyllotaxy shown by given diagram **(Pg. 71, M)**

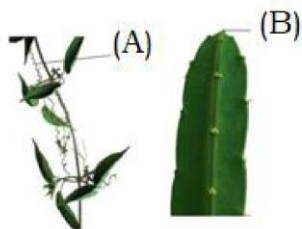


- | | A) | B) | C) |
|----|---------------|-----------|-----------|
| A) | Opposite | Alternate | Whorled |
| B) | Alternate | Opposite | Whorled |
| C) | Alternate | Whorled | Opposite |
| D) | None of these | | |
62. Choose correct statement - **(Pg. 71, E)**
 A) In alternate type; a single leaf arises at each node.
 B) In opposite type; a pair leaves arises at each node.
 C) In whorled type; more than two leaves arises at each node.
 D) All of these
63. Sunflower show- **(Pg. 71, E)**
 A) Alternate phyllotaxy
 B) Opposite phyllotaxy
 C) Whorled phyllotaxy
 D) None of these

Paragraph-5.3.4

Modification of leaves:

64. In Australian acacia (Pg. 71, E)
 A) Lamina modification
 B) Petiole modified
 C) Stipule modified
 D) All of these
65. Select the correct option: (Pg. 71, E)

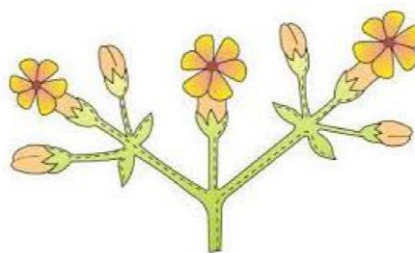


- A) Both A & B are modified by leaves
 B) A is tendrils for climbing
 C) B is spines for defence
 D) All of these
66. Pitcher of pitcher plant is modified – (Pg. 71, E)
 A) Leaf
 B) Stem
 C) Root
 D) Fruit

Paragraph-5.4

The inflorescence:

67. Flower is modified – (Pg. 71, E)
 A) Node
 B) Internode
 C) Leaf
 D) Shoot
68. Choose the correct statement (Pg. 71, E)
 A) In flower, SAM changes to floral meristem
 B) In flower, internode do not elongate
 C) The axis get condensed in flower.
 D) All of these
69. The arrangement of flowers on the floral axis is – (Pg. 71, E)
 A) Phyllotaxy
 B) Inflorescence
 C) Aestivation
 D) Placentation
70. On the basis whether floral apex gets develop into flower or continues to grow, inflorescence are mainly of- (Pg. 72, E)
 A) 3 types
 B) 4 types
 C) 2 types
 D) None of these
71. In racemose- (Pg. 72, E)
 A) Main axis continues to grow
 B) Flower are in basipetal order
 C) Main axis terminate into flower
 D) B & C both
72. Choose the correct statement about given figure (Pg. 72, E)



- A) It is of racemose type inflorescence
 B) Flowers are in basipetal order
 C) Flowers are in acropetal order
 D) Example of *Cassia*
73. Given diagram is of – (Pg. 72, M)



- A) Racemose inflorescence
 B) Cymose inflorescence
 C) Cymose inflorescence of *Cassia*
 D) B & C both

Paragraph-5.5

The flower:

74. A complete flower consist of – (Pg. 73, E)
 A) One whorl
 B) Two whorls
 C) Three whorls
 D) Four whorls
75. Flower stalk is known as – (Pg. 72, E)
 A) Pedicel
 B) Thalamus
 C) Petiole
 D) Stipules
76. Thalamus is not – (Pg. 72, E)
 A) Swollen end of pedicel
 B) Different whorl arranged on it
 C) Accessory whorl
 D) Receptacle for different whorl
77. Choose the correct statement- (Pg. 72, E)
 A) Calyx, corolla, are accessory organ
 B) Androecium, gynoecium are reproductive organ
 C) Perianth present in lily
 D) All of these
78. Perianth is (Pg. 72, E)
 A) Indistinct calyx & corolla
 B) Fused corolla & androecium
 C) Reproductive organ

79. Bisexual flowers is – (Pg. 72, E)
 A) When a flower has both androecium & gynoecium
 B) Present in Solanaceae, Liliaceae
 C) Present in mustard and Pea
 D) All of these

80. How many of following show Actinomorphic, Zygomorphic respectively. (Pg. 72, E)

Mustard, datura, chilli, Pea, Canna, bean, gulmohur, Cassia

- A) 3, 4 B) 4, 3
 C) 4, 4 D) None of these

81. **Statement – I:** when a flower can be divided into two equal radial halves in any radial plane passing through the centre it is actinomorphic flower

Statement – II: when a flower can be divided into two similar halves only in one particular vertical plane, it is zygomorphic

(Pg. 72, E)

- A) Statement – I & II are correct
 B) Statement – I is correct
 C) Statement – II is correct only
 D) Statement – I & II are incorrect

82. *Cassia* show – (Pg. 72, E)

- A) Racemose inflorescence, zygomorphic
 B) Racemose inflorescence, actinomorphic
 C) Cymose inflorescence, actinomorphic
 D) Cymose inflorescence, zygomorphic

83. Flower with leaf that found the base of pedicel are – (Pg. 72, E)

- A) Bracteate B) Ebracteate
 C) Petiolate D) Sessile

84. Flower with floral appendages 3 or multiple of 3 are said – (Pg. 72, E)

- A) Tetramerous B) Trimerous
 C) Triploid D) Pentamerous

85. In hypogynous flower which of following floral part takes highest position

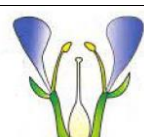
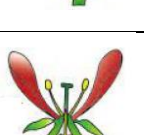
(Pg. 73, E)

- A) Calyx B) Corolla
 C) Androceium D) Pistil

86. Which of following is mismatched

(Pg. 73, E)

	Column-I	Column-II
A)		1. Mustard

B)		2. Brinjal
C)		3. Peach
D)		4. Cucumber

87. Superior ovary found in – (Pg. 73, E)

- A) Hypogynous flower
 B) Perigynous flower
 C) Epigynous flower
 D) Cucumber

88. Choose the correct about perigynous flower – (Pg. 73, E)

- A) Gynoecium is situated in centre
 B) Apart from gynoecium, rest parts are located on rim of thalamus almost at same level
 C) Ovary is half inferior
 D) All of these

89. How many of following are example of perigynous, hypogynous and epigynous respectively. (Pg. 73, E)

Mustard, china Rose. Brinjal, plum, peach, rose, guava, cucumber, ray floret sunflower, Pea, *Asparagus*

- A) 3, 3, 5 B) 3, 3, 3
 C) 3, 5, 3 D) 5, 3, 3

90. (Pg. 73, E)



- A) Hypogynous flower B) Epigynous
 C) Perigynous D) China rose

Paragraph-5.5.1

Parts of flower

91. Flower consist of – (Pg. 73, E)

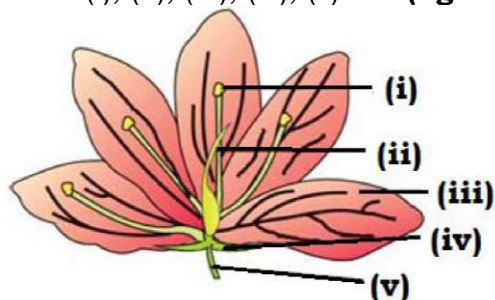
- A) Four reproductive whorl
B) Four whorl
C) Four accessory whorl
D) All of these

Paragraph-5.5.1.1 Calyx

92. The outermost whorl of flower is – (Pg. 73, E)
A) Calyx B) Corolla
C) Bract D) Thalamus
93. Choose the correct statement- (Pg. 73, E)
A) Sepals are members of calyx
B) Petals are members of calyx
C) Sepal are plural of corolla
D) None of these
94. Sepals united in _____ and sepals are free in _____ condition (Pg. 73, E)
A) Gamosepalous, Polysepalous
B) Polysepalous, Gamosepalous
C) Polysepalous, Polysepalous
D) Gamosepalous, Gamosepalous

Paragraph-5.5.1.2 Corolla

95. Corolla are – (Pg. 73, E)
A) Composed of petal
B) United by sepals
C) Composed of tepals
D) Usually for bud protection
96. Polypetalous is condition with _____ while gamopetalous is for _____ (Pg. 74, E)
A) Free petal; fused petal
B) Fused petal; free petal
C) Free petal; free petal
D) Fused petal; fused petal
97. Label (i), (ii), (iii), (iv), (v) (Pg. 74, M)



	(i)	(ii)	(iii)	(iv)	(v)
A)	Gynoecium	Androecium	Pedicel	Corolla	Calyx
B)	Gynoecium	Androecium	Corolla	Calyx	Pedicel
C)	Androecium	Gynoecium	Calyx	Corolla	Pedicel
D)	Androecium	Gynoecium	Corolla	Calyx	Pedicel

98. The mode of arrangement of sepals or petals in floral bud with respect to the

other members of same whorl is termed as – (Pg. 74, E)

- A) Placentation B) Aestivation
C) Phyllotaxy D) Inflorescence

99. Given diagram represent – (Pg. 74, E)



- A) Twisted aestivation
B) Imbricate aestivation
C) Vexillary aestivation
D) Valvate aestivation
100. In *Calotropis*- (Pg. 74, E)
A) Sepals or petals in a whorl just touch one another at the margin, without overlapping
B) One margin of the appendage overlaps that of the next one
C) Margin of sepals or petals overlap one another but not in particular direction
D) None of these
101. "Keel" present in – (Pg. 74, E)
A) Valvate B) Imbricate
C) Papilionaceous D) Twisted
102. In Pea find odd one out – (Pg. 74, E)
A) 'Standard' is largest petals
B) 'Standard' overlaps the two lateral Keel.
C) 'Keel' are smallest anterior petals.
D) Keel are fused
103. The aestivation in gulmohur is – (Pg. 74, E)
A) Valvate B) Twisted
C) Imbricate D) Vexillary
104. Find odd one with respect to aestivation (Pg. 74, E)
A) China rose B) Cassia
C) Lady's finger D) Cotton

Paragraph-5.5.1.3

Androecium

105. Androecium composed of – (Pg. 75, E)
A) Sepals B) Petal
C) Stamen D) Carpel
106. Each anther is usually _____ and each lobe has _____ chambers, pollen sacs (Pg. 75, E)
A) Bilobed; two B) Bilobed; four
C) Tetralobed; four D) None
107. Staminode is – (Pg. 75, E)
A) Fertile stamen B) Sterile stamen

- C) Both A & B D) None of these
108. How many of following statements are true. **(Pg. 75, M)**
- Stamens united into one bundle i.e. monoadelphous
 - Monoadelphous is in china Rose, diadelphous is in Pea and polydephous is in Citrus
 - Variation in the length of filaments within a flower as in Salvia & mustard
 - Two bundle of stamens are diadelphous and when stamen are united into two or more bundle i.e. polyadelphous
- A) 1 B) 2
C) 3 D) 4

Paragraph-5.5.1.4 Gynoecium

109. Female reproductive part of flower is – **(Pg. 75, E)**
- A) Androecium B) Gynoecium
C) Petal D) Sepal
110. Pollen grains receptive surface is – **(Pg. 75, E)**
- A) Stigma B) Style
C) Ovary D) Ovule
111. Placenta attach- **(Pg. 75, E)**
- A) Ovule to ovary
B) Ovary to thalamus
C) Ovary and other floral part
D) None of these
112. Apocarpous is- **(Pg. 75, E)**
- Free carpel
 - Fused carpel
 - Present in rose
 - Present in lotus
 - Present in tomato
- A) i, iii, iv B) i, iii, v
C) ii, iii, iv D) ii, iv, v
113. After fertilization, the ovary develop into _____ and ovule matures into a _____. **(Pg. 75, E)**
- A) Fruit; fruit B) Seed; fruit
C) Fruit; seed D) Seed; seed
114. Placentation is arrangement of _____ within the _____. **(Pg. 75, E)**
- A) Ovary; ovule
B) Placenta; embryosac
C) Ovule; ovary
D) None of these
115. **(Pg. 75, E)**



- A) Such placentation seen in Argemone
B) The placenta is axial and the ovules are attached to it in an unilocular ovary
C) Such placentation seen in china rose
D) The placenta is axial and the ovules are attached to it in multilocular ovary as in *Dianthus*

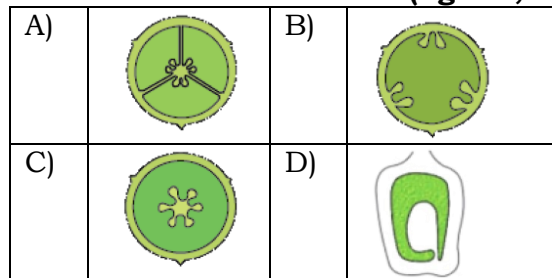
116. Match the column I and column II **(Pg. 75, E)**

	Column I		Column II
1	Parietal	a	Pea
2	Axile	b	Lemon
3	Marginal	c	<i>Argemone</i>
4	Basal	d	<i>Primrose</i>
5	Free - central	e	Sunflower

- A) 1 – c, 2 – b, 3 – a, 4 – e, 5 – d
B) 1 – d, 2 – c, 3 – a, 4 – b, 5 – e
C) 1 – e, 2 – d, 3 – a, 4 – c, 5 – b
D) 1 – b, 2 – e, 3 – a, 4 – d, 5 – c

117. Choose the correct statement – **(Pg. 75, M)**
- A) Unilocular ovary becomes two chambered due to the formation of false septum as in mustard
B) In *Argemone* ovary is two chambered due to the formation of true septum
C) Axile placentation found in multilocular ovary as in tomato
D) A & C both

118. *Dianthus* have – **(Pg. 75, E)**



119. In Marigold – **(Pg. 75, E)**
- A) Same placentation found in sunflower
B) Placenta develop at base of ovary
C) Single ovule is attached to ovary
D) All of those

Paragraph-5.6

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The fruit

120. Parthenocarpic fruit is – **(Pg. 76, E)**
 A) Develop after fertilization from ovary
 B) Develop without fertilization
 C) Develop after fertilization from thalamus
 D) A & C both
121. Pericarp differentiated into – **(Pg. 76, E)**
 A) Outer thin epicarp, middle fleshy edible mesocarp and an inner stony hard endocarp in Mango
 B) Outer fleshy epicarp, middle stony hard endocarp in mango
 C) Outer thin epicarp, middle stony hard mesocarp and an inner seed in mango
 D) None of these

Paragraph-5.7

The seed

122. Seed of wheat is made up of – **(Pg. 76, E)**
 A) A radicle, an embryonal axis & one cotyledon
 B) A radicle, an embryonal axis & two cotyledon
 C) Embryo only
 D) Only one cotyledon

Paragraph-5.7.1

Structure of a dicotyledonous seed

123. Find odd one with respect to endosperm **(Pg. 76, E).**
 A) Pea B) Gram
 C) Castor D) Bean
124. How many are correct statement about dicot seed? **(Pg. 77, E)**
 i) Testa, an inner layer is one of two layers of seed coat
 ii) Seed were attached to fruit by hilum
 iii) Micropyle is small pore below hilum
 iv) Castor is endospermic seed
 A) 1 B) 2
 C) 3 D) 4

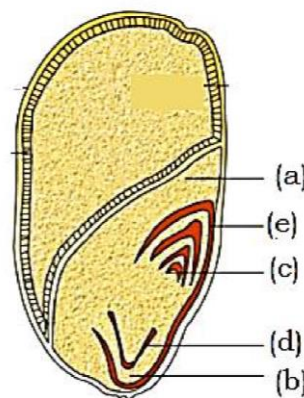
Paragraph-5.7.2

Structure of monocotyledonous seeds

125. How many of following is wrong stated statement? **(Pg. 77, E)**
 i) Generally monocot seeds are non-endospermic seed

- ii) Orchid is example of dicot seed
 iii) In maize, seed coat fused with fruit wall
 iv) Orchid is endospermic seed
 A) 1 B) 2
 C) 3 D) 4

126. Label a, b, c, d, e **(Pg. 77, M)**



	a	b	c	d	e
A)	Scutellum	Coleorhiza	Plumule	Radicle	Coleoptile
B)	Scutellum	Coleorhiza	Radicle	Plumule	Coleoptile
C)	Scutellum	Coleoptile	Radicle	Plumule	Coleorhiza
D)	Scutellum	Coleoptile	Plumule	Radicle	Coleorhiza

127. Aleurone layer is – **(Pg. 77, E)**
 A) Carbohydrate enrich layer
 B) Proteinous layer
 C) Lipid enrich layer
 D) A and B
128. Scutellum present in **(Pg. 77, E)**
 A) Orchid B) Castor
 C) Pea D) Gram

Paragraph-5.8

Semi-technical description of a typical flowering plant-

129. Number of androecium in mustard is – **(Pg. 78, E)**
 A) 2 B) 4
 C) 6 D) 5
130. How many of following is incorrect about Brassicaceae (mustard) actinomorphic, zygomorphic, bisexual, K4, superior ovary, C2+2, C(4) **(Pg. 78, E)**

- A) 1
C) 3
- B) 2
D) 4

Paragraph-5.9 Description of some important family

Paragraph 5.9.1 Fabaceae

131. Fabaceae was earlier called as –
(Pg. 78, E)

- A) Leguminosae B) Papilionoideae
C) Both A & B D) Fabaceae

132. Given diagram is- (Pg. 79, E)



- A) L.S of carpel of pea
B) Fruit of pea
C) T.S. of carpel of pea
D) Androecium of Pea

133. Calyx of fabaceae show- (Pg. 79, E)

- A) Polypetalous B) Polysepalous
C) Valvate aestivation D) Both B & C

134. Androecium of Fabaceae is – (Pg. 79, E)

- A) Ten in number B) 9 are united
C) 1 is free D) All of these

135. How many of following is endospermic seed- (Pg. 79, E)

Arhar, groundnut, Indigofera, muliathi, Sesbania, Trifolium

- A) 0 B) 1
C) 2 D) 3

136. The correct floral formula of sunhemp is- (Pg. 79, E)

- A) $\oplus \text{ } \overline{\text{K}}_{(5)} \text{ } \overline{\text{C}}_{1+2+2} \text{ } \overline{\text{A}}_{(9)+1} \text{ } \underline{\text{G}}_1$
B) $\% \text{ } \overline{\text{K}}_{(5)} \text{ } \overline{\text{C}}_{1+2+(2)} \text{ } \overline{\text{A}}_{(9)+1} \text{ } \underline{\text{G}}_1$
C) $\% \text{ } \overline{\text{K}}_{(5)} \text{ } \overline{\text{C}}_5 \text{ } \overline{\text{A}}_{10} \text{ } \underline{\text{G}}_2$
D) $\oplus \text{ } \overline{\text{K}}_{3+3} \text{ } \overline{\text{A}}_{3+3} \text{ } \underline{\text{G}}_3$

Paragraph-5.9.2

Solanaceae

137. Which of the following is potato family?
(Pg. 79, E)

- A) Fabaceae B) Solanaceae
C) Liliaceae D) Brassicaceae

138. Find out one with respect to Solanaceae
(Pg. 80, E)

- A) Alternate phyllotaxy
B) Exstipulate
C) Reticulate venation
D) Pulvinate

139. In *Solanum*, inflorescence is- (Pg. 80, E)

- A) Racemose B) Cymose
C) Solitary D) B and C

140. How many of following term is not correctly stated about tobacco's family.

Bicarpellary, obligately placed, apocarpous, superior ovary, bilocular, placenta swollen with many ovules, free – central placentation, drupe fruit

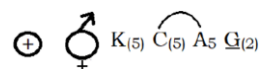
(Pg. 80, E)

- A) 0 B) 1
C) 2 D) 3

141. Persistent calyx found in- (Pg. 80, E)

- A) Brinjal B) Pea
C) Onion D) Colchicine

- 142.



is floral formula of how many of following- Aloe, belladonna, ashwagandha, muliathi, sunhemp, *Indigofera*, *Gloriosa* (Pg. 80, E)

- A) 1 B) 2
C) 3 D) 4

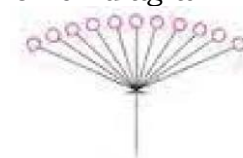
143. Makoi plant – (Pg. 80, E)

- A) *Solanum nigrum*
B) *Solanum tuberosum*
C) *Allium*
D) *Petunia*

Paragraph-5.9.3

Liliaceae

144. Given diagram is – (Pg. 81, E)



- A) Flower of *Allium*
B) Inflorescence of *Allium*
C) Inflorescence of dicot family
D) Racemose

145. How many of following are endospermous seed.

Aloe, *Asparagus*, Tulip, Potato, Tomato, Pea, *Petunia*, Chilli, *Sesbania*, *Trifolium*, *Lupin*, Muliathi, Ashwagandha, *Colchicine*, *Gloriosa*

(Pg. 81, E)

- A) 10 B) 8

- C) 15 D) 5
146. Onion show- (Pg. 81, E)

A) Axile placentation
B) Parietal placentation
C) Free central placentation
D) Basal placentation

147. Gynoecium of Aloe is not- (Pg. 81, E)

A) Tricarpellary B) Apocarpous
C) Syncarpous D) Superior ovary

148. Floral formula of *Colchicum autumnale* does not show- (Pg. 81, E)

A)	Br $\oplus \sigma$
B)	$\overbrace{P_{(3+3)} A_{(3+3)}}$
C)	$\underline{G}_{(3)}$
D)	All of these

149. Choose mismatched – (Pg. 81, H)

	Column-I	Column-II
A)		<i>Asparagus</i> (vegetables)

B)		Mustard
C)		<i>Pisum sativum</i>
D)		Brassicaceae

150. The floral feature of angiosperm represented in summarized form as-

(Pg. 81, E)

A) Floral diagram B) Floral formula
C) A and B D) None of these

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ANSWER KEY

MORPHOLOGY OF FLOWERING PLANT

Q	01	02	03	04	05	06	07	08	09	10
Ans	B	C	C	B	A	A	A	B	D	B
Q	11	12	13	14	15	16	17	18	19	20
Ans	C	B	D	B	B	A	B	D	B	A
Q	21	22	23	24	25	26	27	28	29	30
Ans	D	B	A	A	A	B	A	B	A	B
Q	31	32	33	34	35	36	37	38	39	40
Ans	A	B	C	B	A	C	A	A	B	B
Q	41	42	43	44	45	46	47	48	49	50
Ans	A	D	A	D	D	D	A	A	A	A
Q	51	52	53	54	55	56	57	58	59	60
Ans	A	C	A	C	B	A	B	B	B	A
Q	61	62	63	64	65	66	67	68	69	70
Ans	B	D	A	B	D	A	D	D	B	C
Q	71	72	73	74	75	76	77	78	79	80
Ans	A	B	A	D	B	C	D	A	D	A
Q	81	82	83	84	85	86	87	88	89	90
Ans	A	A	A	B	D	B	A	D	B	B
Q	91	92	93	94	95	96	97	98	99	100
Ans	B	A	A	A	A	A	D	B	D	A
Q	101	102	103	104	105	106	107	108	109	110
Ans	C	B	C	B	C	A	B	D	B	A
Q	111	112	113	114	115	116	117	118	119	120
Ans	A	A	C	C	C	A	D	C	D	B
Q	121	122	123	124	125	126	127	128	129	130
Ans	A	A	C	B	C	A	B	A	C	D
Q	131	132	133	134	135	136	137	138	139	140
Ans	B	A	C	D	D	B	B	D	B	D
Q	141	142	143	144	145	146	147	148	149	150
Ans	A	B	A	B	A	A	B	B	B	C

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5

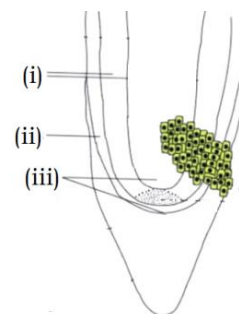
Anatomy of Flowering Plants

Paragraph 6.1 The Tissues**Paragraph 6.1.1 Meristematic tissues:**

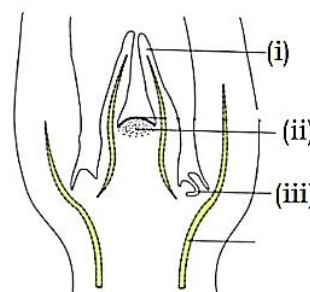
1. Apical meristems (Pg. 84, E)
 - A) Occur at root tip
 - B) Produce primary tissues
 - C) Regenerate parts of plant
 - D) Both A & B
2. During leaf formation and stem elongation, some cells of apical meristem left behind form- (Pg. 84, E)
 - A) Primary cell.
 - B) Intercalary meristem
 - C) Axillary bud
 - D) Interfascicular cambium
3. Intercalary meristem (Pg. 85, E)
 - A) Occur in grasses
 - B) Occur between mature tissue
 - C) Both A & B
 - D) None
4. Primary meristem (Pg. 85, E)
 - A) Appear later in life of plant
 - B) Appear early in life of plant
 - C) Regenerates parts of plant
 - D) Both B & C
5. Primary body of plant is formed by- (Pg. 85, E)
 - A) Meristem
 - B) Vascular cambium
 - C) Both A & B
 - D) None
6. Lateral meristem are- (Pg. 85, E)
 - A) Type of primary meristem
 - B) Appearing early in life of plant
 - C) Responsible for producing secondary tissues
 - D) Both A & B
7. Secondary meristem include- (Pg. 85, E)
 - A) Fascicular vascular cambium
 - B) Cork cambium
 - C) Secondary phloem
 - D) Both A and B
8. Meristem that occur in mature region of root and shoot of plant- (Pg. 85, E)

- A) Apical meristem
- B) Intercalary meristem
- C) Lateral meristem
- D) None of these

9. Identify the correct labels- (Pg. 85, E)



- A) (i) – cortex, (ii) – Protoderm, (iii) – initial of central cylinder & cortex
 - B) (i) – Protoderm, (ii) – cortex, (iii) – central cylinder
 - C) (i) – central cylinder, (ii) – cortex, (iii) – Protoderm
 - D) (i) – central cylinder, (ii) – Protoderm, (iii) – cortex
10. Identify the axillary bud in given figure – (Pg. 85, E)



- A) (i)
- B) (ii)
- C) (iii)
- D) Both (ii) and (iii)

Paragraph – 6.1.2 Permanent Tissue

11. Cell of permanent tissue (Pg. 86, E)
 - A) Divide regularly to repair damage
 - B) Divide occasionally
 - C) Do not divide generally
 - D) Both (B) and (C)
12. Simple tissue are – (Pg. 86, E)
 - A) Meristematic tissues having all cells similar in structure and function
 - B) Meristematic tissues having different types of cells

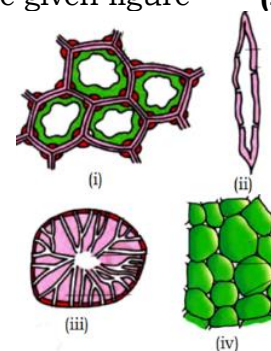
- C) Permanent tissues having all cells similar in structure and function
D) Permanent tissues having many different type of cells
13. Complex tissues are –
(Pg. 86, E)
- A) Meristematic tissues having all cells similar in structure and function
B) Permanent tissues having all cells similar in structure and function
C) Meristematic tissues having different types of cells
D) Permanent tissues having different types of cells.

Paragraph – 6.1.2.1 Simple tissue

14. Simple tissues are made of
(Pg. 86, E)
- A) Some types of cells of similar origin
B) Only one type cells
C) Different types of cells of same origin
D) Different types of cells of different origin
15. Major component within organs is formed by –
(Pg. 86, E)
- A) Collenchyma B) Sclerenchyma
C) Parenchyma D) All of these
16. Walls of parenchyma are made of –
(Pg. 86, E)
- A) Proteose B) Cellulose
C) Keratin D) Pectin
17. Parenchyma performs functions –
(Pg. 86, E)
- A) Photosynthesis B) Storage
C) Secretion D) All of the above
18. Parenchyma cells are generally –
(Pg. 86, E)
- A) Of varying diameters, with no intercellular space
B) Of similar diameters, with no intercellular space
C) Of similar diameters, with small intercellular space
D) Both B and C
19. Where does collenchyma occur?
(Pg. 86, E)
- A) Below endodermis in most monocots
B) Below epidermis in most monocots
C) Below epidermis in most dicots
D) Below endodermis in most dicots
20. Cell of collenchyma are thickened at corners due to deposition of
(Pg. 86, E)
- A) Cellulose B) Hemicellulose

- C) Pectin D) All of these
21. Collenchyma cells –
(Pg. 86, E)
- A) May be polygonal and never contain chloroplasts.
B) May be polygonal and often contain chloroplasts
C) May be oval and contain chloroplasts
D) Both B and C
22. Collenchyma cells
(Pg. 86, E)
- A) Have no intercellular spaces
B) Have large intercellular spaces
C) May or may not have intercellular spaces
D) None of these
23. Mechanical support in plants is provided by
(Pg. 86, E)
- A) Parenchyma B) Collenchyma
C) Sclerenchyma D) Both B and C
24. Choose the best option
(Pg. 86, M)
- A) All collenchymatous cells assimilate food
B) No collenchymatous cells assimilate food
C) Some collenchymatous cells do not assimilate food
D) All collenchymatous cells do not assimilate food
25. Collenchyma provide mechanical support to –
(Pg. 86, E)
- A) Young stem
B) Petiole of leaf organs only
C) Organs only
D) All of these

26. Identify the given figure
(Pg. 86, E)



- A) (i) – parenchyma, (ii) – fibre, (iii) – sclereid, (iv) – collenchyma
B) (i) – sclereids, (ii) – fibre, (iii) – parenchyma, (iv) collenchyma
C) (i) – collenchyma, (ii) – sclerids, (iii) – fibres, (iv) – parenchyma

- D) (i) – collenchyma, (ii) fibre, (iii) – sclereids, (iv) – parenchyma
27. Sclerenchyma cells are – (Pg. 86, E)
- A) Usually dead with protoplast
B) Usually dead without protoplast
C) Usually living with protoplast
D) Usually living without protoplast
28. Read the given statements –
(Pg. 86, M)
- (i) Sclereids are found in leaves of tea.
(ii) Fibres generally occur single in various plant parts.
(iii) Sclerenchyma provides mechanical support to young stems.
(iv) Parenchyma cells have thick walls.
(v) Collenchyma cells are thickened at corners.
- How many are correct
- A) 2 B) 3
C) 4 D) 1
29. Pulp of pear has which type of sclerenchyma cells-
(Pg. 87, E)
- A) Sclereids B) Fibres
C) Tracheids D) Trichomes

Paragraph – 6.1.2.2

Complex Tissues

30. Complex tissues are –
(Pg. 87, E)
- A) Made of one of cells, working as unit
B) Made of many types of cells, working as a unit
C) Made of one type of cells, working separately
D) Made of many types of cells, working separately
31. Xylem has following functions except-
(Pg. 87, E)
- A) Conducting water from roots to upper plant part
B) Conducting minerals from leaves to roots
C) Providing mechanical strength to plant parts
D) Conducting sap from roots to leaves
32. Xylem tissue consists of-
(Pg. 87, E)
- A) Sieve tube, companion cells, fibres, parenchyma
B) Sieve cells, vessels, fibres, parenchyma
C) Vessels, tracheids, sieve tube, fibres
D) Vessels, tracheid, fibres, parenchyma
33. Gymnosperms lack-
(Pg. 87, E)

- A) Xylem vessels
B) Companion cells
C) Sieve tubes and companion cells
D) All of the above
34. Phloem of gymnosperms possess-
(Pg. 87, E)
- A) Albuminous cells B) Companion cells
C) Sieve tube D) Both (B) and (C)
35. Xylem has all dead cells except-
(Pg. 87, E)
- A) Xylem parenchyma
B) Xylem fibres
C) Xylem vessels
D) Xylem tracheids
36. Ray parenchymatous cells help in –
(Pg. 87, E)
- A) Radial conduction of food
B) Axial conduction of water
C) Axial conduction of food
D) Radial conduction of water
37. Food materials can be stored in xylem parenchyma in all of these forms except –
(Pg. 87, E)
- A) Starch B) Fat
C) Tannin D) None
38. In stems,
(Pg. 87, E)
- A) Protoxylem lies towards centre and metaxylem towards periphery, called endarch
B) Protoxylem lies towards centre and metaxylem towards periphery, called exarch
C) Metaxylem lies towards centre and protoxylem towards periphery called endarch
D) Metaxylem lies towards centre and protoxylem towards periphery called exarch
39. In roots –
(Pg. 87, E)
- A) Protoxylem lies towards centre and metaxylem towards periphery, called endarch
B) Protoxylem lies towards centre and metaxylem towards periphery, called exarch
C) Metaxylem lies towards centre and protoxylem towards periphery called endarch
D) Metaxylem lies towards centre and protoxylem towards periphery called exarch
40. A mature sieve element – (Pg. 88, E)
- A) Have peripheral nucleus

- B) Have peripheral cytoplasm and no nucleus
 C) Have no vacuole and no nucleus
 D) Have large vacuole and peripheral nucleus
41. Phloem fibres –
 (Pg. 88, E)
 A) Are made of parenchyma
 B) Are made of collenchyma
 C) Present in primary phloem
 D) Present in secondary phloem
42. Which of the statements about Phloem is correct?
 (Pg. 88, M)
 A) Protoploem consists of narrow sieve tube
 B) Metaphloem consists of narrow sieve tubes
 C) Protophloem consists of bigger sieve tubes
 D) Both protophloem and metaphloem have bigger sieve tubes.

Paragraph – 6.2

The tissue system

43. The three types of tissue systems – epidermal ground and vascular systems are classified based on their-
 (Pg. 88, E)
 A) Function
 B) Location
 C) Structure
 D) Both (B) and (C)

Paragraph – 6.2.1

Epidermal tissue system

44. Outer layer of primary plant body is –
 (Pg. 88, E)
 A) Epiblema
 B) Epidermis
 C) Epicarp
 D) Ectodermis
45. Waxy layer on epidermis-
 (Pg. 89, E)
 A) is called trichome
 B) is called epiblema
 C) is absent in roots
 D) help in exchange of gases
46. Consider the following statements –
 i) Epidermal cells are parenchymatous.
 ii) Epidermis is usually two – layered.
 iii) Stomata are usually present in epidermis of stem.
 iv) Outer walls of guard cells are thick and inner walls are thin.
 v) Subsidiary cells are epidermal cells.
 How many of these statements are incorrect?
 A) 2
 B) 1

- C) 3
 D) 4
47. Stomatal apparatus consists of –
 (Pg. 89, E)
 A) Stomatal aperture only
 B) Stomatal aperture and guard cells
 C) Subsidiary cells
 D) Both (B) and (C)
48. Epidermal cells modify to form
 (Pg. 89, E)
 A) Trichomes only
 B) Trichomes, Root hairs, Stomata
 C) Trichomes, Root hair, Subsidiary cells
 D) Root hairs only
49. Trichomes –
 (Pg. 89, E)
 A) Present on stem and are multicellular
 B) Present on root and are multicellular
 C) Present on stem and are unicellular
 D) Present on root and are unicellular

Paragraph – 6.2.2

The ground Tissue System

50. All tissues are included in ground tissue except –
 (Pg. 89, E)
 A) Cortex
 B) Pith
 C) Pericycle
 D) Epidermis
51. In leaves, mesophyll is present in –
 (Pg. 89, E)
 A) Epidermal tissue system
 B) Ground tissue system
 C) Vascular tissue system
 D) Both (A) & (B)

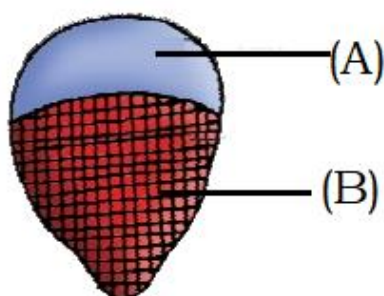
Paragraph – 6.2.3

The Vascular Tissue System

52. In dicots stem, which condition is present
 (Pg. 90, E)
 A) Cambium present between xylem & phloem, known as closed type vascular bundle
 B) Cambium absent between xylem & phloem, known as closed type vascular bundle.
 C) Cambium present outside xylem & phloem, known as open type vascular bundle
 D) Cambium present between xylem & phloem, known as open type vascular bundle.
53. A : Monocot have closed type of vascular bundles
 R : monocots do not show secondary growth
 (Pg. 90, H)

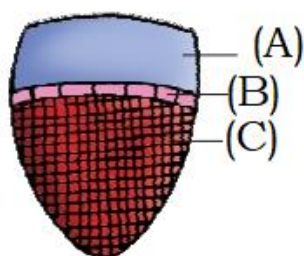
- A) Both A and R are correct and R is correct explanation of A
 B) Both A & R are correct and R is not the explanation of A
 C) A is correct and R is incorrect
 D) Both A & R are incorrect
54. Read given statements in context of given figure

(Pg. 90, E)



- i) A is xylem and B is phloem
 ii) A is phloem and B is xylem
 iii) Primary xylem in figure is endarch type.
 iv) Primary in figure is exarch type.
 Choose the correct statements
 A) (i) and (iii) B) (i) and (iv)
 C) (ii) and (iii) D) (ii) and (iv)
55. The given figure can be vascular bundle of

(Pg. 90, E)



- A) Shoot of sunflower
 B) Shoot of grass
 C) Root of sunflower
 D) Root of grass

Paragraph – 6.3

Anatomy of Dicot & Monocot Plants

TG: @Chalnaayaaar

56. For understand the tissue organization of roots, stems and leaves better, it is convenient to study–
- (Pg. 90, E)
- A) Longitudinal section of young and growing zones of organs
 B) Transverse section of young & growing zones of organs
 C) Longitudinal section of mature zones of organs

- D) Transverse section of mature zones of organs

Paragraph – 6.3.1

Dicotyledonous Root

57. Choose correct order of cells from outside to inside in a sunflower root–
 (Pg. 90, E)
- A) Epidermis – endodermis – cortex – pericycle
 B) Epiblema – cortex – endodermis – pericycle
 C) Epiblema – cortex – pericycle – endodermis
 D) Epidermis – endodermis – pericycle – cortex
58. Suberin is deposited on –
 (Pg. 90, E)
- A) Tangential walls of epidermal cells
 B) Radial walls of cortical cells
 C) Tangential walls of endodermal cells
 D) radial walls of epidermal cells
59. The substance that casparian strips is made up of is –
 (Pg. 91, E)
- A) waxy
 B) water – impermeable
 C) suberin
 D) all of these
60. Initiation of lateral roots in dicot during secondary growth occurs in –
 (Pg. 91, E)
- A) Endodermal cells
 B) Pericycle
 C) Medullary ray
 D) Conjunctive tissue
61. Initiation of vascular cambium in dicot root during secondary growth occurs from –
 (Pg. 91, E)
- A) Thin walled parenchymatous cells
 B) Thick walled collenchyma cells
 C) Thinn walled endodermal cells
 D) Thick walled parenchyma cells
62. Which of the following is true about
- A) Parenchymatous and lie outside phloem
 B) Parenchymatous and lie outside endodermis
 C) Collenchymatous and lie between xylem and phloem
 D) Parenchymatous and lie between xylem & phloem
63. Endodermis is present in dicot root in
 (Pg. 91, E)

- A) Two layer with little intercellular spaces
 B) Two layer without any intercellular spaces
 C) Single layer with little intercellular spaces
 D) Single layer without any intercellular spaces

64. Cortex of dicot root consists of –

(Pg. 91, E)

- A) Multi layers of thick walled parenchyma
 B) Multi layers of thin walled parenchyma
 C) Single layer of thick walled parenchyma
 D) Single layer of thin walled parenchyma

65. Innermost layer of cortex in dicot root is –

(Pg. 91, E)

- A) Pericycle
 B) Hypodermis
 C) Endodermis
 D) Pith
66. Parenchyma cells are generally thin walled. An example of thick-walled parenchyma in dicot root is

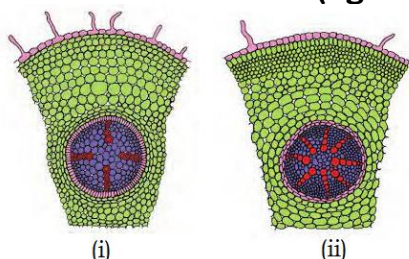
(Pg. 91, E)

- A) Pith
 B) Pericycle
 C) Endodermis
 D) Hypodermis
67. Stele includes

(Pg. 91, E)

- A) Endodermis, pericycle, pith
 B) Endodermis, pericycle, vascular bundles
 C) Pericycle, vascular bundle, pith
 D) Endodermis, vascular bundle, pith
68. Identify the figure (i) & (ii)

(Pg. 91, E)



- A) (i) – T.S of dicot root
 (ii) – T.S of monocot root
 B) (i) – T.S of dicot stem
 (ii) – T.S of monocot stem
 C) (i) – T.S of monocot root
 (ii) – T.S of dicot root
 D) (i) – L.S of monocot stem
 (ii) – L.S of dicot root
69. Identify the correct labels of monocot root T.S

(Pg. 91, E)

- A) (i)– cortex, (ii)– endodermis, (iii)– pericycle
 B) (ii)– cortex, (i)– endodermis, (iii)– pericycle
 C) (iii)– cortex, (ii)– endodermis, (i)– pericycle
 D) (i)– cortex, (iii)– endodermis, (ii)– pericycle

Paragraph – 6.3.2

Monocotyledonous Root

70. Xylem bundles in monocot root–

(Pg. 91, E)

- A) Are fewer than dicot root
 B) Are less than six
 C) Are polyarchy
 D) All of the above

71. Secondary growth in monocot roots occur–

(Pg. 91, E)

- A) By vascular cambium
 B) By interfascicular cambium
 C) Both A & B
 D) None of these

Paragraph – 6.3.3

Dicotyledonous Stem

72. Epidermis of dicot stem–

(Pg. 91, E)

- A) Is called epiblema
 B) Lacks stomata
 C) Has a thin layer of cuticle
 D) Lacks trichomes

73. Cortex in dicot stem is found between–

(Pg. 92, E)

- A) Epidermis and endodermis
 B) Endodermis and pericycle
 C) Pericycle and pith
 D) Endodermis and pith

74. Hypodermis of dicot stem is made of–

(Pg. 92, E)

- A) Parenchyma
 B) Collenchyma
 C) Sclerenchyma
 D) All of these

75. Starch sheath is found in dicot stem in –

(Pg. 92, E)

- A) Endodermis
 B) Cortex
 C) Pericycle
 D) Pith

76. Cortical cells dicot stem has–

(Pg. 92, E)

- A) No intercellular spaces
 B) Inconspicuous intercellular spaces
 C) Conspicuous intercellular spaces
 D) Very large intercellular spaces

77. Pericycle of dicot stem is present in the form of–

(Pg. 92, E)

- A) Semi – square patches of collenchyma
 B) Semi – lunar patches of sclerenchyma
 C) Semi – lunar patches of collenchyma
 D) Semi – lunar patches of parenchyma
78. Medullary rays are –

(Pg. 92, E)

- A) Axially placed, parenchymatous
 B) Axially placed, collenchymatous
 C) Radially placed, parenchymatous
 D) Radially placed, collenchymatous
79. Location of medullary rays –

(Pg. 92, E)

- A) Above endodermis
 B) Between endodermis and pericycle
 C) Between pericycle and cortex
 D) Between vascular bundles

80. In sunflower stem, vascular bundle is –

(Pg. 93 E)

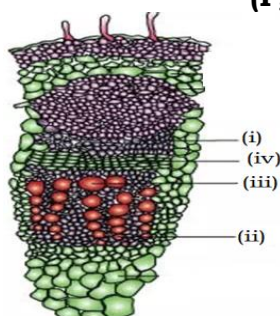
- A) Conjoint, closed, exarch protoxylem
 B) radial, open, endarch protoxylem
 C) conjoint, open, exarch protoxylem
 D) conjoint, open, endarch protoxylem
81. which of these is incorrect about pith of dicot stem?

(Pg. 93, E)

- A) Parenchymatous cells
 B) No intercellular space
 C) Central portion of stem
 D) Large intercellular space

82. Identify the correct labels

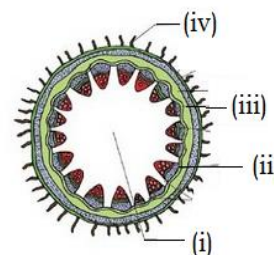
(Pg. 92, E)



- A) (i)- protoxylem, (ii)- cambium, (iii)- phloem, (iv)- metaxylem
 B) (ii)- protoxylem, (iv)- cambium, (i)- phloem, (iii)- metaxylem
 C) (iv)- protoxylem, (i)- cambium, (ii)- phloem, (iii)- metaxylem
 D) (iii)- protoxylem, (iv)- cambium, (i)- phloem, (ii)- metaxylem

83. Identify endodermis in the given figure-
 (Pg. 92, E)

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- A) (i) B) (ii)
 C) (iv) D) (iii)

Paragraph – 6.3.4

Monocot Stem

84. Select the correct match of columns A & B
 (Pg. 93, M)

	Column A		Column B
i	Hypodermis of grasses stem	1	parenchyma
ii	Hypodermis of sunflower stem	2	Collenchyma
iii	Bundle sheath of grasses stem	3	Sclerenchyma
iv	Ground tissue of grasses stem		

- A) (i)- 2, (ii)- 3 B) (iv)- 1, (iii)- 1
 C) (iii)- 3, (i)- 3 D) (ii)- 1, (iv)- 3

85. In monocot stem,

(Pg. 93, E)

- A) Peripheral vascular bundles are generally smaller than central ones
 B) Central vascular bundles are generally smaller than peripheral ones
 C) Both peripheral and central are almost same sized
 D) None of these

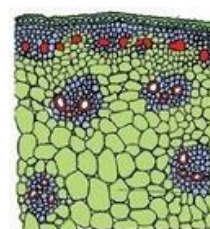
86. Phloem parenchyma is absent in-

(Pg. 93, E)

- A) Gymnosperms B) Monocots
 C) Both D) None

87. The given figure is

(Pg. 92, E)



- A) Monocot root B) Dicot root
C) Monocot stem D) Dicot stem

Paragraph – 6.3.5

Dorsiventral leaf (Dicot)

88. Read the given statements and choose the number of correct statements

(Pg. 93, M)

- (i) Leaf of dicot lack cuticle
(ii) Stomata on adaxial side of epidermis is more in number than abaxial side
(iii) Mesophyll is the ground tissue in dicot leaf
(iv) The adaxial epidermis may lack stomata

- A) 1 B) 2
C) 3 D) 4

89. In the leaf of sunflower, mesophyll lies-

(Pg. 93, E)

- A) Between epidermis and cortex
B) Between adaxial epidermis and abaxial epidermis
C) Between endodermis and pericycle
D) Between pericycle and vascular bundles

90. Which of the given statements about dicot leaf is incorrect?

(Pg. 93, M)

- A) The abaxial palisade parenchyma is made of elongated cells
B) Spongy parenchyma is oval or round
C) The spongy parenchyma has large spaces between cells
D) The parenchyma on adaxial side of leaf are arranged vertically & parallel to each other

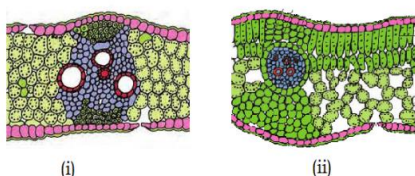
91. Consider the statements given below-

(Pg. 93, M)

- a) Size of vascular bundle in leaf depend upon size veins
b) Vascular bundles in leaf are surrounded by bundle sheath cells
A) (a) is correct & (b) is incorrect
B) (a) is incorrect & (b) is correct
C) Both are correct
D) Both are incorrect

92. Identify the correct option in context of given figures

(Pg. 93, E)



- A) (i)- dicot stem, (ii)- monocot stem

- B) (i)- dicot leaf, (ii)- monocot leaf
C) (i)- monocot stem, (ii)- dicot stem
D) (i)- monocot leaf, (ii)- dicot leaf

Paragraph – 6.3.6

Isobilateral Leaf (Monocot)

93. Which of the following is correct for isobilateral leaves?

(Pg. 94, E)

- A) Present in all angiosperms
B) Two different types of mesophyll are found
C) Stomata on both surfaces of mesophyll
D) Has similar sizes of vascular bundles

94. In grasses, large, empty, colourless cells are called-

(Pg. 94, E)

- A) Subsidiary cells
B) Complementary cells
C) Cortical cells
D) None of these

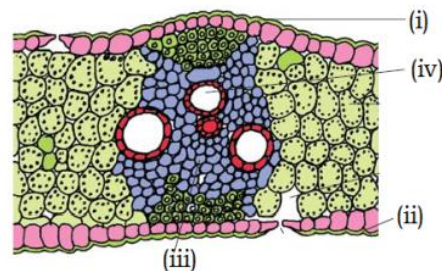
95. Identify the incorrect statement in regards to bulliform cells-

(Pg. 94, E)

- A) Present on abaxial side
B) Empty cells
C) Makes leaf curl inward when flaccid
D) Helps to minimize water loss

96. Identify correct labels for given figure.

(Pg. 94, E)



- A) (i)- adaxial epidermis (ii)- abaxial epidermis, (iii)- xylem (iv)- phloem
B) (ii)- adaxial epidermis (i)- abaxial epidermis, (iii)- xylem (iv)- phloem
C) (i)- adaxial epidermis (ii)- abaxial epidermis, (iv)- xylem (iii)- phloem
D) (ii)- adaxial epidermis (i)- abaxial epidermis, (iv)- xylem (iii)- phloem

Paragraph – 6.4

Secondary growth

97. Increase in girth of plant-

(Pg. 94, E)

- A) Involves lateral meristem
B) Involves intercalary meristem
C) Involves apical meristem

D) All of these

Paragraph – 6.4.1 **Vascular Cambium**

98. Vascular cambium-

(Pg. 94, E)

- i) Is meristematic
- ii) Present in patches between xylem and phloem in young stem
- iii) Present as a single layer between xylem and phloem in young stem
- iv) Forms complete ring later

How many of the above statements are correct-

- A) 1
- B) 2
- C) 3
- D) 4

Paragraph – 6.4.1.1 **Formation of cambial ring**

99. In dicot stem, cambium cells present between xylem & phloem is-

(Pg. 94, E)

- A) Intrafascicular cambium
- B) Interfascicular cambium
- C) Cork cambium
- D) Cortical cambium

100. Interfascicular cambium is formed by-

(Pg. 94, E)

- A) Pericycle cells
- B) Endodermal cells
- C) Medullary cells
- D) Complementary cells

Paragraph – 6.4.1.2 **Activity of Cambial Ring**

101. Cambial ring cuts off new cells-

(Pg. 95, E)

- A) Towards inner side only
- B) Towards outer side only
- C) Towards inner and outer side both
- D) Along its own axis

102. Cambial ring cuts off new cells –

(Pg. 95, E)

- A) Towards pith, called secondary phloem
- B) Towards pith, called secondary cambium
- C) Towards pith, called secondary medullary rays
- D) Towards pith, called secondary xylem

103. Cambial ring cut off –

(Pg. 95, E)

- A) More cells on outer side
- B) More cells on inner side
- C) Equal cells on both sides
- D) Cells randomly

104. **Assertion:** secondary xylem form a compact mass.

Reason: cambium is lesser active on outer side comparatively.

Choose the best option-

(Pg. 95, H)

- A) Assertion & Reason both are correct and Reason is correct explanation for Assertion.
- B) Assertion & Reason both are correct and Reason is not the correct explanation for Assertion
- C) Assertion is correct but Reason is incorrect
- D) Assertion is incorrect but Reason is correct

105. Secondary medullary rays are-

(Pg. 95, E)

- A) Narrow bands of parenchyma
- B) Narrow bands of meristem
- C) Wide bands of parenchyma
- D) Wide bands of meristem

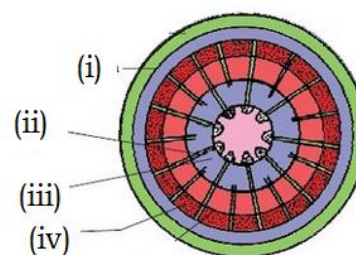
106. Which of these is correct about activity of cambial ring?

(Pg. 95, E)

- A) Secondary xylem crushes primary xylem
- B) Secondary xylem crushes primary phloem
- C) Secondary xylem crushes secondary phloem
- D) Both B & C

107. Identify the secondary xylem in the figure-

(Pg. 95, E)



- A) (i)
- B) (ii)
- C) (iii)
- D) (iv)

Paragraph – 6.4.1.3 **Spring wood and autumn wood**

108. Activity of cambium is under control of-

(Pg. 96, E)

- A) Physiological factors
- B) Environmental factors
- C) Both A & B
- D) Depend on season only

109. In spring, cambium produce-

(Pg. 96, E)

- A) Less xylary elements, having vessels with wider cavities
 B) More xylary elements, having vessels with wider cavities
 C) Less xylary elements, having vessels with narrow cavities
 D) More xylary elements, having vessels with narrow cavities
110. Select the characters of autumn wood from the list-

(Pg. 96, E)

- i) Light in colour ii) Dark in colour
 iii) Low density iv) High density
 v) Wider vessels vi) Narrow vessels
 A) i, iii, v B) i, iv, vi
 C) ii, iv, vi D) ii, iii, v
111. Annual rings are constituted by-

(Pg. 96, E)

- A) Alternate concentric rings of 3 types of woods
 B) continuous concentric rings of 3 types of woods
 C) Alternate concentric rings of 2 types of woods
 D) continuous concentric rings of 2 types of woods.

Paragraph – 6.4.1.4

Heartwood & Sapwood

112. Heartwood is-

(Pg. 96, E)

- A) Light in colour
 B) Dark in colour
 C) Alternately light & dark in colour
 D) None of these
113. Consider the following statements about heartwood-

(Pg. 96, E)

- i) Lighter in colour
 ii) Comprises dead elements
 iii) Suberized walls
 iv) Resistant to attack of micro-organisms
 v) Conducts water and provide mechanical support to plant

How many of the statements are correct?

- A) 2 B) 3
 C) 4 D) 5

Paragraph – 6.4.2

Cork Cambium

114. **Assertion:** Cork cambium is needed due to activity of vascular cambium

Reason: Phellogen is present below endodermis

Select the appropriate answer-

(Pg. 96, E)

- A) Both Assertion & Reason are correct
 B) Assertion is correct and Reason is wrong
 C) Assertion is wrong and Reason is correct
 D) Both Assertion and Reason are wrong
115. Phellogen is made of-

(Pg. 96, E)

- A) Narrow, thick-walled, meristematic cells
 B) Narrow, thin-walled, parenchyma
 C) Narrow, thick-walled, parenchyma
 D) Narrow, thin-walled, meristem
116. Phellogens cuts-

(Pg. 96, E)

- A) Cork on inner side and phelloderm on outside
 B) Phellem on inner and secondary cortex on outside
 C) Bark on outside and secondary cortex on inside
 D) Phellem on outside and phelloderm on inside

117. Cork is impervious to water due to

(Pg. 96, E)

- A) Lignin B) Suberin
 C) Keratin D) Cellulose
118. Bark includes -

(Pg. 97, E)

- A) Secondary xylem and periderm
 B) Secondary phloem and periderm
 C) Pericycle and vascular cambium
 D) Pith and stele

119. Phlloderm is -

(Pg. 97, E)

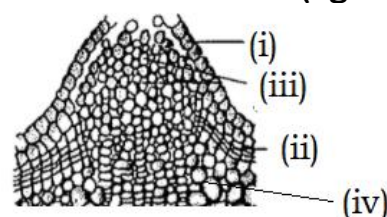
- A) Parenchymatous
 B) Collenchymatous
 C) Sclerenchymatous
 D) Meristematic

120. Lenticles are

(Pg. 97, E)

- A) Circle - shaped B) Rectangular
 C) Lens - shaped D) Polygonal shaped
121. Select the correct labels -

(Pg. 97, E)



- A) (i) - complimentary cells

- B) (ii) – cork cambium
- C) (iii) – secondary cortex
- D) (iv) – epidermis

Paragraph – 6.4.3

Secondary Growth in Roots

122. In sunflower root. Vascular cambium is originated from tissues –

(Pg. 97, E)

- A) Below phloem bundle
- B) Of pericycle
- C) Of interfascicular cambium
- D) Both (A) & (B)

123. Secondary growth does not occur in –

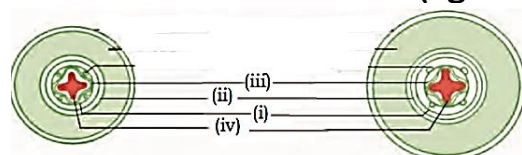
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(Pg. 98, E)

- A) Gymnosperm stem
- B) Gymnosperm root
- C) Monocot
- D) All of these

124. Identify the cambial ring –

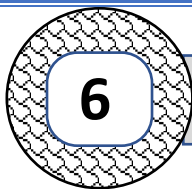
(Pg. 98, E)



- A) (i)
- B) (iii)
- C) (iv)
- D) (ii)

Answer Key
ANATOMY OF FLOWERING PLANTS

Q	01	02	03	04	05	06	07	08	09	10
Ans	D	C	C	D	A	C	D	C	A	C
Q	11	12	13	14	15	16	17	18	19	20
Ans	D	C	D	B	C	B	D	D	C	D
Q	21	22	23	24	25	26	27	28	29	30
Ans	D	A	D	C	A	D	B	A	A	B
Q	31	32	33	34	35	36	37	38	39	40
Ans	B	D	A	A	A	D	D	A	D	B
Q	41	42	43	44	45	46	47	48	49	50
Ans	D	A	D	B	C	C	D	C	A	D
Q	51	52	53	54	55	56	57	58	59	60
Ans	B	D	B	C	A	D	B	C	D	B
Q	61	62	63	64	65	66	67	68	69	70
Ans	D	D	D	B	C	B	C	C	B	C
Q	71	72	73	74	75	76	77	78	79	80
Ans	D	C	A	B	A	C	B	C	D	D
Q	81	82	83	84	85	86	87	88	89	90
Ans	B	B	D	C	A	B	C	B	B	A
Q	91	92	93	94	95	96	97	98	99	100
Ans	C	D	D	D	A	C	A	D	A	C
Q	101	102	103	104	105	106	107	108	109	110
Ans	C	D	B	A	A	D	C	C	B	C
Q	111	112	113	114	115	116	117	118	119	120
Ans	C	B	A	B	D	D	B	B	A	C
Q	121	122	123	124						
Ans	B	D	C	B						



6

Cell : the unit of life

BOTANY

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Cell Structure and Function

1. In living organisms detailed description that brings out their knowledge of diversity is about

Pg-125, easy

- A) Their form
 - B) Their appearance
 - C) Both
 - D) None
2. What brought out the unit of diversity the cellular organisation of all life form:

Pg-125, easy

- A) Theory of evolution
 - B) Species theory
 - C) Cell theory
 - D) Darwinian theory
3. What is not true about physico-chemical approach:-

Pg-125, easy

- A) Established by analysis of living tissue for element and compounds.
- B) Explains what type of organic compounds is present in living organism.
- C) Explains the abnormal process that occur during any diseased condition.
- D) This approach is known as forward biology.

Cell :- The Unit Of Life

4. Unicellular organism are capable of
- A) Independent existence
 - B) Performing the essential functions of life.
 - C) Both
 - D) Does not ensure independent living

Pg-125, easy

5. Living cell was firstly seen and described by:-

- A) Robert Hooke
- B) Anton von Leeuwenhoek
- C) Robert Koch
- D) Robert Brown

Pg-125, easy

Paragraph – 8.2

Cell Theory

6. Cell theory was proposed by:-
- A) Matthias Schleiden and Theodore Schwann
 - B) Schleiden; Schwann and Virchow.
 - C) Rudolf Virchow
 - D) Sutton and Boveri

Pg-126, easy

7. All the plants are composed of different kinds of cells which forms the tissue of the plant, this statement was given by:-

Pg-125, easy

- A) A German botanist ; Rudolf Virchow .
- B) A British zoologist ; Matthias Schleiden
- C) A British zoologist ; Theodore Schwann
- D) A German botanist; Matthias Schleiden

8. Who studied the different types of animal cells to propose cell theory:-

- A) A British zoologist; Matthias Schleiden
- B) A German botanist; Theodore Schwann.
- C) A physicist; Rudolf Virchow.
- D) A British zoologist; Theodore Schwann.

Pg-126, easy

9. A thin outer layer studied by Theodore Schwann nowadays known as:-

- A) Plasma membrane
- B) Cell wall
- C) Glycocalyx
- D) Middle lamella

Pg-126, easy

10. Based on studies of Matthias Schleiden; what is the unique character of plant cell?

- A) Cell wall
- B) Middle lamella
- C) Glycocalyx
- D) None of these

Pg-126, easy

11. The hypothesis that the bodies of animals and plant are composed of cells and their products was proposed by:-

Pg-126, easy

- A) Schleiden and Schwann
- B) Rudolf Virchow
- C) Schwann only
- D) Virchow and Schleiden

12. Scientist who gave the final shape to cell theory?

Pg-126, easy

- A) Schleiden
- B) Schwann
- C) Virchow
- D) Schleiden & Schwann

13. Which of the following is related to cell theory :-

Pg-126, medium

- i) All living organisms are composed of cells and product of cells.
- ii) Proposed by Schleiden and Schwann.
- iii) Modified by Rudolf Virchow
- iv) All cells arise from pre – existing cell.
- v) “Omnis cellula – e – cellula”
- A) Only one of the above
- B) Only two of the above
- C) Only four of the above
- D) All five

Paragraph – 8.3

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An Overview of Cell

14. What is the delimiting boundary around a human cheek cell?

Pg-126, easy

- A) Cell membrane
- B) Protoplasm
- C) Protoplast
- D) Cell wall

15. What is the Semi – fluid matrix inside the cell?

Pg-126, easy

- A) Cell membrane
- B) Protoplast
- C) Cytoplasm
- D) Nucleus

16. How many of the following statements are not true:-

Pg-126, medium

- i) All cells have membrane bound nuclei and nucleolus.
- ii) Nucleus contains the chromosome
- iii) DNA is the Genetic material.
- iv) Cytoplasm is the main arena of cellular activities in plant and animal cells.
- A) Only (ii), (iii), & (iv)
- B) Only (ii) & (iv)
- C) Only (i) & (iii)
- D) Only (i)

17. Besides the nucleus; the ____ cell have other membrane bound distinct structures.

- A) Eukaryotic
- B) Prokaryotic
- C) Both (a) and (b)
- D) None of these

Pg-126, easy

18. What is the non – membranous organelle present in both Eukaryotic as well as Prokaryotic cell

Pg-126, easy

- A) Endoplasmic reticulum
- B) Protein
- C) Mitochondria
- D) Ribosomes of 80s' type

19. Animal cells have another non – membrane bound cellular organelle known as:-

Pg-126, easy

- A) Microbodies
- B) Nucleus
- C) Lysosome
- D) Centrosome

20. Which of the following is not incorrect?

Pg-127, medium

- A) Mycoplasma is the smallest cell -> 0.3 μm in width.
- B) Bacteria could be 3 μm to 5 μm in length
- C) Human RBCs are about 7.0mm in diameter.
- D) Cell's shape is independent of their work they perform.

Paragraph – 8.4

Prokaryotic Cell

21. The prokaryotic cells are represented by:-

Pg-127, easy

- A) Bacteria
- B) BGA
- C) Mycoplasma & PPLO
- D) All of these

22. All prokaryotic cell have this cellular boundary surrounding the cell – membrane except in mycoplasma

Pg-127, easy

- A) Glycocalyx
- B) Protoplast
- C) Cell wall
- D) Cytoplasm

23. Which of the following is related to prokaryotic cell:-

Pg-127, easy

- A) Have no well defined nucleus
 B) Have basically naked genomic material.
 C) An addition to genomic DNA; the extra – genomic DNA is also present known as plasmid.
 D) All of the above
24. Which of the following confirms certain unique phenotypic characters to some bacteria

Pg-127, easy

- A) Chromosomal material
 B) Extra chromosomal material
 C) Mitochondrial DNA
 D) Genetic material present in chloroplast
25. A special form of cell membrane ; which is the characteristic of prokaryotes is:-

Pg-128, easy

- A) Plasmid B) Cell wall
 C) Cell membrane D) Mesosomes.
26. Which of the following is membrane less bodies other than Ribosomes.

Pg-128, easy

- A) Cell wall B) Inclusion
 C) Mesosomes D) Chromatophores
27. Which of the following is the essential infolding's of cell membrane

Pg-128, easy

- A) Inclusion B) Mesosome
 C) Chromatophores D) Plasmid

Paragraph – 8.4.1

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Cell Envelope and it's modification

28. What is the sequence of cell envelope in most of the prokaryotic cell (Outer to Inner)

Pg-128, easy

- A) Glycocalyx ->cell membrane -> cell wall.
 B) Cell membrane -> cell wall -> Glycocalyx
 C) Cell wall -> Glycocalyx -> cell membrane
 D) Glycocalyx ->cell wall -> cell membrane.
29. The prokaryotic cell have a single protective unit made up of

Pg-128, easy

- A) Glycocalyx + cellulosic cell wall + cell membrane
 B) Peptidoglycan cell wall + cell membrane + Glycocalyx
 C) Chitinous cell wall + cell membrane + Glycocalyx
 D) Silicious cell wall + Glycocalyx + cell membrane

30. How many of the following statements are correct:-

Pg-128, easy

- i) Glycocalyx is outermost layer.
 ii) All three layer have same function.
 iii) Bacteria can be classified on the basis of differences in the cell envelope.
 iv) Bacteria can be classified on the basis of response to the staining procedure

- A) Only one B) Only two
 C) Only three D) All four

31. The bacteria that take up gram stain are

Pg-128, easy

- A) Gram positive type.
 B) Gram negative type.
 C) Both type
 D) Neither gram positive nor gram negative.

32. The bacteria that do not take up gram stain are

Pg-128, easy

- A) Gram positive type.
 B) Gram negative type.
 C) Either gram positive or gram negative
 D) Neither gram positive nor gram negative

33. Which of the following in a bacterial envelope is a loose sheath of slimy layer

Pg-128, easy

- A) Glycocalyx B) Cell wall
 C) Cell membrane D) None of the above

34. Glycocalyx could be a thick and tough layer and known as:-

Pg-128, easy

- A) Slimy layer B) Cyst
 C) Capsule
 D) None of the above

35. Which of the following determines the shape of a bacteria cell:-

Pg-128, easy

- A) Glycocalyx B) Capsule
C) Cell membrane D) Cell Wall
36. How many of the following are not incorrect regarding a cell membrane in prokaryotes

Pg-128, medium

- i) Selectively permeable in nature
ii) Structurally similar to eukaryotic cell membrane
iii) Interacts with outer world.
iv) Innermost layer of cell envelope
v) Living layer.
- A) Only (ii), (iii) & (iv)
B) Only (i), (ii), (iii), (iv) & (v)
C) Only (i), (iii), (iv) & (v)
D) Only (i), (iv) & (v)
37. How many of the following are the membranous extensions into the cell of bacteria:-

Pg-128, easy

Mesosomes, Tubules, Vesicles,
Lamellae, Chromatophores,
Inclusions

- A) 6 B) 3
C) 5 D) 4
38. How many functions from the following, the mesosomes can perform

Pg-129, easy

- i) DNA replication
ii) Respiration
iii) DNA distribution to daughter cells
iv) Secretion
v) Increases surface area
vi) Contains enzymatic content.
- A) Only four
B) Only Three
C) All six
D) Only five
39. In cyanobacteria, there are some other membranous extensions except mesosomes are:

Pg-129, easy

- A) Inclusion B) Fat globules
C) Chromatophores D) All of the above
40. What are structures related to Bacterial flagellum:-

Pg-129, easy

- A) Basal body & filament
B) Basal body, Hook & filament.
C) Hook & filament

- D) Filament only.
41. Longest portion of flagellum is:-

Pg-129, easy

- A) Basal body
B) Hook
C) Filament
D) None of the above
42. Which of the following structure helps in motility in bacterial cell:-

Pg-129, easy

- A) Cell membrane B) Pili
C) Fimbriae D) Flagella
43. Which of the following is not a surface structure :-

Pg-129, easy

- A) Fimbriae B) Pili
C) Flagella D) Inclusion
44. Which of the following is small bristle like fibres sprouting out of the cell:-

Pg-129, easy

- A) Pili B) Cilia
C) Flagella D) Fimbriae
45. Which of the following is elongated tubular proteinaceous structure:-

Pg-129, easy

- A) Pili B) Inclusion
C) Mesosome D) Fimbriae
46. Which of the following help the bacteria attach to rocks in streams:-

Pg-129, easy

- A) Inclusion B) Mesosome
C) Fimbriae D) Pili

Paragraph – 8.4.2

Ribosomes and Inclusion Bodies

47. Ribosomes are associated with the structures in a bacterial cell:-

Pg-129, easy

- A) t – RNA strand B) Golgi body
C) Cell membrane D) E.R
48. Ribosomes in the bacterial cell are

Pg-129,

- A) 20nm to 30 nm in size.
B) Made up of two subunits(Larger 60s' & smaller 40s')
C) Made up of two subunits(Larger 50s' & smaller 30s')
D) Associated with E.R and cell membrane

49. A polysome is:-

Pg-129, easy

- A) Several mRNA bound to a single Ribosome.
- B) Several subunits of ribosomes attached to each other.
- C) Several ribosomes attached to a single strand of mRNA
- D) Several mRNA attached to each other.

50. Which of the following structure translate the mRNA into proteins: in a bacterial cell:-

Pg-129, easy

- A) Inclusions of cytoplasm
- B) Ribosomes of E.R
- C) Ribosomes of Polysome.
- D) Polysomes of Ribosome.

51. Inclusion bodies in a prokaryotic cell are:-

Pg-129, easy

- A) Reserve material containing structure
- B) Cell membrane infoldings
- C) Membrane bound structure
- D) All of the above

52. What are example of inclusion bodies:-

Pg-129, easy

- i) Mesosome
- ii) Chromatophores
- iii) Gas vacuole
- iv) Phosphate granules
- v) Cyanophycean granules
- vi) Glycogen granules
- A) Only (ii), (iii) & (iv)
- B) Only (iii), (iv) & (v)
- C) Only (iii), (iv), (v) & (vi)
- D) Only (iv), (v) & (vi)

53. Inclusion bodies can be found in

Pg-129, easy

- A) All type of cells
- B) All eukaryotic cell
- C) BGA & green photosynthetic bacteria
- D) Prokaryotic cell.

Paragraph – 8.5

Eukaryotic cell

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54. All of the above except are eukaryotic except:-

Pg-129, easy

- A) Protista
- B) Plants

C) Monera D) Animals

55. How many of the following statements are true regarding Eukaryotic cell.

Pg-129, easy

- i) Cytoplasm has extensive compartmentalization
- ii) Presence of membrane bound organelle
- iii) Organised nucleus
- iv) A variety of complex locomotory and cytoskeletal structures.
- v) Genetic material is organised into chromosomes

- A) 2 B) 3
- C) 4 D) 5

56. **Statement – I:-** Plant cells differs from animals cells.

Statement – ii:- The former one posses cell walls, plastids & a large vacuole which is absent in latter one.

Pg-129, easy

- A) Both statements are correct.
- B) Both statement are incorrect.
- C) Statement – I is correct but statement – II is incorrect.
- D) Statement – I is incorrect but statement – II is correct.

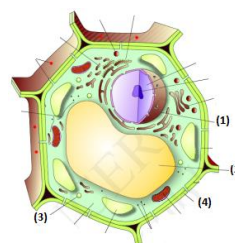
57. Centrioles are present in

Pg-129, easy

- A) Animal cells
- B) Plant cells
- C) Both animal and plant cells.
- D) All other than plant cells.

58. Which of the following correctly explain the diagram.

Pg-130, medium



- A) 1 -> Nuclear membrane 2 -> vacuole 3 -> peroxisome 4 -> cell wall
- B) 1 -> Microvilli 2 -> cell wall 3 -> cytoplasm 4 -> Plasma membrane
- C) 1 -> Vacuole 2 -> cytoplasm 3 -> Microvilli 4 -> cell wall
- D) None of the above

Paragraph – 8.5.1**Cell Membrane**

59. The detailed structure of the membrane was studied:-

Pg-131, easy

- A) Only after the advent of the electron microscope in 1950s.
- B) Enabled to deduce the possible structure of plasma membrane
- C) Both
- D) None

60. Which of the following cell's study enabled the scientists to deduce the possible structure of Plasma membrane?

Pg-131, easy

- A) RBC
- B) Cork cell
- C) WBCs
- D) Bacterial Cell

61. Cell membrane is mainly composed of

Pg-131, easy

- A) Lipids and Proteins
- B) Proteins & Cholesterol
- C) Lipids & Carbohydrates
- D) Carbohydrates & Proteins

62. What is the correct arrangement of Lipid molecules in the cell membrane

Pg-131, easy

- A) Polar head -> Outside, non - polar tails -> Inner side.
- B) Non - polar head -> Outside Polar tail -> Inner side
- C) Polar tail -> Outside non - polar head -> Inner side
- D) Polar tail -> inner side non - polar head -> outer side

63. What ensures that the non - polar tail is protected from aqueous environment?

Pg-131, easy

- A) Polar head -> Outside non - polar tails -> Inner side.
- B) Non - polar head -> Outside Polar tail -> Inner side
- C) Polar tail -> Outside non - polar head -> Inner side
- D) Polar tail -> inner side non - polar head -> outer side

64. The constituents of cell membrane are:-

Pg-131

- i) Phospholipid
- ii) Carbohydrate
- iii) Proteins
- iv) Cholesterol
- v) Phosphoproteins
- A) Only (i), (ii) & (iv)
- B) Only (ii), (iv) & (v)
- C) Only (ii), (iii), (iv) & (v)
- D) Only (i), (ii), (iii) & (iv)

65. Which of the following study revealed that cell membrane also contains proteins & carbohydrate:-

Pg-131, easy

- A) Electron microscopic study.
- B) Phase - Contrast microscopic study.
- C) Biochemical investigation study
- D) Cobalt - chloride paper test study.

66. Which of the following statement is incorrect:-

Pg-131, easy

- A) The tail is hydrophobic of saturated hydrocarbons.
- B) The tail is hydrophilic of saturated hydrocarbons.
- C) The tail is hydrophobic of unsaturated hydrocarbons.
- D) The tail is hydrophilic of unsaturated hydrocarbons

67. Which of the following statement is incorrect:-

Pg-131, easy

- A) The ratio of proteins and lipids varies considerably in different cells.
- B) In erythrocytes; it has approximately 52% proteins and 40% lipids.
- C) On the basis of ease of extraction membrane proteins are of extrinsic and intrinsic type.
- D) None of the above

68. The improved model of the structure of cell membrane was proposed by:-

Pg-132, easy

- A) Messelson & Stahl
- B) Schleiden & Schwann
- C) Anton von Leeuwenhoek
- D) Singer and Nicholson

69. The quasi-fluid nature of lipid enables:-

Pg-132, easy

- A) Flip-flop movement of proteins within the lipid bilayer.

- B) Lateral movement of proteins within the lipid bilayer.
 C) Flip-flop movement of lipid crossing the protein bilayer.
 D) lateral movement of lipid crossing the protein bilayer.
70. One of the most important function of the plasma membrane is:-
Pg-132, easy
 A) Transport of molecules across it.
 B) Flip – flop movement.
 C) Secretion
 D) Cell enlargement.
71. What ability explains the fluidity of cell membrane:-
Pg-132, easy
 A) Quasi – fluid nature of cell membrane.
 B) Lateral movement of proteins.
 C) Cell growth, formation of intercellular junctions; secretion; endocytosis; cell division
 D) All of the above.
72. The plasma membrane is:-
Pg-132, easy
 A) Semi – permeable in nature
 B) Impervious in nature
 C) Impermeable in nature
 D) Selectively permeable in nature.
73. How many of the following functions the cell membrane can perform:-
 Active transport; Osmosis; Passive transport.
Pg-132, easy
 A) Only one B) Only two
 C) All D) None
74. $\text{Na}^+ - \text{K}^+$ pump transports molecules
Pg-132, easy
 A) By passive transport
 B) By active transport
 C) By utilisation of ATP
 D) Both B & C
- Paragraph – 8.5.2**
Cell Wall TG: @Chalnaayaaar
75. The outer covering of fungi and plants is:-
Pg-132, easy
 A) Glycocalyx B) Cell wall
 C) Cell membrane D) All
76. What is the function of cell wall:-
Pg-132, easy
 A) Gives shape to the cell
 B) Protects the cell
 C) Cell – to – cell interaction
 D) All of the above
77. What are chemical composition of algal cell wall
 Cellulose, Galactans, Mannans, Calcium carbonate, Chitin
Pg-132, easy
 A) Only two of them
 B) Only three of them
 C) Only four of them
 D) All five of them
78. Cell wall of plants consists of:-
Pg-132, easy
 A) Cellulose & Pectin's only
 B) Cellulose, hemicellulose & Pectin's only
 C) Cellulose, hemicellulose, Pectin & Proteins.
 D) Hemicellulose & Proteins only.
79. Which of the following is capable of growth
Pg-132, easy
 A) Primary cell wall
 B) Secondary cell wall
 C) Tertiary cell wall
 D) All of them
80. Secondary cell wall is formed
Pg-132, easy
 A) Outside the primary cell wall.
 B) Inside the cell membrane
 C) Inside the plasmodesmata.
 D) Inside the primary cell wall.
81. Which of the following in plant acts as glue between neighbouring plant cells:-
Pg-132, easy
 A) Ca – Pectate
 B) Mg – Pectate
 C) Ca & Mg – Pectate
 D) None of the above
82. Which of the following is traversed by plasmodesmata:-
Pg-132, easy
 A) Cell wall & cell membrane
 B) Cell membrane & Glycocalyx
 C) Cell membrane, cell wall, Glycocalyx & Middle lamella.
 D) Cell wall & middle lamella.

Paragraph – 8.5.3**Endomembrane System**

83. What are the constituent of Endomembrane system:-

Pg-133, easy

- A) Endoplasmic reticulum
- B) Golgi body & E.R.
- C) E.R; Golgi body; Lysosome & Vacuole.
- D) E.R, Golgi body & Lysosome.

84. Why Mitochondria, Chloroplast & Peroxisome are not the part of Endo – system:-

Pg-133, easy

- A) They are autonomous organelles.
- B) They are semi – autonomous organelles.
- C) They are not coordinated with Endomembrane system.
- D) They have their own genetic material.

85. Which of the following is the network of tiny-tubular structure scattered in cytoplasm:-

Pg-133, easy

- A) E.R
- B) Golgi body
- C) Lysosome
- D) Vacuole

86. Which of the following structure divides the intercellular space into two compartments:-

Pg-133, easy

- A) E.R
- B) Golgi body
- C) Lysosome
- D) None of the above

87. The extra luminal & luminal compartment represents:-

Pg-133, easy

- A) Cytoplasm & inside ER
- B) Inside ER & cytoplasm
- C) Outside ER & cytoplasm
- D) Cytoplasm & outside ER

88. The ER having Ribosomes attached to its outer surface is known as

Pg-133, easy

- A) RER
- B) SER
- C) Both
- D) None

89. RER is frequently observed in cells, actively involved in:-

- A) Protein Synthesis
- B) Lipid synthesis
- C) DNA synthesis
- D) Glucose synthesis

90. Which of the following is continuous with the outer membrane of nucleus:-

Pg-133, easy

- A) R.E.R
- B) S.E.R
- C) Golgi body
- D) Lysosome

91. Steroidal hormones are synthesised by:-

Pg-133, easy

- A) R.E.R
- B) Lysosome
- C) S.E.R
- D) Ribosome

92. Golgi body was firstly observed by

Pg-133, easy

- A) Camillo Golgi in 1898
- B) Camillo Golgi in 1897
- C) Camillo Golgi in 1895
- D) Camillo Golgi in 1993.

93. Golgi body is

Pg-133, easy

- i) Reticular structure.
- ii) Densely stained structure
- iii) Made up of cisternae, Tubule & Vesicle
- iv) Concentric cisternae
- A) Only (i) & (iii)
- B) Only (ii), (iii) & (iv)
- C) All of the above
- D) Only (iii) & (iv)

94. What is the diameter of cisternae of Golgi body:-

Pg-133, easy

- A) 0.5µm to 1.0µm
- B) 0.1 µm to 2.0 µm
- C) 0.2 µm to 2.5 µm
- D) 0.3 µm to 2.0 µm

95. The convex – face of cisternae of Golgi body is also known as:-

Pg-134

- i) Cis – face
- ii) Forming face
- iii) Trans – face
- iv) Maturing face
- A) (i) & (ii)
- B) (ii) & (iii)
- C) (iv) & (iii)
- D) (i) & (iv)

96. Which of the following statement is correct:-

Pg-134, easy

- A) Cis & Trans faces are same but inter connected.

- B) Cis & Trans faces different & not inter connected
 C) Cisternae is 0.1 to 2.0 μm in diameter.
 D) None of the above

97. Golgi body principally performs the functions of:-

Pg-134, easy

- A) Secretion
 B) Packaging of materials.
 C) Both
 D) None
98. Materials to be packed in the _____ Fuses with the _____ face:-

Pg-134, easy

- A) Cis – face and Trans – face
 B) Trans – face and cis – face
 C) E.R and cis – face
 D) E.R and trans – face
99. A number of proteins synthesized by ribosomes on the _____(i)_____ are modified in the _____(ii)_____of the _____(iii)_____

Pg-134, easy

- A) (i) ER (ii) Golgi body (iii) cisternae
 B) (i) Golgi body (ii) cisternae (iii) ER
 C) (i) cisternae (ii) RE (iii) Golgi body
 D) (i) ER (ii) cisternae (iii) Golgi body
100. The vesicular structure formed by the process of packing in Golgi apparatus is:-

Pg-134, easy

- A) Vacuole
 B) ER
 C) Lysosome
 D) All
101. The isolated lysosomal vesicle have been found to be very rich in

Pg-134, easy

- i) Lipases
 ii) Proteases
 iii) Carbohydases
 A) Only i) & ii) B) Only ii) & iii)
 C) Only i) & iii) D) All
102. Enzymes present in lysosomes are accumulatively known as:-

Pg-134, easy

- A) Acid proteases B) Lipases
 C) Acid hydrolases D) Carbohydases
103. The membrane bound space in cytoplasm is known as:-

Pg-135, easy

- A) ER
 B) Golgi body
 C) Lysosome
 D) Vacuole

104. Vacuole contains hydrolases; lipases; proteases; water; sap; excretory products & material not useful for the cell

Pg-135, easy

- A) Only four of the above
 B) Only three of the above
 C) Only five of the above
 D) All of them.
105. The membrane of vacuole is
- Pg-134, easy**
- A) Single membrane B) Tonoplast
 C) Both D) none
106. In a plant cell vacuole can occupy up to _____% space of cell

Pg-134, easy

- A) 70 B) 80
 C) 90 D) 50
107. In plant tonoplast facilitates the transport of a number of ____ (i) ____; ____ (ii) ____ the concentration gradient.

Pg-134, easy

- A) (i) Solutes (ii) Along
 B) (i) ions (ii) Along
 C) (i) ions (ii) against
 D) (i) solutes (ii) against
108. How many of the following statements are not wrong:-
- i) Concentration of same ions inside the vacuole is significantly higher.
 ii) In amoeba contractile vacuole helps in osmoregulation & excretion.
 iii) In Protistans, food vacuoles are formed by engulfing the food particle.

Pg-134, medium

- A) Only two B) Only one
 C) All three D) None

Paragraph – 8.5.4

Mitochondria

109. Which of the following statement is correct about mitochondria:-

Pg-134, medium

- A) Easily visible under the microscope; without stain.
 B) Number of mitochondria per cell is invariable
 C) Number of mitochondria depends on the physiological activity of cell.

D) All of the above.

110. How many of the following statement is correct regarding mitochondria :-

Pg-134, medium

- i) A sausage – shaped str.
- ii) Diameter is $0.2 - 1.0 \mu\text{m}$
- iii) Avg. Diameter is $0.5 \mu\text{m}$
- iv) Length is $1.0 - 4.1 \mu\text{m}$
- A) One B) Two
- C) Three D) Four

111. Each mitochondria is ____X____ membrane bound structure; dividing its lumen into ____Y____ distinct compartment

Pg-135, easy

- A) X → single Y → one
- B) X → double Y → one
- C) X → single Y → two
- D) X → double Y → two

112. Matrix of mitochondria is:-

Pg-135, easy

- A) Filled with a dense homogenous substance.
- B) Outer aqueous compartment
- C) Space present between Inner and Outer membrane of Mitochondria
- D) Present within the outer membrane of mitochondria

113. The outer membrane of mitochondria forms the ____ limiting boundary of the organelle, while the inner membrane forms a number of ____

Pg-135, easy

- A) Discontinuous ; infoldings
- B) Infoldings; Cristae
- C) Continuous ; Cristae
- D) Cistae ; Infoldings

114. Which of the following increase the surface area:-

Pg-135, easy

- A) Matrix B) Inner membrane
- C) Outer membrane D) Cristae

115. How many of the following statements are correct:-

Pg-135, easy

- i) Only outer membrane has enzyme for ETS
- ii) Only inner membrane has enzymes.
- iii) Outer membrane is devoid of enzymes.

iv) Mitochondria matrix has enzyme of kerb's cycle.

v) Mitochondria is the site of aerobic respiration

vi) Matrix also possess SS – DNA molecule & few RNA molecules.

- A) Only two B) Only four
- C) Only five D) Only three

116. The matrix of mitochondria possess:-

Pg-135, easy

Single circular DNA molecules;
A few RNA molecules; 70s' ribosomes;
Components required for the synthesis of proteins.

- A) Only two of them
- B) Only three of them
- C) All of them
- D) None of them

117. Mitochondria divides by:-

Pg-135, easy

- A) Endomitosis B) Meiosis
- C) Budding D) Fission

Paragraph – 8.5.5

Plastids

118. Plastids are found in:-

Pg-135, easy

- A) Only plants cells
- B) Only Euglenoids
- C) Both Plants and Euglenoids
- D) Plants; Euglenoids & Cyanobacteria.

119. Classification of plastids are based on-

Pg-135, easy

- A) Chromatophores B) Mesosomes
- C) Inclusions D) Pigments

120. Which of the following is responsible for trapping of light energy

Pg-135, easy

- A) Chlorophyll like a, b, c etc.
- B) Carotenoids
- C) Chlorophylls & carotenoids
- D) Chromosomes

121. Carotenoids is group of

Pg-135, easy

- A) Chlorophyll pigments
- B) Chlorophylls & carotene
- C) Carotenes and xanthophyll's

D) Carotenes ; xanthophyll's & other pigments.

122. Leucoplast is :-

Pg-135, easy

- A) Unmodified plastids
- B) Contains stored nutrients
- C) Imparts colour to the plant cell
- D) Imparts colour to the cyanobacteria

123. What are types of chloroplast:-

Pg-135, easy

- i) Chromoplast ii) Leucoplast
- iii) Amyloplast iv) Aleuroplast
- v) Elaioplast

- A) Three of the above
- B) Four of the above
- C) Five of the above
- D) None of the above

124. Elaioplast contains

Pg-135, easy

- A) Proteins and fats
- B) Fats and starch
- C) Fats and oils
- D) Fats ; Protein and oils.

125. Aleuroplast contains

Pg-136, easy

- A) Proteins and fats
- B) Fats and oils
- C) Proteins & starch
- D) Protein only

126. Majority of chloroplast of the green plants are found in :-

Pg-136, easy

- A) Mesophyll cells of roots
- B) Mesophyll cells of stems
- C) Mesophyll cells of leaves
- D) Mesophyll cells of flowers.

127. Mesophyll cells are:-

Pg-136, easy

- A) Lens – shaped; Oval; Spherical only
- B) Oval & spherical only
- C) Discoidal & ribbon – shaped
- D) None of them

128. What is dimension of chloroplast :-

Pg-136, easy

- A) Length 2 – 4 μm & width 5 – 10 μm
- B) Length 1 – 2 μm & width 2 – 4 μm
- C) Length 5 – 10 μm & width 2 – 4 μm
- D) Length 2 – 4 μm & width 1 – 2 μm

129. Number of chloroplast per cell may vary from _____ per cell of chlamydomonas to _____ per cell in mesophylls.

Pg-136, easy

- A) 20 – 40; 1 – 5
- B) 1 ; 20 – 40
- C) 10 – 20; 20 – 40
- D) 5; 10 – 20

130. Common features of mitochondria & chloroplasts are :-

Pg-136, easy

- A) Number of membrane & type of DNA molecules only
- B) Number of membrane; Ribosomes type and DNA molecule type
- C) Types of thylakoid & genetic material.
- D) Types of thylakoid, genetic material and permeability of membrane.

131. What are types of thylakoid inside the chloroplast:-

Pg-136, easy

- A) Intergranal thylakoid and stroma lamellae
- B) Granum thylakoid only
- C) Stroma thylakoid only
- D) None of the above

132. Flat membranous tubules connecting the thylakoids in chloroplast is known as:-

Pg-136, easy

- A) Granal thylakoid
- B) Grama
- C) Stroma thylakoid / lamellae
- D) All of the above

133. The membrane of chloroplast encloses a space known as:-

Pg-136, easy

- A) Matrix B) Cytoplasm
- C) Lumen D) All of them

134. The stroma of chloroplast contains:-

Pg-136, easy

- (i) Enzyme for carbohydrate & proteins synthesis.
- (ii) Small single stranded DNA molecule.
- (iii) Ribosomes of 70's type.
- A) Only one the above
- B) Only two of the above
- C) Only three of the above
- D) None of the above

135. Chlorophyll pigments are present in the:-

Pg-136, easy

- A) Matrix B) Stroma
C) Membrane D) Thylakoid

136. The ribosomes of chloroplast are:-

Pg-136, easy

- A) Same as Eukaryotic cell
B) 70's type with single subunit
C) 70's type with two subunits
D) All of the above

Paragraph – 8.5.6**Ribosomes**

137. Which of the following statements are true regarding ribosomes :-

Pg-136, easy

- i) Granular structure
ii) First observed as dense particles by George Palade in 1953
iii) Composed of m – RNA & proteins.
iv) Surrounded by a single unit membrane
A) Two of them B) Three of them
C) All of them D) Only one of them

138. What are the types of Ribosomes in a Prokaryotic and Eukaryotic cell.

Pg-136, easy

- A) 70s' and 80s' B) 80s' and 70s'
C) 70s' and 70s' D) 80s' and 80s'

139. How many subunits are presents in a ribosome

Pg-136, easy

- A) Two; one large and one smaller subunits
B) Three; two large and one smaller subunits
C) Only one subunits
D) Three; one large and two smaller subunits.

140. Subunits 50s' and 30s' are found in

Pg-136, easy

- A) 60s' type B) 70s' type
C) 80s' type D) 90s' type

141. What is sedimentation co-efficient

Pg-136, easy

- A) Svedberg unit
B) Measurement of density
C) Measurement of size
D) All of these

142. What type of ribosome are found in Eukaryotic cell

Pg-136, easy

- A) 70s' type only
B) 80s' type only
C) Both 70s' and 80s' type
D) 70s' ; 80s' & 60s' type

Paragraph – 8.5.7**Cytoskeleton**

143. Cytoskeleton refers to the :-

Pg-136, easy

- A) Cilia and flagella only
B) Network of filamentous proteinaecious structure
C) Microtubules only
D) Both (A) & (C)

144. Microtubules; microfilaments & intermediate filaments are constituents of:-

Pg-136, easy

- A) Ribosomes B) Central sheath
C) Cytoskeleton D) Cytolamellae

145. Cytoskeleton in a cell is involved in functions like

Pg-136, easy

- A) Mechanical supports
B) Motility
C) Maintenance of the shape of cell
D) All of the above

Paragraph – 8.5.8**Cilia and Flagella**

146. Which of the following statements in untrue:-

Pg-137, easy

- A) Cilia and flagella are hair like outgrowth
B) Cilia are small and works like oars.
C) Flagella are longer and responsible for cell movement.
D) None of them

147. Statement – (I): both eukaryotic and prokaryotic cells contains flagella.

Statement – (II): eukaryotic flagella are structurally different from prokaryotic flagella.

Pg-137, easy

- A) Both statements are correct
- B) Both statements are not correct
- C) Statement – (I) is correct but statement – (II) is wrong
- D) Statement – (I) is wrong but statement – (II) is correct

148. The core of cilia and flagella is known as

Pg-137, easy

- A) Central sheath
- B) Central microtubule
- C) Axoneme
- D) Bridge

149. The microtubules in the cilia and flagella:-

Pg-137, easy

- A) Runs parallel to each other.
- B) Forms the axoneme and outer membrane
- C) Both (A) & (B)
- D) Arranged centrally only

150. What is arrangement of microtubules in the cilium and flagellum

Pg-137, easy

- A) 9 – peripheral & 3 – central
- B) Two – peripheral & 9 – central
- C) 9 – peripheral & two central
- D) All peripheral

151. The central sheath is:-

Pg-137, easy

- A) Connected to inter doublet bridges
- B) Encloses peripheral doublets
- C) Connected to peripheral microtubules
- D) All of the above

152. Which of the following statement regarding cilia and flagella are not correct:-

Pg-137, easy

- A) Peripheral doublets are inter connected by linker
- B) Linker are also known as inter doublet bridge
- C) Both emerges out from a centriole like structure
- D) Linker are also known as basal body

Paragraph 8.5.9

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Centrosome and centrioles

153. Centrosome and centrioles can be found in:-

Pg-137, easy

- A) Animal cells only
- B) Plant cells only
- C) Both animal & plant cells
- D) In plant & Bacterial cells

154. Centrioles in the centrosome are:-

Pg-137, easy

- A) Parallely arranged to each other
- B) Perpendicularly arranged to each other
- C) Arranged like a cart wheel
- D) Made up of triplets of centrally arranged microtubules

155. The basal body of centriole has micro tubular arrangement of:-

Pg-137, easy

- A) 9 + 0
- B) 9 + 2
- C) 9 + 3
- D) 3 + 9

156. The central part of the proximal region of the centriole is:-

Pg-137, easy

- A) Known as radial spoke
- B) Known as a central hub
- C) Connected to the peripheral doublets
- D) All of the above

157. The structure that give rise to the spindle fibers during cell division in animal cell is:-

Pg-137, easy

- A) Cilia
- B) Flagella
- C) Both
- D) Centriole

Paragraph 8.5.10

Nucleus

158. i) Nucleus as an organelle was first described by Robert brown
 ii) Stained by the basic dyes, the material is known as chromatin by Robert brown
 iii) Double membrane bound structure
 How many of the above statement are not true about the nucleus & its material:-

Pg 138, easy

- A) Only one
- B) Only two
- C) Only three
- D) Only four

159. The nucleus has highly extended and elaborate nucleoprotein fibers known as:-

Pg 138, easy

- A) Nucleoli
- B) Chromosome
- C) Chromatin
- D) Nuclear matrix

160. The contents of an inter phase nucleus are:-

Pg 137, easy

Nucleoli ; chromatin ; nuclear matrix; two membranes

- A) Only two of the above
- B) Only three of the above
- C) Only four of the above
- D) Only of the above

161. What forms the barrier between the cytoplasmic content and nuclear matrix:-

Pg 137, easy

- A) The outer membrane only
- B) The inner membrane only
- C) The perinuclear space
- D) All of the above

162. i) The outer membrane of nucleus is continuous with rest of the cellular organelles

Pg 138, easy

- ii) The inner membrane is continuous with E.R
- iii) Their are interruption known as pores present in outer membrane of nucleus
- iv) Pores are formed by the fusion of both of the membranes.

How many of the above statements are incorrect:-

- A) 2
- B) 1
- C) 3
- D) 4

163. The nuclear pores facilitates :-

Pg 138, easy

- A) Movement of RNA & protein molecules in only one direction
- B) Only proteins in both direction
- C) Proteins in one direction & RNA in both directions
- D) None of the these

164. Few of the mature cells have no any nucleus:-

Pg 138, easy

- A) Their function are not specific
- B) Are dead cells with cytoplasm
- C) Their function are controlled by some another cells.
- D) All of the above

165. Statement – (I): The nucleus per cell varies per cell.

Statement – (II): Normally there is only one nucleus per cell.

Pg 138, medium

- A) Both (I) & (II) are true & (II) is correct explanation of (I)
- B) Both (I) & (II) are true but (II) is not the correct explanation of (I)
- C) (II) is wrong but (I) is true.
- D) (I) is wrong but (II) is true.

166. The nucleus matrix contains:-

Pg 138, easy

- A) Nucleoplasm and chromatin
- B) Nucleoplasm, Chromatin and Mitochondria
- C) Nucleoplasm, chromatin & E.R
- D) None of the above

167. What is not true about the nucleolus:-

Pg 138, easy

- A) Spherical structure present in the nucleoplasm ‘
- B) Membrane less structure.
- C) Also known as Ribosomal factory of the cell.
- D) None of the above

168. At which phase of cell cycle the nucleolus has a loose and indistinct network of nucleoprotein fibers known as chromatin:-

Pg 138, easy

- A) Prophase
- B) Anaphase
- C) Interphase
- D) Metaphase

169. Cell show structured chromosome during:-

Pg 139, easy

- A) All phases except anaphase
- B) All phases except metaphase
- C) All phases except Inter phase
- D) All phases except m – phase

170. Chromatin contains

Pg 139, easy

- A) Histones; Non – histones & RNA
- B) Histones & non – histone proteins only
- C) DNA & some basic proteins
- D) Both (A) & (C)

171. A human cell has approximately _____ meters long thread of DNA, distributed among its _____ chromosomes:-

Pg 139, easy

- A) 4; 46
- B) 2; 46
- C) 4; 23
- D) 2; 23

172. Each chromosome

Pg 139, easy

- A) Has primary constriction
- B) Is visible only in dividing cells.
- C) Has disc shaped structure known as kinetochore
- D) All of the above

173. Function of centriole is:

Pg 139, easy

- A) Provides site of attachment to the spindle fibers on chromosome
- B) Holds two chromatids of a chromosome
- C) Both (A) & (B)
- D) None

174. What is type of chromosome having a middle centromere:-

Pg 139, easy

- A) Metacentric
- B) Sub – metacentric
- C) Acrocentric
- D) Telocentric

175. What is the type of chromosome having its centromere near the telomere

Pg 139, easy

- A) Metacentric
- B) Sub – metacentric
- C) Telocentric
- D) Acrocentric

176. Chromosomes having centromere slightly away from the middle is:-

A) Metacentric

B) Sub – metacentric

C) Telocentric

D) Acrocentric

177. Chromosome having one long and one short arm are:-

Pg 139, easy

A) Metacentric & sub – metacentric

B) Sub – metacentric & acrocentric

C) Acrocentric & telocentric

D) Telocentric & metacentric

178. A non – staining is present on a few chromosome

A) Secondary constriction or centromere

B) Satellite or centromere

C) Secondary constriction or satellite

D) None of the above

Paragraph – 8.5.11

Micro bodies

179. Membrane bound minute vesicles containing enzymes are known as:-

Pg 140, easy

A) Chloroplast

B) Mitochondria

C) Ribosomes

D) Micro bodies

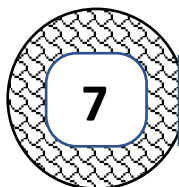
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ANSWER KEY

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CELL THE UNIT OF LIFE

Q	01	02	03	04	05	06	07	08	09	10
Ans	C	C	D	C	B	A	D	D	A	A
Q	11	12	13	14	15	16	17	18	19	20
Ans	A	C	D	A	C	A	A	C	D	B
Q	21	22	23	24	25	26	27	28	29	30
Ans	D	C	D	B	C	D	B	D	B	C
Q	31	32	33	34	35	36	37	38	39	40
Ans	A	B	A	C	D	D	D	C	C	B
Q	41	42	43	44	45	46	47	48	49	50
Ans	C	D	D	D	D	C	C	C	C	C
Q	51	52	53	54	55	56	57	58	59	60
Ans	A	C	D	C	D	A	C	A	C	A
Q	61	62	63	64	65	66	67	68	69	70
Ans	A	A	A	D	C	A	A	D	B	A
Q	71	72	73	74	75	76	77	78	79	80
Ans	D	D	C	B	B	D	C	C	A	D
Q	81	82	83	84	85	86	87	88	89	90
Ans	A	D	C	C	A	A	A	A	A	A
Q	91	92	93	94	95	96	97	98	99	100
Ans	C	A	C	A	A	B	B	C	D	C
Q	101	102	103	104	105	106	107	108	109	110
Ans	D	C	D	A	C	C	C	C	C	D
Q	111	112	113	114	115	116	117	118	119	120
Ans	D	B	C	D	A	C	D	C	D	C
Q	121	122	123	124	125	126	127	128	129	130
Ans	D	B	D	C	D	C	D	C	B	B
Q	131	132	133	134	135	136	137	138	139	140
Ans	A	C	C	A	D	C	B	A	A	B
Q	141	142	143	144	145	146	147	148	149	150
Ans	D	B	B	C	D	D	A	C	A	C
Q	151	152	153	154	155	156	157	158	159	160
Ans	C	D	C	B	A	B	D	A	C	C
Q	161	162	163	164	165	166	167	168	169	170
Ans	D	B	D	C	B	A	D	C	C	D
Q	171	172	173	174	175	176	177	178	179	
Ans	B	D	C	A	C	B	C	C	D	



Cell Cycle And Cell Division

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BOTANY

1. All cells reproduce by dividing into _ _ _ _ , with each parental cells giving rise to _ _ _ _ cells each time they divide.

A)

Easy Page No-162, Paragraph No-1

- A) One ; four daughter
B) Two ; two daughter
C) One ; two daughter
D) Two ; four daughter

10.1 Cell Cycle

2. A cell cycle comprises all the listed events, except:

Easy Page No-162, Paragraph No-2

- A) Cell growth
B) DNA replication
C) Transcription
D) Cell division

3. Consider the following statements-

Statement-I: cell growth (in terms of cytoplasmic increases) is a contingent process which occur during cell cycle.

Statement-II: DNA synthesis occur only during one specific stage in the cell cycle.

Statement-III: The event of cell cycle are under genetic control.

Difficult Page No-162, Paragraph No-2

- A) Statement-I is false & statement-II and III are true
B) Statement-I and II are false & statement-III are true
C) All statement are true
D) None of the above stated statement are true.

10.1.1 Phases of Cell Cycle

4. Cell of human divide once in approximately-

Easy Page No-163, Paragraph No-1

- A) 60 minutes B) 90 minutes
C) 24 hours D) None of these

5. Read the following statements and choose the correct option.

Medium

Page No-163, Paragraph No-1 and 2

Statement A: The M-phase represents the phase when actual cell division occurs

Statement B: Interphase represents the phase between two successive M-phases

- A) Only statement A is correct
B) Only statement B is correct
C) Both the statements are incorrect
D) Both the statements are correct

6. Match the columns and choose the correct option

Medium

Page No-163, Paragraph No-1,2,3,4 and page No-164, paragraph No- 1 and 2

Column I		Column II	
(a)	G ₁ phase	(i)	Quiescent stage of the cell cycle.
(b)	G ₂ phase	(ii)	DNA denoted as 2C, increases to 4C
(c)	Synthesis phase	(iii)	Proteins are synthesized in preparation for mitosis
(d)	G ₀ phase	(iv)	Cell contain initial amount of DNA i.e., 2C

- A) a-iv, b-iii, c-i, d-ii
B) a-iv, b-iii, c-ii, d-i
C) a-iii, b-i, c-iv, d-ii
D) a-ii, b-iv, c-ii, d-i

7. An average duration of yeast cell cycle is-
Easy

Page No-163, Paragraph No-1

- A) 60 minutes B) 90 minutes
C) 20 minutes D) One day

8. Cell cycle is divided into how many basic phases

Easy

Page No-163, Paragraph No-1

- A) One B) Two

- C) Four D) Six
9. Which of following is/are enlisted as basic phases of cell cycle?

Easy

Page No-163, Paragraph No-3

- A) G_0 phase B) S phase
C) Interphase D) Metaphase
10. The phase of cell cycle during which mitosis occur is-

Easy

Page No-163, Paragraph No-2

- A) Interphase B) M-phase
C) G-phase D) S-phase
11. The phase between two successive M-phase is-

Easy

Page No-163, Paragraph No-2

- A) Interphase B) G-phase
C) S-phase D) M-phase
12. The time span of interphase and M-phase is an average human cell cycle is-

Easy

Page No-163, Paragraph No-2

- A) 12 hours each
B) 95% M-phase & one hour interphase
C) 8 hour M-phase & 16 hour interphase
D) One hour M-phase & 23 hour interphase

13. The correct sequence of cell is-

Easy

Page No-163, Figure No-10.1

- A) $M \rightarrow G_2 \rightarrow S \rightarrow G_1$
B) $S \rightarrow G_2 \rightarrow G_1 \rightarrow M$
C) $M \rightarrow G_1 \rightarrow G_2 \rightarrow S$
D) $G_1 \rightarrow S \rightarrow G_2 \rightarrow M$
14. The process which mark as start & usually end of M-phase are-

Medium

Page No-163, Paragraph No-3

- A) Division of cytoplasm & Karyokinesis respectively
B) Cytokinesis and division of cytoplasm respectively
C) Separation of daughter chromosome & cytokinesis respectively
D) Karyokinesis & karyokinesis respectively
15. Resting phase of cell-cycle is-

Easy

Page No-163, Paragraph No-3

- A) M-phase B) Interkinesis
C) G_1 & G_2 phase D) Interphase
16. Interphase is divided into_ _ _ phases further.

Easy

Page No-163, Paragraph No-3

- A) 4 B) 3
C) 2 D) 5
17. Which of following stage corresponds to the interval between mitosis & initiation of DNA replication?

Medium

Page No-163, Paragraph No-4

- A) S-phase B) G_2 -phase
C) M-phase D) G_1 -phase
18. Select the correct statement about G_1 phase-

Easy

Page No-163, Paragraph No-4

- A) Cell is metabolically inactive
B) DNA does not replicate
C) DNA replicate
D) Chromosome number is doubled
19. Correct sequence of phase of M-phase is-

Easy

Page No-163, Figure No-10.1

- A) Cytokinesis $\rightarrow$ Prophase $\rightarrow$ Metaphase $\rightarrow$ Anaphase $\rightarrow$ Telophase
B) Prophase $\rightarrow$ Anaphase $\rightarrow$ Metaphase $\rightarrow$ Telophase $\rightarrow$ Cytokinesis
C) $G_0 \rightarrow G_1 \rightarrow S \rightarrow G_2$
D) None of these
20. What would be amount of DNA (C) and number of chromosome (N) in animal cell just after completion of S phase if the initial amount is 2C and 2N?

Difficult

Page No-163, Paragraph No-4

- A) 2C and 2N respectively
B) 4C and 4N respectively
C) 4C and 2N respectively
D) 2C and 4N respectively
21. Duplication of centriole occur in-

Easy

Page No-163, Paragraph No-5

- A) M-phase B) G_2 -phase

- C) S-phase D) G₀-phase
22. The S-phase of animal cell marked by-

Easy

Page No-163, Paragraph No-5

- A) DNA replication
B) Centriole duplication
C) Cell growth and protein synthesis
D) A & B

23. The G₂ of cell cycle is pronounced by-

Easy

Page No-163, Paragraph No-5

- A) Cell growth and division
B) Cell duplication
C) Protein synthesis & centriole duplication
D) Cell growth & protein synthesis
24. Find mismatch column.

Difficult

Page No-163, Paragraph No-1,2,3,4

	Column-I	Column-II
A)	Karyokinesis	Separation of daughter chromosome
B)	cytokinesis	Division of cytoplasm
C)	Interphase	Smallest phase of cell cycle
D)	M-phase	Mitosis phase

25. The inactive stage of cell cycle is-

Easy

Page No-164, Paragraph No-1

- A) Quiescent stage B) G₁
C) S – Phase D) A & B
26. Choose the correct statement with respect to G₀ phase:

Medium

Page No-164, Paragraph No-1

- A) Also known as quiescent stage and start after G₂ phase
B) Cell of this stage remain inactive and no longer proliferation
C) Cell of this stage remain in active but no longer proliferation unless called to do so depending on the requirement of organism
D) Cell of this stage remain active and proliferation till death without any condition

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27. How many chromosome does onion somatic cell have –

Easy

Page No-164, Top box

- A) 12 B) 14
C) 16 D) 20
28. What number of chromosome does onion somatic cell have in G, S, G₂ & M – phase respectively

Medium

Page No-164, Top box

- A) 32, 16, 16, 32 B) 16, 32, 16, 16
C) 16, 16, 16, 16 D) None of these
29. Mitotic division occur in –

Easy

Page No-164, Paragraph No-2

- A) Diploid somatic cell
B) Haploid male honey bee
C) A & B
D) Gametes
30. Match the following column:

Difficult

Page No-163 & 164, Paragraph No-1,2

Column – I	Column – II
a) G ₁ Phase	i) Metabolically active cell, do not proliferate
b) S Phase	ii) Content of DNA doubled
c) G ₀ phase	iii) Protein synthesised
d) G ₂ Phase	iv) Metabolically active cell grows continuously

- A) a – iv), b – ii), c – i), d – iii)
B) a – i), b – ii), c – iv), d – iii)
C) a – iv), b – iii), c – i), d – ii
D) None of these

10.2 M-Phase

31. M – phase refer to –

Easy

Page No-164, Paragraph No-3

- A) Metaphase B) Meiosis
C) Karyokinesis D) A & B both
32. Most dramatic period of cell cycle is-

Easy

Page No-164, Paragraph No-3

- A) Gap 1 only B) M-phase

- C) S-phase only D) Interphase
33. Equational division refer to –
Easy
Page No-164, Paragraph No-3
 A) Meiosis
 B) Mitosis
 C) Number of cell chromosome in parent & progeny cell is same
 D) B & C

34. Karyokinesis of mitosis is divided into _____ stages

Easy

Page No-164, Paragraph No-3

- A) 2 B) 3
 C) 4 D) 8
35. Correct order of mitotic division is –
Easy
Page No-164, Paragraph No-3
 A) Metaphase → Anaphase → Prophase → Telophase
 B) Prophase → Metaphase → Anaphase → Telophase
 C) Anaphase → Telophase → Metaphase → Prophase
 D) Telophase → Prophase → Anaphase → Metaphase

10.2.1 Prophase

36. Select the correct option:
 I) Prophase is first stage of Karyokinesis.
 II) It occur after completion of protein synthesis during cell cycle

Easy

Page No-164, Paragraph No-4

- A) Both (I) & (II) are true
 B) Both (I) & (II) are false
 C) (I) is true but (II) is false
 D) (I) is false but (II) is true
37. During prophase, which of the following occurs?
Medium [TG: @Chalnaayaaar](#)
Page No-164, Paragraph No-4
 A) Condensation of chromosomal material
 B) Chromosomal material become tangled
 C) Centrosome duplication
 D) Movement of both centriole at one pole of cell
38. Choose the incorrect match

Difficult

Page No-164, Paragraph No-4; Page No-165, Paragraph No-2

- A) Beginning of movement of chromosome to opposite poles – Prophase
 B) Two asters with spindle – Mitotic apparatus
 C) Attachment of spindle – Metaphase
 D) Chromosome move to opposite poles – Metaphase
39. Mitotic apparatus consist of –
Easy
Page No-164, Paragraph No-6
 A) Four asters with spindle fibres
 B) One asters with spindle fibres
 C) Two asters with spindle fibres
 D) Centrosome with their microtubules without spindle fibres.
40. How many of following structures are observed when cells are viewed under the microscope at end of prophase Golgi body, ER, Nucleolus, Nuclear envelop, centrosome

Medium

Page No-165, Paragraph No-1

- A) Zero B) One
 C) Three D) All of these
41. How do the chromosome appear during prophase of animal cell during mitosis

Easy

Page No-164, Paragraph No-6

- A) Consisting of four chromatid which remain attached to centromere
 B) Consisting of two chromatid which remain attached to centromere
 C) Consisting of four chromatid without centromere
 D) As chromatin material without any defined structure
42. Asters formed during prophase are –
Easy
Page No-169, Paragraph No-6
 A) Composed of microtubules originate from centromere
 B) Composed of protein which secreted by golgi body
 C) Highly condensed area of chromosome

- D) None of these
43. What difference would indicate early prophase & late prophase of animal cell.

Difficult

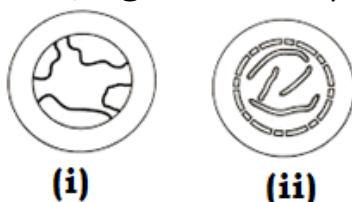
Page No-167 and 165, Paragraph No-

	Early Prophase	Late Prophase
A)	Nucleolus & nuclear membrane present	Nucleolus & nuclear membrane are absent
B)	Chromosomes are highly condensed	There is no condensation of chromosome
C)	Nucleolus & centrosome are present	Nucleolus & centromere are absent
D)	Other organelles like ER, golgi body complexes are not observed	Other organelles like ER, golgi complex are observed.

44. Identify correct stage of given diagram.

Difficult

Page No-165, Figure No-10.2 (a)



- A) Late prophase Early prophase
B) Early prophase Late prophase
C) Metaphase Prophase
D) Prophase Metaphase

10.2.2 Metaphase

45. The complete disintegration of nuclear envelop marks start of:

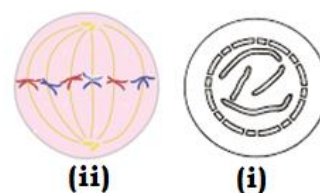
Easy

Page No-165, Paragraph No-2

- A) Late prophase
B) Metaphase
C) Anaphase
D) None of these
46. Identify stage of given diagram

Difficult

Page No-165, Figure No-10.2



- A) Early prophase, metaphase
B) Late prophase, transition to metaphase
C) Early prophase, transition to metaphase
D) Late prophase, metaphase
47. Which stage of cell cycle is best to study chromosome morphology

Easy

Page No-165, Paragraph No-2

- A) Late prophase B) Early prophase
C) Anaphase D) Metaphase
48. Condensation of chromosome is completed in –

Easy

Page No-165, Paragraph No-2

- A) Stage where centrosome is duplicated
B) Stage where DNA content doubled
C) Stage where complete integration of nuclear envelope occurs
D) Stage where complete disintegration of nucleus envelope occurs
49. Metaphase chromosome is made up of –

Easy

Page No-165, Paragraph No-2

- A) Two non – sister chromatid which are held together by centromere
B) Four sister chromatid which are held together by centromere
C) Two sister chromatid which are held together by centromere
D) Four non – sister chromatid which are held together by centromere
50. Kinetochores are

Easy

Page No-165, Paragraph No-2

- A) Precursors of microtubules
B) Sites of attachment of spindle fibres
C) Site for origination of spindle fibres
D) Small disc – shaped structure at telomere of chromosome
51. Metaphase is characterised by –

Easy

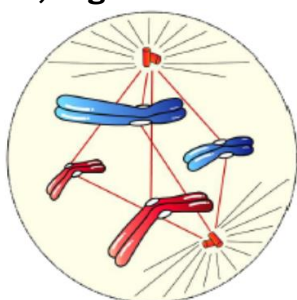
Page No-165, Paragraph No-2

- A) Some chromosomes coming to lie at the pole
 B) One chromatid of each chromosome connected by its centromere to spindle fibres from one pole
 C) Sister chromatid connected by its kinetochore to spindle fibres from opposite poles
 D) All of these

52. Identify stage

Difficult

Page No-165, Figure No-2 Part b.



- A) Transition to metaphase
 B) Anaphase
 C) Metaphase
 D) Telophase

10.2.3 Anaphase

53. At the onset of anaphase, each chromosome split into –

Easy

Page No-165, Paragraph No-2

- A) One chromatid
 B) Four daughter chromatids
 C) Two daughter chromosomes
 D) Eight chromatids

54. Anaphase is characterised by –

Easy

Page No-165, Paragraph No-3

- i) Migration of daughter chromatid toward equator.
 ii) centromere of each chromosome remain directed toward pole
 iii) centromere of each chromosome remain directed toward equator
 iv) Chromatid split and centromere separate
 v) Chromatid separate after centromere split

A) i, ii, v

B) ii, v

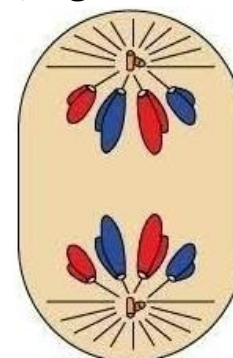
C) iii, v

D) ii, iv

55. Identify stage –

Difficult

Page No-166, Figure No-10.2 (c)



A) Anaphase

B) Telophase

C) Interphase

D) Metaphase

10.2.4 Telophase

56. During telophase:

- (i) Chromosome cluster at opposite spindle poles
 (ii) Two daughter nuclei formed
 (iii) Chromosomes lose their individuality
 (iv) It is reversal of prophase
 (v) Nucleolus is not reformed

Choose the incorrect statement:-

Medium

Page No-166, Paragraph No-2

A) i), (ii)

B) (iii), (iv)

C) (v) only

D) none of these

10.2.5 Cytokinesis:

57. Match the following column –

Difficult

Page No-166, Paragraph No-3

	Column I		Column II
a	Syncytium	i	Divide the cytoplasm of animal cell
b	Cell-plate	ii	Occur in liquid endosperm of coconut
c	Cell furrow	iii	Method of cytokinesis in plant cell

A) a-iii, b-ii, c-i

B) a-ii, b-iii, c-i

C) a-i, b-ii, c-iii

D) a-ii, b-i, c-iii

58. Cell plate represent –

Easy

Page No-166, Paragraph No-3

A) Primary lamella

B) Middle lamella

C) Both

D) formation of plate by lysosome

10.3 Cytokinesis:

59. Mitosis usually results in

Easy

Page No-167, Paragraph No-1

A) haploid daughter cells with identical genetical complement

B) growth of multicellular organism

C) diploid daughter cells without identical genetical complement

D) haploid daughter cells without identical genetical complement

60. Which one is odd w.r.t. significance of meiosis?

Medium

Page No-167, Paragraph No-1-4, 170 paragraph 2

A) Increase genetic variability in organisms

B) Helps in restoring of original chromosome number in a sexually reproducing species.

C) Ensure production of haploid phase

D) Cell repair

61. The growth in plant is/are contributed by

Easy

Page No-167, Paragraph No-1

A) Mitotic division in apical meristem

B) Meiotic division in lateral meristem

C) Meiotic division in apical meristem

D) A & B both

62. a) The nucleo-cytoplasmic ratio in organism is restore by mitosis

b) The cells of the upper layer of the epidermis, cells of lining of gut, and blood cells are being constantly replaced by Mitotic division.

Choose the correct option from following :-

Medium

Page No-167, Paragraph No-2

A) Statement (a) is true but (b) is false

B) Statement (b) is true but (a) is false

C) Statement (a) & (b) are true

D) Statement (a) & (b) are false

10.4 Meiosis:

63. Meiosis result in

Easy

Page No-167, Paragraph No-3

A) production of gametes

B) reduction in number of chromosomes

C) introduction of variation

D) all of these

64. Meiosis ensure the production of phase in life cycle of sexually reproduction organisms whereas fertilization restore phase.

Easy

Page No-167, Paragraph No-3

A) haploid & haploid respectively

B) haploid & diploid respectively

C) diploid & diploid respectively

D) diploid & haploid respectively

65. Which of the following statement is correct?

Medium

Page No-167, Paragraph No-3

A) Meiosis involves single cycle of nuclear and cell division

B) Doubling of chromosomes occur once during s-phase

C) Recombination between sister chromatid of non-homologous chromosome

D) Pairing of homologous chromosome

66. At the end of meiosis-II, how many haploid cells are formed?

Easy

Page No-167, Paragraph No-3

A) One

B) Two

C) Zero

D) Four

67. Recombination occurs between –

Easy

Page No-167, Paragraph No-3

- A) sister chromatid of non-homologous chromosome
- B) non-sister chromatid of non homologous chromosome
- C) sister chromatid of homologous chromosome
- D) non-sister chromatid of homologous chromosome

10.4.1 Meiosis-I

68. Longest phase of meiosis is :

Easy

Page No-168, Paragraph No-1

- A) Prophase-I B) Prophase-II
 - C) Metaphase-I D) Telophase-II
69. During which of the given phases, homologous chromosomes separate, while sister chromatids remain associated at their centromere?

Difficult

Page No-169, Paragraph No-1

- A) Anaphase of mitosis
 - B) Anaphase II
 - C) Anaphase I
 - D) Metaphase I
70. Prophase-I of meiosis is divided into phase based on chromosomal behaviour.

Easy

Page No-168, Paragraph No-1

- A) 2 B) 3
 - C) 4 D) 5
71. Identify correct sequence of prophase-I.

Easy

Page No-168, Paragraph No-1

- A) leptotene, Diplotene, Zygotene
 - B) Zygotene, pachytene, leptotene
 - C) Diplotene, Zygotene, Pachytene
 - D) None of these
72. A bivalent is

Easy

Page No-168, Paragraph No-2

- A) Pair of non-homologous chromosomes
- B) The complex formed by a pair of synapsed homologous chromosomes.
- C) Formed during pachytene stage
- D) More clearly visible at zygotene

Stage

73. Synaptonemal complex dissolves during-
Easy

Page No-168, Paragraph No-2

- A) Leptotene B) Diakinesis
 - C) Zygotene D) Diplotene
74. During which phase of meiosis centromere splits?

Easy

Page No-169, Paragraph No-2

- A) Anaphase I B) Anaphase II
 - C) Telophase II D) Telophase I
75. Choose the correct option with respect to leptotene:

Medium

Page No-168, Paragraph No-2

- (i) It is the foremost and the short-lived stage of prophase
 - (ii) It begins when the process of compaction of chromosome is accomplished
 - (iii) chromosome become visible under light microscope
 - (iv) It followed by zygotene
- A) One statement that is (ii) is incorrect
B) i, ii and iii are correct while (iv) is incorrect
C) iii & iv are correct while i, ii are incorrect
D) All statement are correct
76. Zygotene is characterized by –

Easy

Page No-168, Paragraph No-2

- (i) chromosome start pairing
 - (ii) non-homologous chromosome paired
 - (iii) synapsis occurs between non-homologous chromosomes
 - (iv) formation of synaptonemal complex in homologous chromosomes
 - (v) formation of synaptonemal complex in non homologous chromosomes
- A) i, ii, v B) i, iii, iv
C) i, iv D) i, ii, iii, v
77. Bivalent stage is –

Easy

Page No-168, Paragraph No-2

- A) complex formed by a pair of synapsed homologous chromosomes

- B) complex formed by a pair of synapsed non-homologous chromosomes
C) complex formed by four pair of synapsed homologous chromosomes
D) complex formed by four pair of synapsed non-homologous chromosomes

78. Crossing over occurs in –

Easy

Page No-168, Paragraph No-2

- A) leptotene B) zygotene
C) Pachytene D) diplotene

79. Pachytene is stage that is/are :-

Easy

Page No-168, Paragraph No-2

- A) long lived than zygotene
B) two chromatid of each bivalent chromosomes becomes distinct
C) short lived than leptotene
D) long lived than leptotene & short lived than zygotene

80. Choose the correct statement from following:

Medium

Page No-168, Paragraph No-2

- A) Pachytene is characterised by appearance of recombination nodule
B) Recombination nodule is site of crossing over
C) Both A & B
D) Recombination nodule formed in diplotene

81. Given below are statements (I - VI). Choose correct set with respect to crossing over.

Medium

Page No-168, Paragraph No-2

- I) It occurred between sister chromatid of homologous chromosomes.
II) It is enzyme mediated process.
III) Recombinase enzyme involved in it.
IV) It occurs at recombination nodules.
V) It occurs between non sister chromatid of non-homologous chromosomes.
VI) It occurs between sister chromatid of non-homologous chromosomes.
A) I, II, III & IV B) V, II, III & IV
C) II, III, IV & VI D) II, III & IV

82. Diplotene is not characterized by

Medium

Page No-168, Paragraph No-3

- A) Dissolution of synaptonemal complex.
B) Tendency of recombined homologous chromosomes of tetrad to separate from each other, except at sites of crossover.
C) Formation of chiasmata
D) Tendency of recombined non homologous chromosome of bivalent to separate from each other, except at sites of crossover.

83. Chiasmata is –

Easy

Page No-168, Paragraph No-3

- A) X – shaped structures
B) Formed by recombined chromosome yet to be separated
C) Site of cross over
D) All of these

84. Which stage of Meiosis – I last for months or year in some vertebrate oocytes?

Easy

Page No-168, Paragraph No-3

- A) Diakinesis B) Diplotene
C) Pachytene D) Zygotene

85. Diakinesis marked by –

Easy

Page No-168, Paragraph No-4

- A) Terminalisation of chiasmata
B) Chromosomes are fully condensed
C) Meiotic spindle assembled
D) All of these

86. Meiotic spindle assembled to prepare –

Easy

Page No-168, Paragraph No-4

- A) Non homologous chromosome separation.
B) Formation of aster ray.
C) Homologous chromosome separation.
D) Both B & C

87. Match the following

	Column I		Column II
I	Leptotene	a	Compaction of chromosome
II	Zygotene	b	Separation of chromosome

			except at crossover
III	Pachytene	c	Terminalisation of chiasmata
IV	Diakinesis	d	Appearance of recombination of nodules
V	Diplotene	e	Synapsis

Difficult

Page No-168, Paragraph No-1,2,3,4

A) I-a, II-e, III-d, IV-c, V-b

B) I-a, II-b, III-d, IV-c, V-e

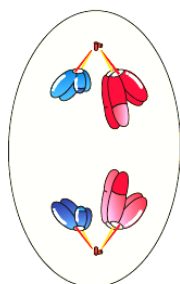
C) I-c, II-d, III-a, IV-e, V-b

D) None of these

88. Identify stage

Medium

Page No-169, Figure No-10.3



A) Homologous chromosome separate, while sister chromatid remain associated at centromere.

B) Homologous chromosome along with sister chromatid separate.

C) Spindle attached to Kinetochore in this stage.

D) This stage followed by diakinesis.

89. Spindle fibre attach to kinetochores of homologous chromosome in –

Easy

Page No-168, Paragraph No-5

A) Metaphase – I of meiosis

B) Metaphase – II of meiosis

C) Both A & B

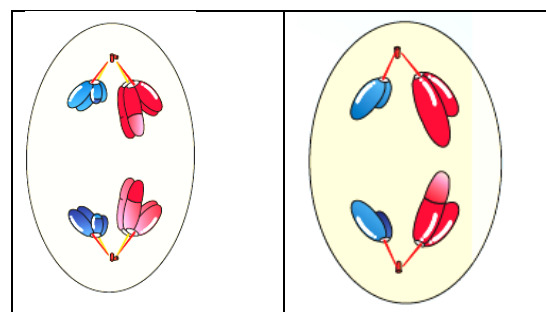
D) Anaphase of mitosis

90. Identify stage

Easy

Page No-169, Figure No-10.3 & Page No-170, Figure No-10.4

a	b
---	---



A) a = Anaphase I, b = Anaphase II

B) a = Anaphase II, b = Metaphase II

C) a = Anaphase II, b = Anaphase I

D) a = Anaphase I, b = Anaphase II

91. Dyads of cells are formed in –

Easy

Page No-169, Paragraph No-2

A) Telophase – I

B) Telophase – II

C) Diakinesis

D) Both A & B

10.4.2 Meiosis-II

92. Meiosis – II initiated immediately after

Easy

Page No-169, Paragraph No-3

A) Telophase – I

B) Prophase

C) Cytokinesis – I

D) Chromosome have fully elongated

93. Which of the following resembles with normal mitosis-

Medium

Page No-169, Paragraph No-3

A) Meiosis – I

B) Meiosis – II

C) Both

D) None of these

94. In the beginning of Meiosis – II, a cell contain four chromatid. What number of chromatid is expected to be in each daughter cell at end of telophase – II

Medium

Page No-169, Paragraph No-3

A) 4

B) 2

C) 8

D) 16

95. Find mismatched column

Difficult

Page No-169,314 & 170 Paragraph No-1

Column I	Column II
----------	-----------

A	Metaphase – II	Chromosomes align at equator and microtubule from opposite poles of spindle get attached to kinetochores of non-sister chromatid
B	Prophase – II	Nuclear membrane disappear
C	Telophase – II	Formation of tetrad of cells
D	Anaphase – II	Splitting centromere which hold sister chromatid together, allow them to move toward opposite pole of cells

96. Movement of chromatid toward opposite pole is achieved by-

Easy

Page No-169, Paragraph No-4

- A) Shortening of microtubules attached to centromere
- B) Shortening of microtubules attached to kinetochores
- C) Elongating of microtubules attached to kinetochores

- D) Elongating of microtubules attached to centromere

10.5 Significance of Meiosis

97. Conservation of specific chromosome number of each species is achieved across generations in sexually reproducing organism is done by –

Easy

Page No-170, Paragraph No-2

- A) Mitosis
- B) Meiosis only
- C) Meiosis & Mitosis
- D) None of these

98. Choose the correct statement about meiosis

Medium

Page No-170, Paragraph No-2

- A) Increase genetic variability of an individual of an organism
- B) decrease genetic variability of an organism from one generation to other
- C) Reduction of chromosome by one-fourth
- D) Play an important role in evolution

TG: @Chalnaayaaar

TG: @Chalnaayaaar

ANSWER KEY CELL CYCLE AND CELL DIVISION

Q	1	2	3	4	5	6	7	8	9	10
Ans	B	C	A	C	D	D	B	B	C	A
Q	11	12	13	14	15	16	17	18	19	20
Ans	A	D	D	C	D	B	D	B	A	C
Q	21	22	23	24	25	26	27	28	29	30
Ans	C	D	D	C	A	C	C	C	A	A
Q	31	32	33	34	35	36	37	38	39	40
Ans	C	B	D	C	B	A	A	A	C	A
Q	41	42	43	44	45	46	47	48	49	50
Ans	D	A	B	B	B	D	D	D	C	B
Q	51	52	53	54	55	56	57	58	59	60
Ans	A	C	C	B	A	B	B	B	A	D
Q	61	62	63	64	65	66	67	68	69	70
Ans	A	C	D	D	D	D	C	A	C	D
Q	71	72	73	74	75	76	77	78	79	80
Ans	C	B	D	B	C	A	A	C	A	C
Q	81	82	83	84	85	86	87	88	89	90
Ans	D	D	B	D	D	C	A	A	A	A
Q	91	92	93	94	95	96	97			
Ans	A	C	B	B	B	B	D			

8

Transport in plants

1. Melvin Calvin earned Nobel prize in 1961 for
 - (A) mapping pathway of carbon assimilation in respiration
 - (B) mapping pathway of carbon absorption in photosynthesis
 - (C) mapping pathway of carbon assimilation in photosynthesis
 - (D) mapping pathway of carbon absorption in respiration.

Page – 174, Easy

2. Cytoplasmic streaming helps to move substances over
 - (A) long distances
 - (B) small distances
 - (C) Both (a) and (b)
 - (D) None

Page – 175, Easy

3. Translocation is transport over
 - (A) long distance
 - (B) short distance
 - (C) Both long and short distance
 - (D) None of these

Page – 175, Easy

4. Transport of minerals in plants is
 - (A) unidirectional only
 - (B) multidirectional
 - (C) Both unidirectional & multidirectional
 - (D) Dependent on the hormones released

Page – 175, Easy

5. Nutrients are re-exported from
 - (A) nascent leaves to senescent leaves
 - (B) senescent leaves to nascent leaves
 - (C) all parts to senescent leaves
 - (D) not re-exported

Page – 176, Easy

11.1.1 Diffusion

6. Movement by diffusion is
 - (A) active with energy expenditure
 - (B) passive with energy expenditure
 - (C) both active and passive
 - (D) without energy expenditure
7. In diffusion, molecules
 - (A) move in a fixed fashion, from high to low concentration

Page – 176, Easy

- (B) move in random fashion, from high to low concentration
- (C) move in fixed fashion, from low to high concentration
- (D) move in random fashion, from low to high concentration.

Page – 176, Easy

8. Diffusion
 - (A) in solid is more likely rather than of solid
 - (B) of solid is more likely than in solid
 - (C) Both (a) and (b)
 - (D) Does not occur in solids at all.

Page – 176, Easy

9. Diffusion rates are affected by
 - (A) Concentration gradient
 - (B) pressure
 - (C) temperature
 - (D) All of these

Page – 176, Easy

10. Statement (A) → Diffusion can't occur in dead cell.
Statement (B) → Diffusion is the only means for gaseous movement in plant body.
Choose the best option
 - (A) Statement A is correct and Statement B is wrong
 - (B) Statement A is wrong and Statement B is correct
 - (C) Both are correct
 - (D) Both are wrong

Page – 176, Easy

11.1.2 Facilitated Diffusion

11. Diffusion rate
 - (A) depend on size and larger substance diffuse faster
 - (B) depend on size and smaller substance diffuse faster
 - (C) doesn't depend on size
 - (D) depend on size and do not substance diffuse larger.

Page – 176, Easy

12. Hydrophilic moiety substances
 (A) diffuse through a membrane easily
 (B) do not diffuse through a membrane easily
 (C) need no membrane facilitation to diffuse through
 (D) Both (a) and (c)

Page – 176, Easy

13. Read the following statements
 (i) Membrane proteins aid in transport of hydrophobic substance.
 (ii) Membrane proteins do not set up a concentration gradient.
 (iii) Diffusion through membrane proteins is called facilitated diffusion.
 (iv) Membrane proteins always need ATP to transport substances across membrane.

How many of the above statements are wrong?

- (A) 1 (B) 2
 (C) 3 (D) 4

Page – 176, Easy

14. In facilitated diffusion
 (A) special proteins & ATP are involved
 (B) only special proteins are involved
 (C) only ATP are involved
 (D) neither special proteins nor ATP are involved.

Page – 176, Easy

15. Facilitated diffusion cannot
 A) transport molecules from high concentration to low concentration
 B) transport molecules from low concentration to high concentration
 C) Both (a) and (b)
 D) Concentration does not matter

Page – 176, Easy

16. Facilitated diffusion transport is
 (i) Saturable (ii) unsaturable
 (iii) inhibitable (iv) non-inhibitable
 (v) selective (vi) non-selective
 (vii) uphill (viii) downhill
 Which is the correct combination
 (A) i, iii, v, vii (B) ii, iv, vi, viii
 (C) i, iii, v, viii (D) i, iv, vi, viii

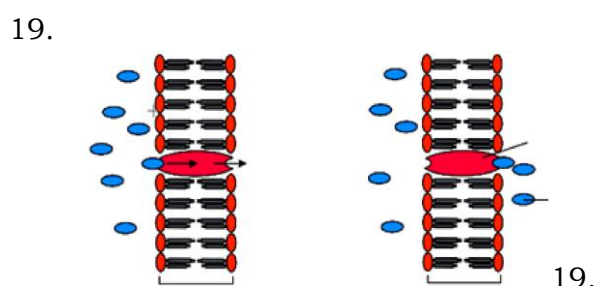
Page – 176-177 Medium

17. Porins are found in
 (A) outer membrane of plastids & mitochondria
 (B) Inner membrane of plastids & mitochondria
 (C) both outer & inner membrane of mitochondria
 (D) membrane of lysosomes

Page – 177, Easy

18. Water channels are made up of ____ different types of aquaporins
 (A) 6 (B) 8
 (C) 10 (D) 12

Page – 177, Easy



Identify the correct label for the figure given

- (A) It shows facilitated diffusion
 (B) shows simple diffusion
 (C) shows sample of water channels
 (D) Both (a) and (c)

Page – 177, Easy

11.1.2.1 Passive symports & antiports

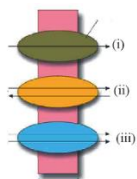
20.
 (i) Symport will not work if single type of molecule is there.
 (ii) Uniport allows two molecules to move in a unidirection together.
 (iii) Antiport allows two types of molecules to move in opposite direction.

How many of the above statements is correct

- (A) 0 (B) 1
 (C) 2 (D) 3

Page – 177, Medium

21.



Identify correct statements about the figure given

- (A) (i) – It shows simple diffusion via uniport
 (B) (ii) – It shows simple diffusion via antiport
 (C) Both (a) & (b) are correct
 (D) None of these

Page – 177, Easy

11.1.3 Active transport

22. Active transport is
 (A) Uphill (B) downhill
 (C) unsaturable (D) both (a) and (b)
23. Pumps are
 (A) energy using transport proteins
 (B) non-energy using transport protein
 (C) energy using transport lipids
 (D) non-energy using transport lipids
24. Active transport rate reaches maximum when
 (A) All molecules are loaded on carrier proteins
 (B) 80% of the molecules are loaded on carrier proteins
 (C) 50% of the molecules are loaded on carrier proteins
 (D) Can be any of these

Page – 178, Easy

11.1.4 Comparison of different transport processes

25. Match the columns A & B
- | A | B |
|----------------------------|---------------------|
| (i) Simple diffusion | (I) Uphill |
| (ii) Facilitated diffusion | (II) Saturable |
| (iii) Active transport | (III) Selective |
| | (IV) Passive |
| | (V) Carrier protein |

- (A) (i)–III, (ii)–IV, (iii)–i
 (B) (i)–IV, (ii)–II, (iii)–III
 (C) (i)–V, (ii)–IV, (iii)–II
 (D) (i)–IV, (ii)–I, (iii)–II

Page – 178, Medium

11.2 Plant-water relations

26. Most herbaceous plants have about
 (A) 10-15% of its dry weight as fresh matter.
 (B) 85-90% of its fresh weight as dry matter.
 (C) 10-15% of its fresh weight as dry matter.
 (D) 85-90% of its fresh weight as water.
27. Why is water often limiting factor for plant growth & productivity?
 (A) Due to high respiration
 (B) Due to high photosynthesis
 (C) Due to low availability of water
 (D) Due to transpiration of water

Page – 178, Easy

Page – 179, Easy

11.2.1 Water potential

28. Kinetic energy possessed by water molecules is represented directly by its
 (A) pressure potential
 (B) water potential
 (C) soluble potential
 (D) osmotic potential
29. Pure water has
 (A) Lowest water potential at all pressures
 (B) Zero water potential at all pressures.
 (C) Water potential at all pressures highest
 (D) Both (b) and (c)
30. Water moves from system containing water at (i) to one with (ii)
 (A) (i) – low Ψ_w , (ii) – high Ψ_w
 (B) (i) – zero Ψ_w , (ii) – zero Ψ_w
 (C) (i) – positive Ψ_w , (ii) – zero Ψ_w
 (D) (i) – high Ψ_w , (ii) – low Ψ_w
31. Which of the given equations is correct?

Page – 179, Easy

Page – 179, Easy

Page – 179, Easy

(A) $\psi_w = \psi_s + \psi_p$

(B) $\psi_s = \psi_w + \psi_p$

(C) $\psi_p = \psi_s + \psi_w$

(D) $\psi_p = \psi_s - \psi_w$

Page – 180, Easy32. ψ_s is

(A) always positive

(B) always negative

(C) sometimes negative

(D) mostly zero

Page – 180, Easy33. ψ_p is

(A) always positive

(B) always negative

(C) usually positive, sometimes negative

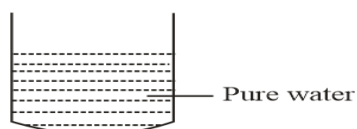
(D) usually negative, sometimes positive

Page – 180, Easy

34. The more the solute

(A) the lower (less negative) the ψ_s (B) the higher (less negative) the ψ_s (C) the lower (more negative) the ψ_s (D) the higher (more negative) the ψ_s **Page – 180, Easy**

35. If pure water (pH = 7) is kept in open vessel at room temperature, its water potential



(A) zero

(B) positive

(C) negative

(D) can't say

Page – 180, Easy

36. Water potential represents kinetic energy of water molecules.

When $\psi_w = 0$,

(A) kinetic energy of molecules of water is zero.

(B) kinetic energy of molecules of water is not zero.

(C) kinetic energy of molecules of water is negative

(D) kinetic energy of molecules of water is positive

Page – 180, Easy**11.2.2 Osmosis**

37. Cell wall is

(A) impermeable to water and substances in solution

(B) permeable to water and substances in solution

(C) permeable to water but not to substance in solution.

(D) impermeable to water but not to substances in solution.

Page – 180, Easy

38. Read the following statements

(i) vacuolar sap contribute to solute potential of cell

(ii) cell membrane & tonoplast together are importance determinants of movement of molecules in or out of cells.

(iii) Osmosis occurs spontaneously in response to a driving force

How many of the above statements are Incorrect

(A) 1

(B) 2

(C) 3

(D) None of these

Page – 180, Easy

39. Osmosis refers to

(A) diffusion of solute across permeable membrane

(B) diffusion of solute across differentially-permeable membrane

(C) diffusion of water across differentially permeable membrane

(D) diffusion of water across permeable membrane

Page – 180, Easy

40. Water moves under osmosis from

(A) higher chemical potential to lower chemical potential

(B) lower chemical potential to higher chemical potential.

(C) lower potential concentration to higher concentrations.

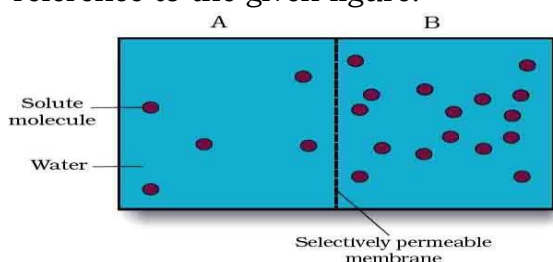
(D) more than one option is correct.

Page – 180, Easy

41. In potato osmometer, if potato tuber is placed in water
 (A) water exits the cavity of potato tuber via simple diffusion.
 (B) water enters the cavity of potato tuber via simple diffusion.
 (C) water exits the cavity of potato tuber via osmosis
 (D) water enters the cavity of potato tuber via osmosis

Page – 180, Easy

Questions 42 to 48 are to be solved in reference to the given figure.



42. Which chamber has a lower water potential?
 (A) A (B) B
 (C) Both are equal (D) Can't say

Page – 180, Medium

43. Solution of which chamber has more negative solute potential?
 (A) A (B) B
 (C) Both are equal (D) can't say

Page – 180, Medium

44. In which direction will osmosis occur?
 (A) from A to B
 (B) from B to A
 (C) No net movement
 (D) can't say (insufficient data)

Page – 180, Medium

45. Which solution has a higher solute potential?
 (A) B (B) A
 (C) Both are equal (D) can't say

Page – 180, Medium

46. At equilibrium which chamber will have lower water potential?
 (A) B (B) A
 (C) Both are equal (D) Insufficient data

Page – 180, Medium

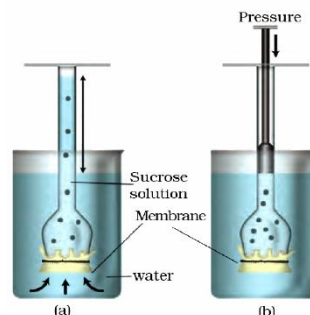
47. If one chamber has a ψ of -2000 kPa and the other -1200 kPa, which is chamber with higher ψ ?
 (A) B (B) A
 (C) C (D) Can't say

Page – 180, Medium

48. If one of the solutions has $\psi_w = 0.2$ MPa and other has $\psi_w = 0.1$ MPa, what will be direction of water movement?
 (A) A to B
 (B) B to A
 (C) No net movement
 (D) Random movement

Page – 180, Medium

49.



To prevent water from diffusing in pressure is applied. Which of the following statements is correct?

- (A) The more the solute, the greater will be pressure required.
 (B) The more the solute, the lesser will be pressure required
 (C) The pressure is equal to osmotic potential exactly.
 (D) Both (a) & (c)

Page – 181, Medium

50. Osmotic pressure is (i) & osmotic potential is (ii)
 (A) (i) – positive, (ii) negative
 (B) (i) –negative, (ii) – positive
 (C) (i), – positive, (ii) – positive
 (D) (i) – negative, (ii) – negative

Page – 181, Medium

11.2.3 Plasmolysis

51. Match the columns
 A B

- (i) Isotonic I. external solution is more dilute
 (ii) Hypotonic II. external solution is more concentrated
 (iii) Hypertonic III. external solution balances the osmotic pressure of cytoplasm
- (A) (i)-I, (ii)-III, (iii)-II
 (B) (i)-III, (ii)-I, (iii)-II
 (C) (i)-III, (ii)-II, (iii)-I
 (D) (i)-II, (ii)-I, (iii)-III

Page – 181, Medium

52. Cells

- (A) swell in hypotonic, shrink in isotonic
 (B) swell in isotonic, shrink in hypertonic
 (C) swell in hypertonic, shrink in hypotonic
 (D) swell in hypotonic, shrink in hypertonic

Page – 181, Medium

53. Plasmolysis occurs

- (A) in hypotonic solution
 (B) when water moves into the cell
 (C) when solution has more solute than protoplasm
 (D) when cell membrane becomes turgid

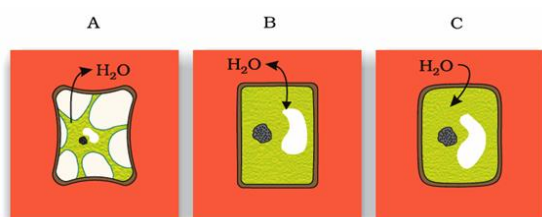
Page – 181, Medium

54. When water moves out of a cell placed in hypertonic solution.

- (A) water is first lost from vacuole, then cytoplasm
 (B) water is first lost from cytoplasm, then vacuole
 (C) water is first lost from tonoplast, then cytoplasm
 (D) water is first lost from cytoplasm, then tonoplast

Page – 182, Easy

55.



Identify A, B & C in given figure.

- (A) A – plasmolysed, B – isotonic, C – Turgid
 (B) B – flaccid, C – hypertonic, A – Turgid
 (C) A – hypotonic, C – hypotonic, B – Turgid
 (D) A – turgid, B – flaccid, – hypertonic

Page – 182, Easy

56. The process of plasmolysis is

- (A) always irreversible
 (B) always reversible
 (C) usually reversible
 (D) always temporary

Page – 182, Easy

57. Plant cells do not rupture in hypotonic solution due to

- (A) turgor pressure
 (B) pressure potential
 (C) cell membrane
 (D) cell wall

Page – 182, Easy

58. What will be Ψ_p of flaccid cell

- (A) positive (B) negative
 (C) zero (D) any of the above

Page – 182, Medium

11.2.4 Imbibition

59. Imbibition

- (A) Causes reduction in volume
 (B) is a type of active transport
 (C) is along the concentration gradient
 (D) occurs in gases

Page – 182, Medium

11-3 Long distance transport of water

60. Bulk movement of substances through vascular tissues of plants is called

- (A) Active transport
 (B) Facilitated diffusion
 (C) Transportation
 (D) Translocation

Page – 183, Easy

61. Substances in mass flow

- (A) are swept at some pace in solution
 (B) are swept at speed depending upon size.

- (C) are swept at some pace in suspensions
(D) Both (A) and (C)

Page – 183, Easy

62. Bulk flow is achieved by
(A) positive water pressure gradient
(B) negative water pressure gradient
(C) Both (A) and (B)
(D) It rarely depends on pressure gradient

Page – 183, Easy

63. Xylem is associated with translocation of mainly

- | | |
|----------------------|----------------------------------|
| (i) Water | (ii) organic solutes and sucrose |
| (iii) mineral salts | (iv) organic nitrogen |
| (v) inorganic solute | (vi) hormones |
- Choose correct combination

- | | |
|-----------------|----------------|
| (A) i, v, iii | (B) ii, vi, iv |
| (C) iii, vi, iv | (D) i, ii, iii |

Page – 184, Easy

11.3.1 How do plants absorb water?

64. Absorption of water along with mineral solutes by root hairs is

- (A) purely by facilitated diffusion
(B) purely by diffusion
(C) purely by active transport
(D) by a combination of diffusion and active transport

Page – 184, Easy

65. Apoplast is continuous throughout the plant, except at

- | | |
|-------------------|----------------------|
| (A) endodermis | (B) casparian strips |
| (C) plasmodesmata | (D) tracheids |

Page – 184, Easy

66. Apoplastic movement involves

- (A) crossing the cell membrane
(B) crossing the tonoplast
(C) crossing the cell wall
(D) Both (a) and (c)

Page – 184, Easy

67. Symplastic system of cells is connected through

- | | |
|---|--|
| (A) nucleoplasmic strands extending through phragmosomes | |
| (B) nucleoplasmic strands extending through plasmodesmata | |

- (C) cytoplasmic strands extending through phragmosomes

- (D) cytoplasmic strands extending through plasmodesmata

Page – 185, Easy

68. Cytoplasmic streaming

- (A) helps in long distance transport
(B) can be seen in Hydrilla leaf
(C) may be part of symplastic movement
(D) Both (B) & (C)

Page – 185, Easy

69. Most of the water flow in roots occurs via

- (A) symplast through living cells
(B) symplast through cortical cells
(C) apoplast through intercellular spaces
(D) apoplast through endodermal cells

Page – 185, Easy

70. Water movement through root tissues

- (A) can be initially symplastic and finally apoplastic
(B) has to be ultimately apoplastic
(C) can be completely apoplastic
(D) None of the above is correct.

Page – 185, Easy

71. Read the given statements

- (i) Mycorrhiza is symbiotic bacterial association of root system.
(ii) Mycorrhiza helps in water absorption.
(iii) Mycorrhiza may penetrate root cells
(iv) Mycorrhiza may form a network around young root.

Which of these statements is correct?

- | | |
|-------|-------|
| (A) 1 | (B) 2 |
| (C) 3 | (D) 4 |

Page – 185-186, Difficult

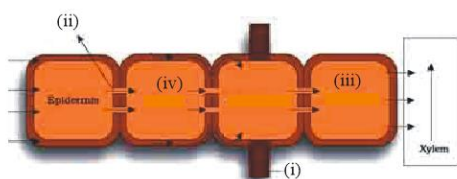
72. Which of the following statements about mycorrhiza is correct?

- (A) Fungus provides N-containing compounds to plant roots.
(B) Roots provide minerals & water to mycorrhizae.
(C) Pinus seeds cannot germinate without mycorrhiza
(D) Both (A) & (C)

Page – 186, Easy

11.3.2 Water movement a plant

73.



Identify the correct labels in given figures

- (A) (i)-Cortex, (ii)-Plasmodesmata, (iii)-Endodermis, (iv)-pericycle
 (B) (i)-Casparian strips, (ii)-Plasmodesmata, (iii)-Pericycle, (iv)-Cortex
 (C) (i)-Cytoplasmic extension, (ii)-Cortex, (iii)-Endodermis, (iv)-Pericycle
 (D) (i)-Endodermis (ii)-Cytoplasmic extension, (iii)-Cortex, (iv)-Pericycle

Page – 186, Easy

11.3.2.1 Root Pressure

74. Root pressure is caused by
 (A) active transport of ions into roots
 (B) passive transport of water into roots
 (C) active transport of water into roots
 (D) both (A) & (B)

Page – 186, Easy

75. Root pressure is
 (A) always positive (B) always negative
 (C) mostly positive (D) mostly negative

Page – 186, Easy

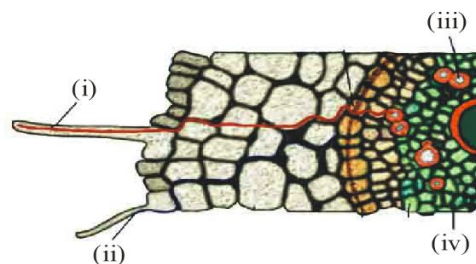
76. Guttation occurs
 (A) due to negative root pressure and low evaporation
 (B) due to positive root pressure and low evaporation
 (C) due to negative root pressure and high evaporation
 (D) due to positive root pressure and high evaporation

Page – 186, Easy

77. Root pressure contributes in
 (A) majority of plant water transport
 (B) transpirational pull
 (C) re-establishing the continuous chain of water in xylem
 (D) Both (a) & (c)

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78.



Identify the correct labels for given figure.

- (i) (ii) (iii) (iv)
 (A) Apoplastic symplastic xylem phloem
 Pathway pathway
 (B) symplastic apoplastic xylem
 phloem Pathway pathway
 (C) Apoplastic symplastic phloem xylem
 Pathway pathway
 (D) symplastic Apoplastic Phloem xylem
 Pathway pathway

Page – 185, Easy

11.3.2.2 Transpiration pull

79. Which of the statements is correct?
 (A) About 30% water reaching leaves is transpired
 (B) About 80% water reaching leaves is transpired
 (C) About 90% water reaching leaves is transpired
 (D) About 99% water reaching leaves is transpired

Page – 187, Easy

11.4 Transpiration

80. The immediate cause of opening and closing of stomata is
 (A) change in CO₂ concentration
 (B) change in turgidity of guard cell
 (C) change in concentration in complementary cell
 (D) change in water (moisture) content of air.

Page – 187, Easy

81. Stomatal aperture is
 (A) cell between guard cells
 (B) Pore between guard cell
 (C) Inner wall of guard cell
 (D) Inner wall of subsidiary cell

Page – 187, Easy

82. Inner wall of each guard cell is

- (A) thin and inelastic
- (B) thin and elastic
- (C) thick and inelastic
- (D) thick and elastic

Page – 187, Easy

83. Microfibrils of cell wall of guard cell are

- (A) proteinaceous and radial
- (B) proteinaceous and longitudinal
- (C) cellulosic and radial
- (D) cellulosic and longitudinal

Page – 187, Easy

84. Which of these statements about stomata opening or closing is correct?

- (A) When guard cells are turgid, stoma closes
- (B) When guard cells are flaccid, stoma opens
- (C) When guard cells lose turgor, elastic outer walls regain their original shape and stoma closes
- (D) None of these

Page – 187, Easy

85. How many of the following are plant factors affecting transpiration?

Water status of plant, number of stomata, wind speed, light, canopy structure, humidity, temperature

- (A) 7
- (B) 3
- (C) 4
- (D) 5

Page – 187, Easy

86.



Choose the correct labels for the given figure

- | (i) | (ii) | (iii) | |
|-----------------------|-------------|-------------|-------------------|
| (A) Guard cell | cell | Microfibril | Stomatal aperture |
| (B) Microfibril | Guard cell | cell | Stomatal aperture |
| (C) Stomatal aperture | Microfibril | cell | Guard cell |
| (D) Guard cell | Stomatal | Microfibril | aperture |

Page – 187, Easy

87. Which of the following statements is incorrect?

- (A) Cohesion is the property of xylem sap.
- (B) Adhesion is the attraction of water molecules to surface of tracheary elements
- (C) Adhesion is a property of xylem wall.
- (D) Capillarity is the ability of water to ascend in thin tubes.

Page – 185-187, Difficult

88. Water is moved from xylem to leaf cells by

- (A) a push force of continuously upcoming xylem sap
- (B) a push force of water incoming from phloem
- (C) a pull force of cohesion between water molecules
- (D) a pull force of water diffusing into air.

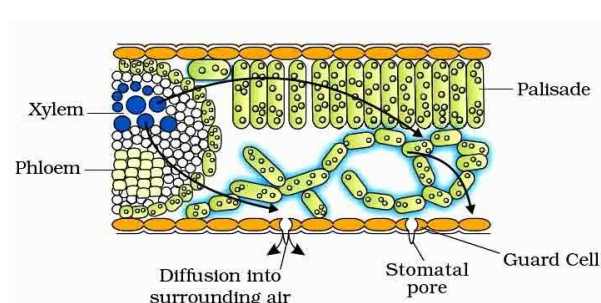
Page – 187, Easy

89. Why does water diffuse into the surrounding?

- (A) Due to lower concentration of water vapour in atmosphere.
- (B) Due to lower concentration of water vapour in the sub-stomatal cavity.
- (C) due to lower concentration of water vapour in the intercellular spaces.
- (D) Due to lower concentration of water vapour in the xylem element.

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90.



Choose correct option

- (A) The figure shows water movement in a monocot leaf.
- (B) The water moves due to a negative pressure created by xylem.

- (C) The water moves due to a push force created by the water diffusing into surrounding
 (D) The figure shows water movement in a dicot leaf.

Page – 188, Easy

11.4.1 Transpiration & Photosynthesis – a compromise

91. Transpiration
 (A) supplies water for photosynthesis
 (B) decreases water available for photosynthesis
 (C) has no relation with photosynthesis
 (D) Both (a) & (b)

Page – 189, Easy

92. Read the given statements
 (i) Transpiration enables mineral transport
 (ii) Transpiration maintains shape of plants.
 (iii) Transpiration enables light absorption by plants.
 (iv) Transpiration causes cooling effect.
 Choose the appropriate answer
 (A) Statement (i) & (ii) are correct, (iii) & (iv) are wrong
 (B) Statement (iii) & (iv) are correct, (i) & (ii) are wrong
 (C) Statement (i), (ii), (iii) are correct (iv) is wrong
 (D) Statement (i), (ii), (iv), are correct (iii) is wrong

Page – 189, Easy

93. Transpiration cools leaf surface by upto
 (A) 2–3°C (B) 5–6°C
 (C) 10–15°C (D) 18–20°C

Page – 189, Easy

94. A limiting factor for photosynthesis is
 (A) Water due to evaporation by high light intensity
 (B) Water due to transpiration
 (C) Sunlight due to cooling effect of transpiration
 (D) CO₂ due to excess transpiration

Page – 189, Easy

95. Humidity of rainforests is largely due to

- (A) Cycling of nutrients from leaf to root
 (B) Cycling of water from leaf to root
 (C) Cycling of nutrients from root to leaf
 (D) Cycling of water from root to leaf

Page – 189, Easy

96. Read the given statements
 (I) C₄ plants loses double the water lost by C₃ plant for same amount of CO₂ fixed
 (II) C₄ plants are more efficient in making sugar than C₃ plants.
 Choose the best option
 (A) I and II are correct
 (B) I is correct and II is incorrect
 (C) I is incorrect and II is correct
 (D) Both I & II are incorrect

Page – 189, Medium

11.5.1 Uptake of Mineral Ions

97. All minerals cannot be passively absorbed by roots because
 (A) They are present as ions which cannot more a cross cell membrane.
 (B) Concentration of minerals in soil is higher than the concentration of minerals in roots
 (C) Both (a) & (b)
 (D) all minerals are passively absorbed
98. Which of the given statements is correct about uptake of mineral ions?
 (A) Active uptake of ions is helps in uptake of water actively
 (B) Passive uptake of ions helps in uptake of water actively
 (C) Active uptake of ions help in uptake of water passively.
 (D) Passive uptake of ions help in uptake of water passively.

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99. Ions are absorbed from soil by
 (A) active transport only
 (B) passive transport only
 (C) mostly passive transport
 (D) both active & passive transport

Page – 189, Easy

100. The transport proteins embedded in the plasma membrane of endodermal cells
 (A) allow all types of solute to pass to xylem.
 (B) allow some solutes to cross the membrane
 (C) shows no selectivity
 (D) Both (a) & (c)

Page – 189, Easy

101. Quantity & types of solute reaching xylem are decided at
 (A) control points of epidermal cells as the transport starts there
 (B) control point of pericycle cells as they surround the xylem
 (C) control point of cortical cells as they have large intercellular spaces.
 (D) control point of endodermal cells as they have specific transport proteins and suberin.

Page – 189, Easy

102. Layer of suberin present in root
 (A) in cortical possess ability to passively transport ions in one direction only.
 (B) can actively transport selected ions in both the directions.
 (C) can transport ions actively in one direction only.
 (D) can transport ions in multi directions actively

Page – 189, Easy

11.5.2 Translocation of mineral ions

103. After the ions reach xylem, their further transport to all parts of plant is through
 (A) diffusion (B) active transport
 (C) translocation (D) All of the above

Page – 190, Easy

104. Chief sinks for mineral elements are the following except
 (A) root hairs (B) fruits
 (C) seeds (D) shoot tip

Page – 190, Easy

105. Unloading of mineral ions occurs at the fine vein ending through (i) and uptake by cells is (ii)

(i) (ii)

- (A) active transport diffusion
 (B) diffusion actively
 (C) active transport passive
 (D) diffusion passive

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106. Mineral ions are
 (A) rarely remobilized, from mature parts to young parts.
 (B) rarely remobilized from young leaves to old parts
 (C) frequently remobilized from older parts to young parts
 (D) frequently remobilized from young parts to older parts

Page – 190, Easy

107. Elements most readily mobilized
 (A) phosphorous (B) potassium
 (C) calcium (D) both (A) & (B)

Page – 190, Easy

108. Most of the nitrogen travels through xylem as
 (A) inorganic ions
 (B) inorganic complex
 (C) organic compounds
 (D) both (a) & (b)

Page – 190, Easy

109. Which of the following is correct
 (A) most of the P and S are carried as organic compounds
 (C) most of P and S are carried as inorganic compounds.
 (C) Little of P and S are carried as organic compounds.
 (D) Both (B) & (C)

Page – 190, Easy

110. Read the given statements
 (I) Some exchange of materials occur between xylem and phloem
 (II) We cannot say that xylem transports only inorganic nutrients.
 Choose the correct option.
 (A) I and II both are correct and II is correct explanation for I
 (B) I and II both are correct but II does not explain I
 (C) I is correct and II is incorrect

(D) I and II both are incorrect

Page – 190, Medium

11.6 Phloem Transport : Flow from source to sink

111. Which of the following statements about source and sink is incorrect

- (A) Source is the part which produces food, like leaf
- (B) Sink is the part which needs food
- (C) Leaf can never be a sink
- (D) Roots may act as a source

Page – 190, Easy

112. Choose the correct option

- (A) Movement in phloem is bidirectional-left & right, while movement in xylem is unidirectional upward
- (B) Movement in phloem is unidirectional upward while movement in xylem is bidirectional left & right
- (C) Movement in phloem is bidirectional up & down while movement in xylem is unidirectional up
- (D) movement in phloem is unidirectional upward while movement in xylem is bidirectional up & down.

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113. Phloem sap includes

- (A) water, sucrose, hormones
- (B) sucrose only
- (C) water and sucrose but no hormones
- (D) sucrose and hormones but no water

Page – 190, Easy

114. Amino acids are transported by

- (A) xylem only
- (B) phloem only
- (C) both xylem & phloem
- (D) neither xylem nor phloem

Page – 190, Easy

11.6.1 The pressure flow or mass flow hypothesis

115. The sugar mainly transported is

- (A) Glucose (monosaccharide)
- (B) Glucose (disaccharide)
- (C) Sucrose (disaccharide)
- (D) Sucrose (monosaccharide)

Page – 191, Easy

116. Glucose is converted to sucrose at

- (A) the source
- (B) the sink
- (C) midway in xylem during transport
- (D) Sometimes at source and other times at sink

Page – 191, Easy

117. Select the correct pathway for sugar transport by phloem as per the mass flow hypothesis

- (A) Sucrose → Sieve tube → Companion cells via diffusion
- (B) Sucrose → sieve tube → companion cells via active transport
- (C) Sucrose → Companion cells → Sieve tube via diffusion
- (D) Sucrose → Companion cells → Sieve tube via active transport

Page – 191, Easy

118. Loading at source during phloem translocation

- (A) makes phloem hypertonic and attract water from xylem
- (B) makes phloem hypotonic and attract water from xylem
- (C) makes phloem hypertonic and attract water from shoot cells
- (D) makes phloem hypotonic and attract water from shoot cells

Page – 191, Easy

119. Choose the correct option for phloem transport

- (A) loading is active process and unloading is passive
- (B) loading is passive process and unloading is active
- (C) Both loading and unloading are active
- (D) Both loading and unloading are passive

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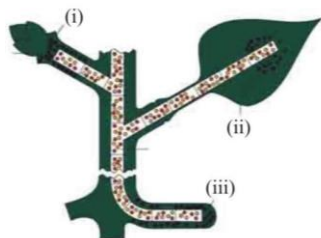
120. Choose the incorrect option for phloem transport

- (A) transport occurs due to high osmotic pressure in phloem
- (B) transport occurs due to low osmotic pressure in xylem.

- (C) transport occurs due to water potential gradient
 (D) transport occurs due to pressure potential gradient

Page – 191, Easy

121.



Identify the correct match

- (A) Sugar enter sieve tube, water follows by osmosis
 (B) Sugar leaving sieve tube, water follow by osmosis

	(i)	(ii)	(iii)
(A)	A	B	B
(B)	B	A	A
(C)	A	B	A
(D)	B	A	B

Page – 191, Easy

TG: @Chalnaavaaar

122. Girdling experiment was used to identify
 (A) tissue for water transport
 (B) tissue for food transport
 (C) tissue for mineral transport
 (D) Both (A) and (C)

Page – 192, Easy

123. In girdling experiment, a ring of bark is cut upto the depth of
 (A) the xylem layer
 (B) the phloem layer
 (C) the cortex layer
 (D) the endodermal layer

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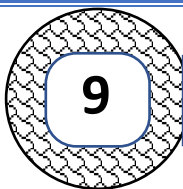
124. In girdling experiment, the stem swells
 (A) above the ring, and transport is unidirectional towards roots
 (B) above the ring, and transport is unidirectional towards shoot
 (C) below the ring, and transport is unidirectional towards shoot
 (D) Both above and below the ring, and transport is bidirectional towards root and shoot.

Page – 192, Easy

Answer Key
Transport in plants

Q	01	02	03	04	05	06	07	08	09	10
Ans	C	B	A	A	B	B	B	A	D	C
Q	11	12	13	14	15	16	17	18	19	20
Ans	B	B	C	B	B	A	A	B	A	C
Q	21	22	23	24	25	26	27	28	29	30
Ans	D	A	A	A	A	C	D	B	C	D
Q	31	32	33	34	35	36	37	38	39	40
Ans	A	A	C	C	A	B	B	D	C	A
Q	41	42	43	44	45	46	47	48	49	50
Ans	D	B	B	A	B	A	B	A	A	A
Q	51	52	53	54	55	56	57	58	59	60
Ans	B	D	C	B	A	C	D	C	C	D
Q	61	62	63	64	65	66	67	68	69	70
Ans	D	C	C	B	B	C	D	D	C	D
Q	71	72	73	74	75	76	77	78	79	80
Ans	C	C	B	A	A	B	B	B	D	B
Q	81	82	83	84	85	86	87	88	89	90
Ans	C	D	C	D	B	B	C	D	A	D
Q	91	92	93	94	95	96	97	98	99	100
Ans	A	D	C	B	D	C	A	C	D	B
Q	101	102	103	104	105	106	107	108	109	110
Ans	D	C	C	A	B	C	D	C	D	A
Q	111	112	113	114	115	116	117	118	119	120
Ans	C	C	A	C	C	A	D	A	C	B
Q	121	122	123	124						
Ans	D	B	B	A						

TG: @Chalnaayaaar



12.1 Methods to study the mineral requirements of plants:

- Hydroponics has been successfully employed as a technique for commercial production of **(PG. 195, E)**
 - Vegetables such as tomato
 - Seedless cucumber
 - lettuce
 - all of these
- Hydroponics was first time demonstrated by **(PG. 194, E)**
 - Julius von Sachs, a prominent German botanist in 1860.
 - Julius von Sachs, a prominent French botanist in 1860.
 - Melvin Calvin, a prominent French botanist in 1960.
 - None of these
- Hydroponics helps in **(PG. 195, E)**
 - identification of essential elements
 - discovery of deficiency symptoms of essential elements
 - growing some commercial crops like tomatoes
 - all of these

12.2 Essential Mineral elements

- Plants growing near nuclear test sites take up **(PG. 195, E)**
 - Selenium
 - Strontium
 - gold
 - none of these
- Hydroponics are techniques that are able to detect the minerals even at a very low concentration upto **(PG. 195, E)**
 - 10⁻⁵g/ml
 - 10⁻⁶g/ml
 - 10⁻³g/ml
 - 10⁻⁴g/ml

12.2.1 Criteria for essentiality

- The criteria for essentiality of an element are: **(PG. 195, E)**
 - The element must be absolutely necessary for supporting normal growth and reproduction
 - The requirement of the element must be specific and not replaceable by another element.
 - The element must be directly involved in the metabolism of the plant.
 - all of these
- Macronutrients are not **(PG. 196, E)**

- Generally present in plant tissues in large amounts in excess of 10m mole/kg of dry matter.
 - Carbon, Hydrogen & oxygen are mainly obtained from CO₂ and H₂O.
 - Phosphorous, sulphur, potassium, calcium are macronutrient.
 - Manganese, which is absorbed from soil as mineral nutrition.
- How many essential elements are classified into macronutrient and micronutrient.

(A) 9	(B) 17
(C) 8	(D) 10
 - How many essential elements are called non-mineral elements **(PG. 196, E)**

(A) 3	(B) 5
(C) 7	(D) 9
 - Match the column-I & II **(PG. 196, E)**

Column I	Column II
(A) Mo	(i) RubisCo
(B) Mg ²⁺	(ii) Alcohol dehydrogenase
(C) Zn ²⁺	(iii) Nitrogenase
(A) A-i, B-ii, C-iii	(B) A-iii, B-i, C-ii
(C) A-ii, B-iii, C-i	(D) A-iii, B-ii, C-i
 - Mg²⁺ act as **(PG. 196, E)**
 - activator for enzymes phosphoenol pyruvate carboxylase during photosynthetic carbon fixation.
 - inhibitor for Ribulose biphosphate carboxylase-oxygenase during photosynthetic carbon fixation.
 - inhibitor for enzyme phosphoenol pyruvate carboxylase during photosynthetic carbon fixation
 - b and c both
 - Which of following does play important roles in opening and closing of stomata **(PG. 196, E)**

(A) Potassium	(B) Phosphorous
(C) Calcium	(D) magnesium
 - Which of following is part of chlorophyll and ATP respectively. **(PG. 196, E)**
 - Manganese, phosphorous
 - Magnesium, phosphorous
 - Manganese, Potassium
 - Magnesium, Potassium
 - Which of following is used to categorize essential elements. **(PG. 196, E)**
 - components of biomolecules
 - Activate or inhibit enzymes.
 - Osmotic potential of a cell role.

(iv) Components of energy-related chemical compounds.

- (A) i, ii only (B) iii & iv only
(C) i, iii & iv (D) all of these

12.2.2 Role of Macro-and Micro-nutrients.

15. Anion-cation balance in cell maintained by **(PG. 197, E)**
(A) Potassium (B) phosphorous
(C) Nitrogen (D) Sulphur
16. Which of following involved is protein synthesis **(PG. 197, E)**
(A) Phosphorous (B) Potassium
(C) Calcium (D) Iron
17. Choose incorrect about function of calcium in plants **(PG. 197, E)**
(A) It accumulate in newly formed leaf.
(B) Synthesis of cell wall.
(C) formation of spindle fibres
(D) none of these
18. How many of enlisted elements are/is major constituents of nucleic acids. Potassium, Phosphorous, Calcium, Magnesium, Nitrogen **(PG. 197, E)**
(A) 2 (B) 3
(C) 4 (D) 1
19. Plant obtain sulphur in the form of **(PG. 197, E)**
(A) Sulphide (B) Sulphate
(C) Sulphite (D) a & b
20. Plant obtain iron in the form of **(PG. 197, E)**
(A) ferrous (B) ferrate
(C) ferric ions (D) a & b
21. Magnesium help in maintaing structure of **(PG. 197, E)**
(A) cell wall (B) cell membrane
(C) Ribosome (D) Lysosome
22. In how many amino acid does sulphur present. **(PG. 197, E)**
(A) 0 (B) 1
(C) 2 (D) 5
23. Main constituent of biotin is **(PG. 197, E)**
(A) Sulphur
(B) Same as main constitute of thiamine
(C) Retinol
(D) a & b both
24. Plant obtain calcium is form of **(PG. 197, E)**
(A) calcium ions (B) calcium solid
(C) calcium (D) none

25. Which of following is present in ferredoxin. **(PG. 197, E)**
(A) Sulphur (B) Iron
(C) Both a & b (D) None
26. Coenzyme A consist of **(PG. 197, E)**
(A) Magnesium (B) Sulphur
(C) Iron (D) Potassium
27. Which of following does plant obtain as monovalent ion **(PG. 197, E)**
(A) Manganese (B) Zinc
(C) Copper (D) Chlorine
28. Which of following does not take part is nitrogen metabolism **(PG. 197, E)**
(A) Nitrogenase
(B) Nitrate reductase
(C) Molybdenum
(D) nitrate oxygenase
29. Redox reaction is performed by **(PG. 197, E)**
(A) Copper (B) Iron
(C) Both a & b (D) none of these
30. Synthesis of auxin need **(PG. 197, E)**
(A) Zinc (B) Copper
(C) Iron (D) Chlorine
31. The best defined function of manganese is **(PG. 198, E)**
(A) Splitting of water that liberate oxygen during photosynthesis
(B) Combination of OH⁻ and H⁺ that leads to formation of water.
(C) aerobic respiration
(D) fermentation
32. Choose correct set about Boron **(PG. 198, E)**
(i) It absorbed as B72-
(ii) It absorbed as B4O33-
(iii) It required for uptake & utilization of ZN2+
(iv) Pollen germination
(v) Carbohydrate translocation.
(A) I, ii, iii, iv, v (B) iii, iv, v
(C) iv, v (D) none of these
33. Boron is required for uptake & utilization of **(PG. 198, E)**
(A) Ca2+ (B) Mn2+
(C) Mg2+ (D) all of these

12.2.3 Deficiency symptoms of essential elements

34. Whenever the supply of an essential elements becomes limited, plant growth is **(PG. 198, E)**
(A) accelerated (B) retarded
(C) no effect (D) optimum
35. Critical concentration is **(PG. 198, E)**

- (A) The concentration of the essential element below which plant growth is retarded.
 (B) the concentration of the non-essential element below which plant growth is accelerated.
 (C) The concentration of the essential element above which plant growth is accelerated.
 (D) The concentration of the essential element below which plant growth is accelerated.
36. Deficiency symptoms is **(PG. 198, E)**
 (A) Morphological changes that indicate certain element deficiencies
 (B) It is not varying from element to element
 (C) Never disappear when the deficient mineral nutrient is provided to plant.
 (D) all of these
37. For elements that are actively mobilized within the plants, and exported to young developing tissues, the deficiency symptoms tend to appear **(PG. 198, E)**
 (A) first in meristematic tissue
 (B) first in older tissue
 (C) first in leaf
 (D) all of these
38. Which of following element deficiencies are visible in senescent leaves **(PG. 198, E)**
 (A) Nitrogen (B) Potassium
 (C) Magnesium (D) all of these
39. Chlorosis is **(PG. 199, E)**
 (A) loss of chlorophyll leading to yellowing of leaves
 (B) caused by deficiency of elements like N, K, Mg, S, Mn, Fe, Zn, MO and Cu.
 (C) A & B both
 (D) none of these
40. Deficiency of Ca, Mg, Cu, K lead to **(PG. 199, E)**
 (A) Chlorosis
 (B) Necrosis
 (C) inhibition of cell division
 (D) no of these
41. Inhibition of cell division is not related to deficiency of **(PG. 199, E)**
 (A) S (B) Cu
 (C) K (D) Mo
42. Given below are list of element N, K, Mg, Ca, Cu, B, Fe, Mn, Zn, Mo
 How many of them are related to necrosis, chlorosis and inhibition of cell division respectively. **(PG. 199, E)**
 (A) 8, 4, 4 (B) 4, 8, 4

- (C) 4, 4, 8 (D) none of these

12.2.4 Toxicity of Micronutrient

43. The requirement of micronutrients is always inconcentration their moderate decrease cause the and a moderate increase cause **(PG. 199, E)**
 (A) high, deficiency symptoms, toxicity
 (B) low, deficiency symptoms, toxicity
 (C) low, toxicity symptoms, deficiency symptoms
 (D) high toxicity, symptoms, deficiency symptoms
44. Any mineral ion concentration in tissues that reduced the dry weight of tissues by about how much present is considered toxic. **(PG. 199, E)**
 (A) 10% (B) 20%
 (C) 2% (D) more than 50%
45. Choose correct statements **(PG. 199, E)**
 (i) The prominent symptom of manganese toxicity is appearance of brown spots surrounded by chlorotic veins.
 (ii) Manganese compete with magnesium for binding with enzymes.
 (iii) Manganese inhibit calcium translocation in Root apex
 (iv) Excess of manganese may in fact induce deficiencies of iron, magnesium & calcium
 (A) i, ii, iii, iv (B) i, ii, iv only
 (C) i, iii only (D) iv only

12.3 Mechanism of absorption of elements

46. Choose the correct about mechanism of absorption of elements by plants. **(PG. 200, E)**
 (A) An initial rapid uptake of ions into the 'outer space' of cells i.e. apoplast is passive.
 (B) The passive movement of ions into the apoplast usually occurs through ion-channels, the trans-membrane protein.
 (C) The entry or exist of ions to and from the symplast is an active process.
 (D) all of these

12.4 Translocation of Solutes:

47. Mineral salts are transported through **(PG. 200, E)**
 (A) Xylem (B) Phloem

- (C) Pericycle (D) a & b

12.5 Soil as Reservoir or essential elements

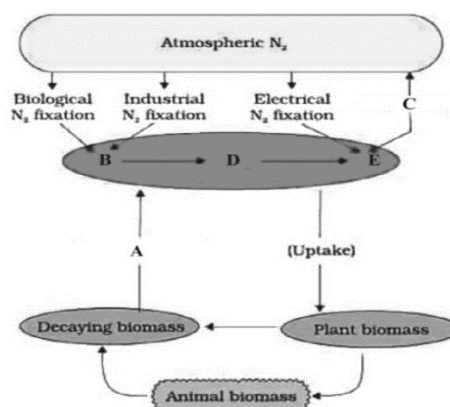
48. Soil supplies (PG. 200, E)
 (A) Mineral salt
 (B) Nitrogen-fixing bacteria
 (C) hold water
 (D) all of these
49. which of following may be supplied by fertilizers (PG. 200, E)
 (A) Macronutrients (B) Micronutrient
 (C) both A & B (D) none

12.6 Metabolism of Nitrogen

50. Nitrogen is a constituent of (PG. 200, E)
 (A) hormones (B) Chlorophyll
 (C) Proteins (D) All of these
51. How many from following statement are correct. (PG. 201, E)
 (i) Plants compete with microbes for limited nitrogen that is available in soil.
 (ii) Nitrogen is limiting nutrient for agricultural ecosystem
 (iii) Nitrogen is not limiting nutrient for natural ecosystem.
 (iv) Nitrogen is absorbed mainly as NO_2^-
 (v) Nitrogen is example of macronutrient of plant as manganese because these present in plant tissue in large amounts (in excess of 10 mmole kg^{-1} of dry matter)
 (A) 4 (B) 2
 (C) 3 (D) 5
52. Two nitrogen atoms joined by (PG. 201, E)
 (A) Three ionic bond
 (B) three covalent bond
 (C) three coordination
 (D) a & b both
53. Nitrogen fixation is conversion of (N_2) into (PG. 201, E)
 (A) NO_2 (B) N_2O
 (C) NH_3 (D) A and C both
54. Oxidation of ammonia into nitrite is carried out by (PG. 201, E)
 (A) *Nitrosomonas* (B) *Nitrobacter*
 (C) *Pseudomonas* (D) *Thiobacillus*
55. *Nitrococcus* is responsible for (PG. 201, E)
 (A) Oxidation of ammonia
 (B) Oxidation of nitrite
 (C) Reduction of nitrate
 (D) formation of NO_3^-
56. Nitrification is related to (PG. 201, E)

- (A) $2\text{NH}_3 + 3\text{O}_2 \rightarrow 2\text{NO}_2^- + 2\text{H}^+ + 2\text{H}_2\text{O}$
 (B) $2\text{NO}_2^- + \text{O}_2 \rightarrow 2\text{NO}_3^-$
 (C) Photoautotrophic bacteria
 (D) A & B both

57. Plant absorb (PG. 201, E)
 (A) nitrate (B) nitrite
 (C) Ammonia (D) All of these
58. Formation of amine group of amino acid in leaf is achieved by (PG. 201, E)
 (A) oxidation of nitrite
 (B) reduction of nitrite
 (C) oxidation of nitrate
 (D) reduction of nitrate
59. Denitrification is process of (PG. 201, E)
 (A) Reduction of nitrate
 (B) Reduction of nitrite only
 (C) Oxidation of nitrite only
 (D) oxidation of nitrate only
60. Denitrifying bacteria are (PG. 201, E)
 (A) *Thiobacillus* & *Nitrosomonas*
 (B) *Nitrococcus* & *Nitrosomonas*
 (C) *Pseudomonas* & *Thiobacillus*
 (D) None of these
61. *Pseudomonas* is responsible for (PG. 201, E)
 (A) Ammonification (B) Nitrification
 (C) Denitrification (D) All of these
62. Identify A, B, C, D, E (PG. 201, E)



	A	B	C	D	E
A	Ammonification	NO_2^-	Denitrification	NO_3^-	NH_3
B	Ammonification	NH_3	Denitrification	NO_2^-	NO_3^-
C	Denitrification	NO_3^-	Ammonification	NH_3	NO_2^-

D	Denitrification	NH ₃	Ammonification	N ₂ O ₃ -	N ₂ O ₂ -
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12.6.2 Biological Nitrogen Fixation

63. Nitrogenase enzymes found exclusively is (PG. 202, E)

- (A) prokaryotes (B) eukaryotes
(C) both a & b (D) aquatic

64. Choose correct option. (PG. 202, E)

- (A) *Azotobacter* is free-living N₂-fixing aerobic microbe.
(B) *Beijerinckia* is free-living N₂-fixing anaerobic microbe.
(C) *Rhodospirillum* is aerobic and free-living N₂-fixes
(D) *Azotobacter* is free-living N₂-fixing anaerobic microbe.

65. *Frankia* is associated with to form root nodule. (PG. 202, E)

- (A) leguminous plants root
(B) Root of non-legumes (*Alnus*)
(C) A & B both
(D) none of these

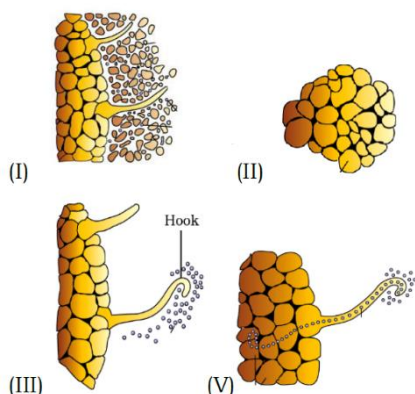
66. *Rhizobium* is

- (A) Rod-shaped (B) Coccus shaped
(C) Spirillum shaped (D) comma-shaped

67. *Rhizobium* is

- (A) Rod-shaped (B) symbiotic
(C) associated with alfalfa (D) all

68. Arrange the sequence of nodule formation by *Rhizobium* and root of host plant. (PG. 203, E)



- (A) I→III→V→II (B) I→III→II→V
(C) II→III→V→I (D) II→V→III→I

69. Which of following is incorrect about root nodule formation (PG. 203, E)

- (A) *Rhizobia* multiply & colonise the surrounding of roots & get attached to cortical cells.

(B) Root nodule formation initiate in cortex of root.

(C) The bacteria are released from the infection thread in to the cells which leads to the differentiation of specialized N₂-fixing cells.

(D) Nodules establishes a direct vascular connection with host for exchange of nutrients.

70. The enzyme nitrogenase (PG. 203, E)

- (i) Mo-Fe protein
(ii) Catalyses the conversion of atmospheric nitrogen to ammonia
(iii) highly sensitive to molecular oxygen
(iv) require anaerobic condition
(A) i, ii, iii, iv are correct
(B) i, iii & iv are only correct
(C) ii, iii are incorrect
(D) I, ii are only correct.

71. Leg-haemoglobin is not (PG. 203, E)

- (A) leguminous haemoglobin
(B) oxygen producer
(C) oxygen scavengers
(D) Make red-pink color appearance of root nodule

72. Production of one molecule of ammonia require (PG. 204, E)

- (A) 16 ATP (B) 8 ATP
(C) 8e⁻ (D) a & c both

73. How many electron required to convert (N₂) into 2NH₃ (PG. 204, E)

- (A) 4e⁻ (B) 8e⁻
(C) 16e⁻ (D) 2e⁻

74. The energy require for N₂ fixing comes from (PG. 204, E)

- (A) Nitrogenase activity of microbes
(B) Respiration of host cell
(C) Carbon assimilation of host cell
(D) All of these

75. Reductive amination require (PG. 204, E)

- (i) Ammonium ion
(ii) NADP
(iii) Glutamate dehydrogenase
(iv) Water
(v) α-ketoglutaric acid
(A) i, ii, iii, v only (B) i, iii, v only
(C) ii & iv only (D) all of these

76. Transamination is (PG. 204, E)

- (A) Transfer of amino group from one amino acid to keto group of a keto acid.
(B) Transfer of keto group from one amino acid to amino group of a keto acid
(C) Transfer of kept group from keto acid to amino group of an amino acid.

- (D) Transfer of amino group from keto acid to keto group of an amino acid.
77. Which of following is Amino donor. **(PG. 204, E)**
- (A) $\text{R1-H} \mid \text{C} \mid \text{NH}_3^+ \text{ } ^-\text{COO}^-$
 (B) R2-C-COO^-
 $\quad \quad \quad \parallel \text{O}$
 (C) H-C-COO^-
 $\quad \quad \quad \parallel \text{O}$
 (D) $\text{R2-H} \mid \text{C} \mid \text{N}_3^+ \text{ } ^-\text{COOH}$
78. Asparagine & glutamine are **(PG. 204, E)**
- (A) two amide
 (B) formed from two amino acid i.e. aspartic acid and glutamate respectively
 (C) contain less nitrogen than amino acid.
 (D) transported by phloem
79. Ureides have **(PG. 204, E)**
- (A) high carbon to nitrogen ratio
 (B) high nitrogen carbon ratio
 (C) $\text{N/C} = 1$
 (D) none of them

**ANSWER KEY
MINERAL NUTRIENTS**

Q	01	02	03	04	05	06	07	08	09	10
Ans	D	A	D	A	A	D	D	B	A	B
Q	11	12	13	14	15	16	17	18	19	20
Ans	D	A	B	D	A	B	A	A	B	A
Q	21	22	23	24	25	26	27	28	29	30
Ans	C	C	B	A	A	B	D	D	C	A
Q	31	32	33	34	35	36	37	38	39	40
Ans	A	C	A	B	A	A	B	D	C	B
Q	41	42	43	44	45	46	47	48	49	50
Ans	B	B	B	A	A	D	A	D	C	D
Q	51	52	53	54	55	56	57	58	59	60
Ans	C	B	C	A	A	D	A	D	A	C
Q	61	62	63	64	65	66	67	68	69	70
Ans	C	B	A	A	B	A	D	A	A	A
Q	71	72	73	74	75	76	77	78	79	
Ans	B	B	C	B	B	A	A	A	B	

13.1 What do we know?

- Chlorophyll is the-
(Pg. 206, E)
A) Red pigment of leaf of all plants
B) Blue pigment of leaf of all plants
C) Green pigment of root of all plants
D) None of these
- In an experiment where a part of leaf is enclosed in test tube containing KOH Soaked Cotton & exposed to light will-
(Pg. 207, E)
A) Test positive for starch
B) Test negative for starch due to inability to absorb light inside test tube
C) Test negative for starch due to inability to absorb CO₂
D) Test negative for starch due to absence of water

13.2 Early Experiments

- Match the experiment objective with the scientist who performed it-
(Pg. 207, H)

i	Priestly	I	Production of glucose in photosynthesis
ii	Julius von Sachs	II	Role of sunlight in photosynthesis
iii	Jan Ingenhousz	III	Role of air in photosynthesis

	(i)	(ii)	(iii)
(A)	I	III	II
(B)	II	I	III
(C)	II	III	I
(D)	III	I	II

- Who performed a series of experiments that revealed the essential role of air on the growth of green plants and when?
(Pg. 207, E)
A) Cornelius van Niel (1787)
B) Joseph Priestly (1770)
C) T. Engelmann (1756)
D) Both A and B

- Who discovered oxygen and when?
(Pg. 207, E)
A) Joseph Priestly (1770)
B) T. Engelmann (1770)
C) Jan Ingenhousz (1787)
D) Joseph Priestly (1774)
- Who showed that sunlight is essential to the plant?
(Pg. 207, E)
A) T. Engelmann B) Joseph Priestly
C) Jan Ingenhousz
D) Cornelius van trial
- part of the plants that could release oxygen.
(Pg. 207, E)
A) Jan Ingenhousz
B) T. Engelmann
C) Joseph priestly
D) None of these
- Match the following
(Pg. 207, H)

(A)	First action spectrum	(1)	Cornelius van nel
(B)	Chlorophyll	(2)	T.W Engelmann
(C)	O ₂ evolve from H ₂ O	(3)	Algae
(D)	<i>Cladophora</i>	(4)	Julius von sachs
		(5)	Bacteria

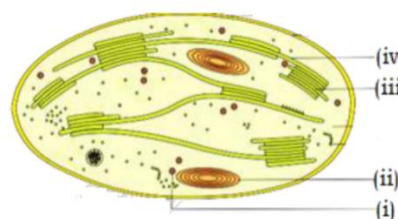
- A) A-1, B-4, C-1, D-3,5
B) A-3, B-2, C-4, D-1
C) A-1, B-3, C-2, D-5
D) A-2, B-4, C-1, D-3
- _____ were used to detect the sites of O₂ evolution.
(Pg. 207, E)
A) Bacteria B) Daze
C) Fungi D) Virus
- Cornelius van Neil studied on ____ to demonstrate that photosynthesis is essentially a light dependent reaction.
(Pg. 208, E)
A) *Cladophora*
B) Purple and green bacteria

- C) Red algae
(D) Both A and B
11. _____ from a suitable oxidisable compound reduces CO₂ to Carbohydrates.
(Pg. 208, E)
- A) Oxygen B) Hydrogen
C) Carbon D) Both A and B
12. *Cladophora* is-
(Pg. 208, E)
- A) Purple and green bacteria
B) Green bacteria
C) Red algae
D) Green algae
13. (A) – O₂ evolved by the green plant comes from H₂O, not from carbon dioxide.
(B) – This was proved by using Radio isotopic techniques.
(Pg. 208, E)
- A) Statement A is wrong and Statement B is right
B) Both Statement A and B are wrong
C) Statement B is wrong and Statement B is correct
D) Both Statement A and B are correct

13.3 Where does photosynthesis take place?

14. Where does photosynthesis take place?
(Pg. 209, E)
- A) Green part of leaves
B) Green part of stem
C) Brown part of stem
D) Both A and B
15. Assertion – Chloroplasts usually align themselves along the walls of mesophyll cells.
Reason – They get optimum quantity of incident light by aligning along wall. Choose the correct option.
(Pg. 209, M)
- (A) Assertion and Reason are correct and Reason is correct explanation for Assertion
(B) Assertion and Reason are correct but is not the explanation of Assertion
(C) Assertion and Reason are both incorrect

- (D) Assertion is correct but Reason is incorrect
16. Chloroplast is-
(Pg. 209, E)
- A) Single membrane organelle
B) Double membrane organelle
C) Triple membrane organelle
D) Not an organelle
17. Choose the incorrect statement from the following?
(Pg. 209, E)
- (A) There is no clear division of labour within chloroplast
(B) Chloroplast has membranous system which includes stroma as well
(C) Membrane system is responsible for trapping the light energy
(D) More than one of the above
18. Dark reaction-
(Pg. 209, E)
- A) is not light-dependent
B) occurs in darkness
C) is photochemical reaction
D) is indirectly light-dependent
- 19.



Identify correct labelling. (Pg. 209, E)

	(i)	(ii)	(iii)	(iv)
A	Starch granule	Lipid droplet	Stroma lamella	Grana
B	Starch granule	Lipid droplet	Grana	Stroma lamella
C	Lipid droplet	Starch granule	Grana	Stroma lamellae
D	Lipid droplet	Starch granule	Stroma lamella	Grana

20. Sugar is synthesized-
(Pg. 209, E)
- A) Non-enzymatically in grana
B) Non-enzymatically in stroma
C) Enzymatically in grana
D) Enzymatically in stroma
21. Which of the following is correct?

(Pg. 209, E)

- A) Light reaction depends on dark reaction
 B) Dark reaction depends on light reaction
 C) Both of the above
 D) None of the above
22. If a plant is kept in dark for a long time-

(Pg. 209, E)

- A) Starch will be synthesized in chloroplast
 B) ATP will be synthesized in chloroplast but no starch
 C) NADPH will be synthesized in chloroplast but no starch
 D) None of these

23. Choose the incorrect option- During daytime-

(Pg. 209, E)

- A) ATP will be synthesized in chloroplast by light reaction
 B) NADPH will be synthesized in chloroplast by light reaction
 C) Starch will not be synthesized by dark reaction
 D) None of these

13.4 How many types of pigments are involved in photosynthesis

24. The colour of leaf is due to- (Pg. 210, E)

- A) Chlorophyll only
 B) Chlorophyll, carotenoids only
 C) Chlorophyll, carotenoids, xanthophyll
 D) None of these

25. Leaf pigments are separated by- (Pg. 210, E)

- A) Crystallization
 B) Gel electrophoresis
 C) Blotting
 D) Paper chromatography

26. Match the pigment with its colour - (Pg. 210, E)

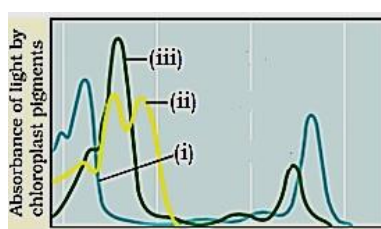
	I		II
(i)	Chlorophyll a	(A)	Blue green
(ii)	Chlorophyll b	(B)	Yellow
(iii)	Carotenoids	(C)	Yellow-green
(iv)	Xanthophyll	(D)	Yellow-orange

	(i)	(ii)	(iii)	(iv)
A)	A	C	B	D
B)	A	C	D	B
C)	A	D	B	C
D)	A	D	C	B

27. Which is the most abundant plant pigment in the world? (Pg. 210, E)

- A) Chlorophyll a B) Chlorophyll b
 C) Carotenoids D) xanthophylls

- 28.



Identity correct

(Pg. 210, E)

- | | | |
|---------------|-------------|-------------|
| i | ii | iii |
| A Chl a | Chl b | Carotenoids |
| B Carotenoids | Chl a | Chl b |
| C Chl b | Chl a | Carotenoids |
| D Chl b | Carotenoids | Chl a |

29. Maximum absorption by chlorophyll a occurs in- (Pg. 210, E)

- A) blue & green region
 B) red & green region
 C) blue & red region
 D) yellow & red region

30. Assertion - Chlorophyll 'a' is the chief pigment associated with photosynthesis
 Reason - Chlorophyll maximum absorption coincides with maximum photosynthesis.

Choose correct option - (Pg. 210, M)

- A) Assertion & Reason are correct & Reason is correct explanation of Assertion
 B) Assertion & Reason are correct but Reason is not correct explanation of Assertion
 C) Assertion is correct & Reason is incorrect.

- D) Assertion & Reason are incorrect.
31. Accessory pigments include **(Pg. 210, E)**
 A) Chlorophyll a B) Chlorophyll b
 C) both of these D) None of these
32. Accessory pigments **(Pg. 210, E)**
 A) Pass on the energy to chl 'a'
 B) pass on the energy to primary acceptor
 C) Use energy for photolysis of water
 D) more than one option
33. Advantages of accessory pigments include – **(Pg. 210, E)**
 A) they help by photolyzing the water
 B) they protect chl 'a' from photo-oxidation
 C) they enable narrower range of wavelength of incoming light to be used for photosynthesis
 D) both a & b

13.5 What is light Reaction?

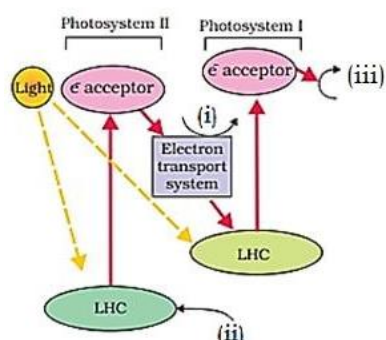
34. Light Reaction is also Known as- **(Pg. 211, E)**
 A) photochemical phase
 B) biosynthetic phase
 C) both of these
 D) None of these
35. Choose correct order of events in light reaction- **(Pg. 211, E)**
 i) ATP & NADPH formation
 ii) Water Splitting
 iii) Oxygen release
 iv) Light absorption
 A) III IV II I
 B) IV III I III
 C) IV II III I
 D) II III IV I
36. LHC stands for- **(Pg. 211, E)**
 A) Late Harvesting Complex
 B) Light Harvesting Complex
 C) Light Hanging Complex
 D) Late Hanging Complex
37. The naming of PS I & PS II was based on- **(Pg. 211, E)**
 A) their discovery order
 B) their functioning sequence
 C) the scientist who named it
 D) the components of the photosystem.

38. Which of the following is correct? **(Pg. 211, E)**
 A) PS I is called P800
 B) PS II is called P680
 C) Both a & b
 D) None of these
39. Reaction Centre is formed by- **(Pg. 211, E)**
 A) Only one chlorophyll 'a' molecule
 B) A few chlorophyll 'a' molecule
 C) One chlorophyll 'a' and a few accessory
 D) A few chlorophyll 'a' and a few accessory pigments.
40. Choose the incorrect statements- **(Pg. 211, E)**
 A) Antennae is a light harvesting system
 B) Contains accessory pigments
 C) Does not include reaction centre
 D) None of these

13.6 The Electron Transport

41. When the light energy is absorbed by PS-II, it is- **(Pg. 211, E)**
 A) Converted to mechanical energy
 B) Used to excite electrons
 C) Used to change configuration of RUBisCO
 D) Both a & c
42. The movement of excited electrons in Noncyclic Photophosphorylation: **(Pg. 211, E)**
 A) uphill in terms of reduction potential scale
 B) downhill in terms of reduction potential scale
 C) uphill and downhill in terms of oxidation-reduction potential scale
 D) both A and C
43. The electrons excited from PS II- **(Pg. 211, E)**
 A) get used up by the first electron acceptor.
 B) get used up in the middle of its ETS pathway to PS I
 C) get passed on to pigments of PS I
 D) get partially used up in ETS and the rest is passed to PS I.
44. The electrons passed on by PS I to electron acceptor are- **(Pg. 212, E)**

- A) the ones that were transferred to PS I from PS II
 B) electrons from the water splatted.
 C) electrons excited when PS I absorbs light.
 D) All of these
45. Electrons from PS-I move downhill to a molecule of energy-rich- **(Pg. 212, E)**
 A) NADP^+ B) NAD^+
 C) FAD^+ D) GTP
46. The Z scheme is named so because- **(Pg. 212, E)**
 A) it was discovered by a scientist with 'Z' as initial letter of name
 B) the carriers of ETS present in thylakoid membrane are in 'Z' shape.
 C) it forms 'Z' shape when the carriers of ETS are arranged in sequence on redox potential scale.
 D) both A & C
- 47.



Identify the correct site for **(Pg. 212, E)**
 I- water splitting, II- NADP^+ reduction, III- ATP synthesis

- | | I | II | III |
|----|-----|----|-----|
| A) | I | II | III |
| B) | II | I | III |
| C) | III | II | I |
| D) | III | I | II |

13.6.1 Splitting of Water

48. Splitting of water is important- **(Pg. 212, E)**
 A) for the O_2 formation
 B) for the electrons released
 C) for the hydroxide ions released
 D) for the H_2 released
49. Water splitting is associated with-

- (Pg. 212, E)**
 A) PS I located on inner side of thylakoid membrane
 B) PS II located on inner side of thylakoid membrane
 C) PS I located on Outer stroma lamellae
 D) PS II located on outer stroma lamellae membrane
50. The O_2 is released in- **(Pg. 212, E)**
 A) Lumen of thylakoid
 B) Outer side of thylakoid
 C) Stroma
 D) Cytoplasm
51. Protons are released- **(Pg. 212, E)**
 A) Lumen of thylakoid
 B) Outer side of thylakoid
 C) Stroma
 D) Cytoplasm

13.6.2 Cyclic & Non-Cycle Photophosphorylation

52. The process of ATP synthesis in cells is/are- **(Pg. 212, E)**
 A) Photo-phosphorylation
 B) Oxidative phosphorylation
 C) Phosphosynthesis
 D) Both A & B
53. The order of working of the two photosystems is- **(Pg. 213, E)**
 A) PS I $\rightarrow$ PS II
 B) PS II $\rightarrow$ PSI
 C) Any of these depending upon location
 D) None of these
54. Non-cyclic photo-phosphorylation involves- **(Pg. 213, E)**
 A) PS I
 B) PS II
 C) Both PS I & PS II
 D) None of the these, only enzymes in stroma
55. End product of Z-scheme is- **(Pg. 213, E)**
 A) ATP B) Glucose
 C) $\text{NADH} + \text{H}^+$ D) Both A & C
56. Cyclic photophosphorylation involves- **(Pg. 213, E)**
 A) PS I only
 B) PS II only
 C) Both PS I & PS II

- D) None of these
57. Cyclic phosphorylation ends in formation of- **(Pg. 213, E)**
- A) ATP only
B) Glucose only
C) NADPH + H^+ only
D) Both A & C
58. A possible location of cyclic photophosphorylation under full light is condition. **(Pg. 213, E)**
- A) Stroma
B) Stroma lamellae
C) Cristate
D) Outer membrane of chloroplast.
59. Assertion – Cyclic photophosphorylation occurs in stroma
Reason – Stroma membrane lacks PS II and NADP reductase.
Choose correct answer- **(Pg. 213, M)**
- A) Both Assertion & Reason are correct and Reason is correct explanation for A
B) Both Assertion & Reason are correct but Reason is not correct explanation for Assertion
C) Assertion is correct but Reason is wrong
D) Both Assertion & Reason are wrong

13.6.3 Chemiosmotic Hypothesis

60. ATP Synthesis is linked to _i_ graduate across a membrane in _ii_ **(Pg. 213, E)**

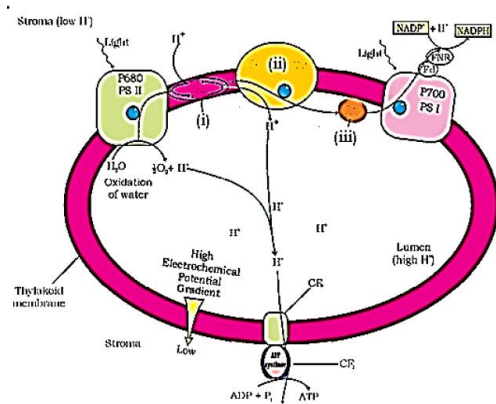
	(i)	(ii)
A)	Electron	Photosynthesis & respiration
B)	Electron	Photosynthesis only
C)	Proton	Photosynthesis and respiration
D)	Proton	Photosynthesis but not respiration

61. Which of the following statements is true? **(Pg. 213, E)**
- A) the protons accumulate towards outer side of membrane in photosynthesis
B) the protons accumulate towards inner side (lumen) of thylakoid in respiration.

- C) The protons accumulate towards outer side of membrane of respiration thylakoid
D) None of these
62. The proton gradient may be formed in photosynthesis due to- **(Pg. 213, E)**
- A) Splitting of water
B) Reduction of NAD^+
C) Both A and B
D) None of these
63. Assertion – Protons move through photosystems, protons are transported across membrane.
Reason – Primary acceptor of electrons is an H carrier **(Pg. 213, M)**
- A) Both Assertion & Reason are correct and Reason is explanation of Assertion
B) Both Assertion & Reason are correct and Reason is not the explanation for Assertion
C) Assertion is correct but Reason is not correct
D) Assertion & Reason both are incorrect
64. Which of these is an H carrier? **(Pg. 213, E)**
- A) PS II B) Ferredoxin
C) Plastocyanin D) Plastoquinone
65. NADP reductase enzyme is located on _____ of thylakoid membrane. **(Pg. 214, E)**
- A) Stroma side (outer side)
B) Lumen side (I.e. outer side)
C) Stroma Side (i.e. inner side)
D) Lumen side (i.e. inner side)
66. The proton gradient is also formed due to- **(Pg. 214, E)**
- A) reduction of NAD^+
B) reduction of $NADP^+$
C) reduction of both NAD^+ & $NADP^+$
D) reduction of FAD^+
67. Which of the following is true? **(Pg. 214, M)**
- A) ATP & NADPH + H^+ both are formed towards stroma.
B) ATP & NADPH + H^+ both are formed in lumen of thylakoid
C) ATP is formed in lumen while NADPH + H^+ is formed towards stroma.

D) $\text{NADPH} + \text{H}^+$ formed in lumen while ATP is formed in stroma.

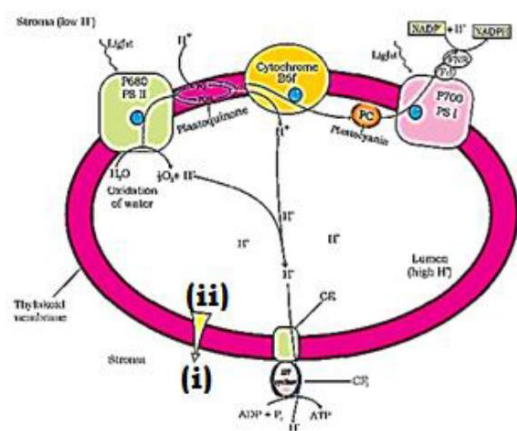
68.



Identify correct labels- (Pg. 214, E)

	(i)	(ii)	(iii)
A)	PQ	PC	Cyt b_6f
B)	Cyt b_6f	PQ	PC
C)	PC	Cyt b_6f	PC
D)	PQ	Cyt b_6f	PC

69.



Identify correct - (Pg. 214, E)

	I	II
A)	High electrochemical gradient	Low gradient
B)	Low electrochemical gradient	High gradient
C)	High electrochemical gradient	High gradient
D)	Low electrochemical gradient	Low gradient

70. Statement A – The accumulation of protons in stroma cause decrease in pH of stroma.

Statement B – The accumulation of proton in lumen cause formation of potential gradient across thylakoid membrane.

Select the correct option- (Pg. 214, M)

- A) A is correct and B is incorrect
- B) B is correct and A is incorrect
- C) A & B are correct
- D) A & B are incorrect

71. ATP formation occurs upon- (Pg. 214, E)

- A) build up of potential gradient
- B) break down of potential gradient
- C) Both of these
- D) None of these

72. The transmembrane channel in ATP synthase enzyme is formed by-

(Pg. 214, E)

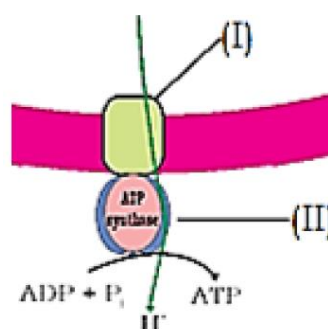
- A) CF_0
- B) CF_1
- C) CF_2
- D) Both A & B

73. The transmembrane channel allows – across membrane for ATP synthesis

(Pg. 214, E)

- A) Osmosis of protons
- B) Simple diffusion of proton
- C) Facilitated diffusion of electron
- D) Facilitated diffusion of proton

74.



The ATP synthase has two parts I & II

- | | |
|-------------------|---------------|
| I | II |
| (A) CF_0 | CF_1 |
| (B) CF_1 | CF_0 |
| (C) CF | CF_0 |
| (D) None | |

75. CF_0 is – (Pg. 214, E)

- A) embedded in chloroplast membrane

- B) protruding on outer surface of chloroplast
 C) protruding on inner surface of chloroplast membrane
 D) None of these
76. CF_1 is- **(Pg. 215, E)**
 A) embedded in chloroplast membrane
 B) protruding on outer surface of chloroplast membrane
 C) protruding on inner surface of chloroplast
 D) None of these
77. Conformational change in ____ makes ATP. **(Pg. 215, E)**
 A) CF_0 B) CF_1
 C) Both D) None
78. For creating proton gradient across thylakoid membrane _____. **(Pg. 215, E)**
 A) Energy is used
 B) No energy is used
 C) Energy is released
 D) None of these
79. The end products of light reaction are- **(Pg. 215, E)**
 A) Stored till dark reaction takes place at right
 B) immediately used up in next round of light reaction
 C) transferred to the stroma from lumen to be used in biosynthetic reaction occurring in stroma
 D) None of these

13.7 Where are the ATP and NADPH used?

80. The products of light reaction are- **(Pg. 215, E)**
 A) ATP only B) ATP & NADPH
 C) ATP, NADPH, O_2 D) NADPH Only
81. O_2 is- **(Pg. 215, E)**
 A) used up in dark reaction in stroma
 B) used up in dark reaction in lumen thylakoid
 C) diffused out of chloroplast
 D) more than one option is correct
82. Statement A – Biosynthetic reaction is independent of direct presence of light

Statement B – Biosynthetic process continues for some time after the light becomes unavailable and then stops.

(Pg. 215, E)

- A) Both A & B are correct
 B) A is correct and B is incorrect
 C) A is incorrect and B is correct
 D) A & B are in correct
83. Calvin discovered that first CO_2 fixation product is- **(Pg. 215, E)**
 A) 3-carbon organic acid
 B) 4-carbon organic acid
 C) 5-carbon organic acid
 D) 6-carbon organic acid
84. To discover the first CO_2 fixation product, Calvin worked on-using- **(Pg. 215, E)**
 A) algae, radioactive C_{12}
 B) fungi, radioactive C_{12}
 C) algae, radioactive C_{14}
 D) fungi, radioactive C_{14}
85. The first product of CO_2 fixation was identified to be in the Calvin cycle. **(Pg. 215, E)**
 A) PGA B) RUBP
 C) Citric acid D) OAA
86. In C_4 pathway, first CO_2 fixation product is same options as **(Pg. 215, E)**
 A) PGA B) RUBP
 C) Citric acid D) OAA
87. OAA and PGA stands for- **(Pg. 216, E)**
 A) 3-phosphoglyceric acid and oxalic acid respectively
 B) 3-peptide glutaric acid and oxalic acid respectively
 C) 3-phosphoglutamic acid and oxalic acid respectively
 D) None of these

13.7.1 The primary Acceptor of CO_2

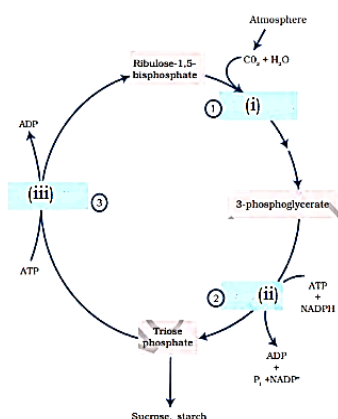
88. For a 3 carbon compound to be formed after CO_2 fixation, the acceptor molecule is of- **(Pg. 216, E)**
 A) 2-carbon B) 3-carbon
 C) 4-carbon D) 5-carbon
89. RUBP stands for- **(Pg. 216, E)**
 A) Ribulose Biphosphate Carboxylase-oxygenase

- B) Ribose Bisphosphate Carboxylase-oxygenase
C) Ribulose Bisphosphate
D) Ribose Bisphosphate Carboxylase-oxygenase

13.7.2 The Calvin Cycle

90. The Calvin cycle starts with _____ ends with _____ (Pg. 216, E)
A) RUBisCo, regeneration of RUBisCo
B) RUBP, regeneration of RUBisCo
C) RUBP, regeneration of RUBP
D) PGA, regeneration of PGA
91. Calvin cycle- (Pg. 216, E)
A) occurs in C_3 plants only
B) occurs in C_4 plants only
C) occurs in both C_3 & C_4
D) None of these

92.



The three steps in Calvin cycle are- (Pg. 216, E)

	i	ii	iii
A)	Carboxylation	Oxidation	Regeneration
B)	Reduction	Carboxylation	Regeneration
C)	Carboxylation	Reduction	Regeneration
D)	Carbonation	Reduction	Regeneration

93. The most crucial step of Calvin cycle is- (Pg. 216, E)
A) Carbonation B) Carboxylation
C) Reduction D) Regeneration
94. Carboxylation is catalyzed by the enzyme-

(Pg. 216, E)

- A) RUBP B) PEP
C) NADPH D) None of these
95. RUBisCo has the activity of- (Pg. 217, E)
A) Carbonation B) Oxygenation
C) Oxidation D) None of these
96. Reduction involves Use of _____ molecules of ATP for fixed CO_2 reduction (Pg. 217, E)
A) 1 B) 2
C) 3 D) 4
97. Reduction involves use of _____ molecules of NADPH to reduce fixed CO_2 . (Pg. 217, E)
A) 1 B) 2
C) 3 D) 4
98. For formation of 1 glucose molecule, how many turns of Calvin cycle is needed? (Pg. 217, E)
A) 3 B) 1
C) 2 D) 6
99. Regeneration of __ (i) __ takes place at expense of __ (ii) __ ATP & __ (iii) __ NADPH. (Pg. 217, E)

	(i)	(ii)	(iii)
A)	RUBP	0	1
B)	RUBP	1	0
C)	RUBisCo	0	1
D)	RUBisCo	1	0

100. Statement A – In CO_2 fixation cycle, the molecules of ATP used is more than NADPH used.
Statement B – to meet the difference in number of ATP & NADPH used in dark reaction, cyclic phosphorylation take place.
Choose the correct option- (Pg. 217, M)
A) A is correct but B is wrong
B) B is correct but A is wrong
C) A & B are correct and A explains B
D) A & B are incorrect.
101. For formation of 1 glucose, how many molecules of ATP are required by C_3 cycle? (Pg. 217, E)
A) 12 B) 16

- C) 18 D) 10
102. For one glucose formation, how many NAD molecules are needed by C_3 pathway?

(Pg. 217, E)

- A) 10 B) 12
C) 16 D) 18

13.8 The C_4 Pathway

103. C_4 plants are adaptation of plants to-
(Pg. 218, E)

- A) wet regions (heavy rainfall)
B) polar regions
C) dry tropics
D) moist rainforest

104. (i) – C_4 plants lack Calvin cycle
(ii) – C_4 plants lack photorespiration
(iii) – C_4 plants have more productivity than C_3 plants
(iv) – C_4 plants cannot tolerate higher temperature

How many of the above statements are incorrect? (Pg. 218, M)

- A) 0 B) 1
C) 2 D) 3

105. First CO_2 fixation product in C_4 cycle is-
(Pg. 218, E)

- A) RBP B) PEP
C) OAA D) Malate

106. Bundle sheath cells are present in ____ around ____.
(Pg. 218, E)

- A) C_4 plants, vascular bundles
B) C_3 plants, vascular bundles
C) Both of these
D) None of these

107. Leaves with bundle sheath cells are said to show-
(Pg. 218, E)

- A) Kranz anatomy B) Kranz anatomy
C) Kent anatomy D) Krez anatomy

108. Bundle sheath cells- (Pg. 218, E)

- A) Allow gaseous exchange
B) Have intercellular spaces
C) Have large number of chloroplasts
D) All of these

109. Example of C_4 plants is- (Pg. 218, E)

- A) Rice B) Maize
C) Soyabean D) Both A and C

110. Primary CO_2 acceptor in C_4 plants is-
(Pg. 218, E)

- A) 3-carbon molecule RUBP
B) 3-carbon molecule PEP
C) 4-carbon molecule PEP
D) 4-carbon molecule OAA

111. Enzyme responsible for primary CO_2 fixation in C_4 plants is- (Pg. 218, E)

- A) RUBisCO B) PEPCase
C) Oxaloacetase D) Phenolase

112. Which of the following is true? (Pg. 218, E)

- A) C_4 plants lack RUBisCO
B) Mesophyll cells of C_4 plants lack RUBisCO
C) Bundle sheath cells of C_4 plants lack RUBisCO
D) C_3 plants lack RUBisCO

113. Primary CO_2 fixation occurs in C_4 plants in
(Pg. 218, E)

- A) Bundle sheath cells
B) Mesophyll cells
C) Any of the above
D) None of these

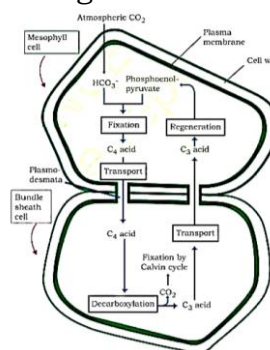
114. CO_2 fixation in C_4 plants occurs in-
(Pg. 218, E)

- A) Bundle sheath cells
B) Mesophyll cells
C) Both A and B
D) None of the above

115. OAA forms other four carbon acids which are transported. They are- (Pg. 218, E)

- A) Malic acid and oxalic acid
B) Malic acid and aspartic acid
C) Succinic acid and aspartic acid
D) Succinic acid and glutamic acid

116. The figure shows (Pg. 219, E)



- A) Krebs cycle
B) Calvin cycle
C) Hatch and Slack pathway
D) EMP pathway

117. In C_4 pathway, RUBisCO is- **(Pg. 219, E)**

- A) absent
- B) present in mesophyll cells
- C) present in bundle sheath cell
- D) none of these

118. PEPcase enzyme is- **(Pg. 219, E)**

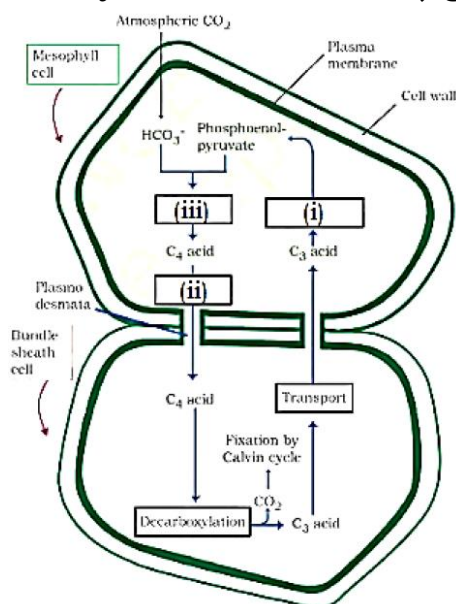
- A) absent in mesophyll cells
- B) present in bundle sheath cells
- C) both A and B
- D) None of these

119. Calvin cycle takes place in __ (i) __ in all C_3 plants in __ (ii) __ in all C_4 plants

(Pg. 219, E)

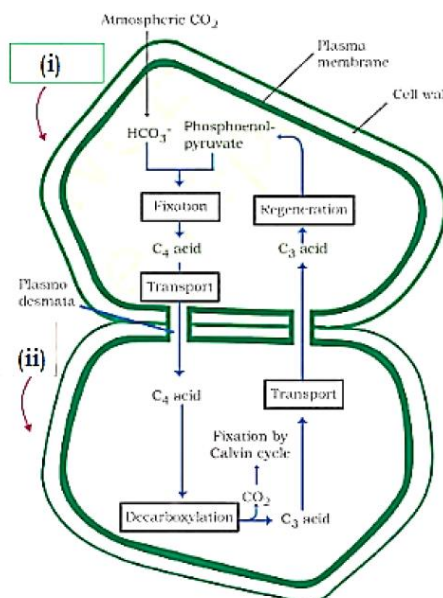
	(i)	(ii)
(A)	mesophyll cells	mesophyll cells
(B)	bundle sheath cells	mesophyll cells
(C)	mesophyll cells	bundle sheath cells
(D)	bundle sheath cells	bundle sheath cells

120. Identify correct labels- **(Pg. 219, E)**



	(i)	(ii)	(iii)
A	Fixation	Decarboxylation	Regeneration
B	Transport	Fixation	Regeneration
C	Regeneration	Transport	Fixation
D	Regeneration	Decarboxylation	Fixation

121. Identify the A and B **(Pg. 219, E)**



	(i)	(ii)
A	mesophyll cells	mesophyll cells
B	bundle sheath cells	mesophyll cells
C	mesophyll cells	bundle sheath cells
D	bundle sheath cells	bundle sheath cells

13.9 Photorespiration

122. Read the following statements-

Statement A – Ribulose Biphosphate is the most abundant enzyme in the world.
Statement B – Photorespiration doesn't occur in C_4 plants.

Choose the correct option- **(Pg. 220, E)**

- A) A is correct and B is incorrect
- B) B is correct and A is incorrect
- C) A and B are correct
- D) A and B are incorrect

123. RUBisCO has _____ when CO_2 & O_2 is equal. **(Pg. 220, E)**

- A) greater affinity for CO_2 than O_2
- B) greater affinity for O_2 than CO_2
- C) equal affinity for CO_2 & O_2
- D) no affinity for O_2

124. In C_3 plants- **(Pg. 220, E)**

- A) Some O_2 binds to RUBisCO and CO_2 fixation increases
 B) no O_2 binds to RUBisCO
 C) Some O_2 binds to RUBisCO and CO_2 fixation decreases
 D) only O_2 binds to RUBisCO
125. When O_2 binds to RUBisCO, RUBP is converted to _____ and _____.
(Pg. 220, E)
- A) Phosphoglycerate, phosphoenolpyruvate
 B) Phosphoglycerate, phosphoglycerate
 C) Phosphoenolpyruvate, phosphoglycerate
 D) Phosphoglycolate, phosphoglycerate
126. In photorespiration- **(Pg. 220, E)**
- A) Sugar and ATP are formed
 B) Sugar is formed but not ATP
 C) ATP is formed but not sugar
 D) Sugar and ATP are not formed
127. Assertion – Photorespiration doesn't occur in C_4 plants.
 Reason – CO_2 concentration at enzyme site is high in C_4 plants.
 Chose correct option- **(Pg. 220, E)**
- A) Both Assertion and Reason are correct and Reason is correct explanation for Assertion
 B) Assertion is correct and Reason is wrong
 C) Assertion is wrong and Reason is correct
 D) Both Assertion and Reason are wrong

13.10 Factors Affecting Photosynthesis

128. Photosynthesis is dependent on- **(Pg. 222, E)**
- A) internal factors of plant
 B) external factors of environment
 C) both A and B
 D) None of these
129. How many of the following are factors affecting photosynthesis? **(Pg. 222, E)**
 age of leaves, orientation of leaf, internal CO_2 concentration, amount of chlorophyll, number of leaves
- A) 4 B) 2

- C) 3 D) 5
130. Blackman's which law comes into effect when several factors affect any biochemical process? **(Pg. 222, E)**
- A) Law of Limited Components (1910)
 B) Law of Limiting Factors (1910)
 C) Law of Limited Components (1905)
 D) Law of Limiting Factors (1905)
131. According to Blackmann's Law, the rate of chemical process is determined by the factor which **(Pg. 222, E)**
- A) is nearest to its maximum value
 B) is nearest to its minimum value
 C) both A and B
 D) none of these

13.10.1 Light

132. The relationship between incident light and CO_2 fixation rate at higher light intensity is- **(Pg. 222, E)**
- A) rate is constant with increasing intensity
 B) rate increases with increasing intensity
 C) rate decreases with increasing intensity
 D) none of these
133. At lower Light intensity, the rate of CO_2 fixation- **(Pg. 222, E)**
- A) is constant with increasing light intensity
 B) increasing with increasing light intensity
 C) decreases with increasing light intensity
 D) none of these
134. Light saturation occurs at _____ of full sunlight. **(Pg. 222, E)**
- A) 5% B) 10%
 C) 20% D) 40%
135. Very big increase in light intensity causes- **(Pg. 222, E)**
- A) increase in photosynthesis
 B) decrease in photosynthesis
 C) no change in photosynthesis rate
 D) none of these

13.10.2 Carbon dioxide concentration

136. Which of the following is true? **(Pg. 223, E)**

- A) CO_2 is a major limiting factor for photosynthesis in nature
- B) Light is rarely a limiting factor for photosynthesis in nature
- C) Both of these
- D) None of these

137. The concentration of CO_2 beyond which the CO_2 becomes damaging over longer periods is- **(Pg. 223, E)**

- A) 0.03% B) 0.04%
- C) 0.05% D) 0.08%

138. The CO_2 fixation rates increases upto the CO_2 concentration of- **(Pg. 223, E)**

- A) 300 ppm B) 400 ppm
- C) 500 ppm D) 800 ppm

139. At low light conditions, which of the groups respond positively to increase in CO_2 - **(Pg. 223, E)**

- A) C_3 B) C_4
- C) Both D) None

140. At high light conditions, which of the groups respond positively to increase in CO_2 . **(Pg. 223, E)**

- A) CO_2 B) C_4
- C) Both D) None

141. C_4 plants show saturation at CO_2 concentration of- **(Pg. 223, E)**

- A) $240 \mu\text{L}^{-1}$ B) $360 \mu\text{L}^{-1}$
- C) $450 \mu\text{L}^{-1}$ D) $540 \mu\text{L}^{-1}$

142. C_3 plants show saturation for CO_2 concentration at- **(Pg. 223, E)**

- A) $450 \mu\text{TL}^{-1}$ B) $360 \mu\text{L}^{-1}$
- C) $540 \mu\text{L}^{-1}$ D) $240 \mu\text{L}^{-1}$

143. Assertion – Greenhouse crops like tomatoes and bell pepper are grown in CO_2 enriched atmosphere for higher yields. Reason – C_4 plants respond to higher CO_2 concentration by showing increased rate of photosynthesis.

Choose the correct option. **(Pg. 223, E)**

- A) Both Assertion and Reason are correct and Reason is correct explanation for Assertion
- B) Both Assertion and Reason are correct but Reason is not the explanation for Assertion

C) Assertion is correct but Reason is wrong

D) Assertion and Reason are wrong

13.10.3 Temperature

144. Which of the reaction is more sensitive to temperature? **(Pg. 223, E)**

- A) Light Reaction
- B) Dark Reaction
- C) Both of them are equal
- D) None of the above

145. Which group of plants has a higher temperature optimum? **(Pg. 223, E)**

- A) C_4 B) C_3
- C) Both D) None

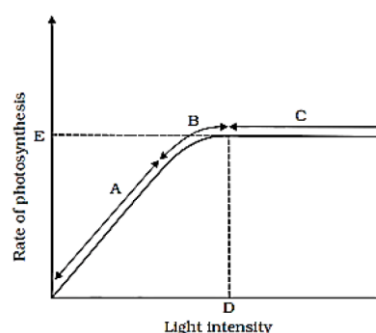
146. Which of the following is true? **(Pg. 223, E)**

- A) Tropical plants have higher temperature optimum than temperature plants
- B) Temperature plants have higher temperature optimum than tropical plants
- C) Temperature and Tropical have equal temperature optimum
- D) Polar regions plants have highest temperature optimum

147. Water stress causes **(Pg. 223, E)**

- A) reduced CO_2 availability
- B) leaf wilting
- C) reduced surface area of leaf
- D) All of these

148.



In the given graph, in which region will plant not respond to increase in CO_2 concentration? **(Pg. 223, E)**

- A) A B) B
- C) C D) None

Answer Key

PHOTOSYNTHESIS IN HIGHER PLANTS.

Q	01	02	03	04	05	06	07	08	09	10
Ans	D	C	D	B	D	C	A	D	A	B
Q	11	12	13	14	15	16	17	18	19	20
Ans	B	D	D	D	A	B	A	D	C	D
Q	21	22	23	24	25	26	27	28	29	30
Ans	B	D	C	C	D	B	A	D	C	A
Q	31	32	33	34	35	36	37	38	39	40
Ans	B	A	B	A	C	B	A	B	A	D
Q	41	42	43	44	45	46	47	48	49	50
Ans	B	C	C	C	A	C	D	B	B	A
Q	51	52	53	54	55	56	57	58	59	60
Ans	C	D	B	C	D	A	A	B	B	C
Q	61	62	63	64	65	66	67	68	69	70
Ans	D	A	C	D	A	B	A	D	B	B
Q	71	72	73	74	75	76	77	78	79	80
Ans	B	A	D	A	D	D	B	A	D	C
Q	81	82	83	84	85	86	87	88	89	90
Ans	C	A	A	C	A	D	D	D	C	C
Q	91	92	93	94	95	96	97	98	99	100
Ans	C	C	B	D	B	B	B	D	B	C
Q	101	102	103	104	105	106	107	108	109	110
Ans	C	B	C	C	C	A	B	C	B	B
Q	111	112	113	114	115	116	117	118	119	120
Ans	B	B	B	C	B	C	C	D	C	C
Q	121	122	123	124	125	126	127	128	129	130
Ans	C	C	A	C	D	D	A	C	D	D
Q	131	132	133	134	135	136	137	138	139	140
Ans	B	A	B	B	B	C	C	C	D	C
Q	141	142	143	144	145	146	147	148		
Ans	B	A	C	B	A	A	D	A		

11

Respiration in plants

- Respiration is defined as – **(Pg. 227, E)**
 - Formation of C – C bonds of complex compound
 - Breaking of C – C bonds of complex compound
 - Breaking of C – N bonds of complex compound
 - All of the above
- Respiration results finally to a formation and release of which among the following? **(Pg. 227, E)**
 - NADPH
 - Glucose
 - ATP
 - Both A & C
- The C – C bond of complex compound is broken by which process in respiration? **(Pg. 227, E)**
 - Oxidation
 - Reduction
 - Hydrogenation
 - None of the above
- Assertion – ATP act as energy currency of cell.
Reason – Energy released through respiration is trapped as bio-chemical energy in the form of ATP. **(Pg. 227, H)**
 - Only Assertion is correct
 - Only Reason is correct
 - Both Assertion and Reason is correct
 - Both Assertion and Reason is wrong
- Which among the following is wrong? **(Pg. 227, E)**
 - Only carbohydrates are oxidised to release energy in the process of respiration.
 - Energy produced in respiration is not released in a single step.
 - ATP can be broken down, as and when energy needs to be utilised.
 - Only ii
 - Only iii
 - Only i
 - None of the above
- ATP stands for? **(Pg. 227, E)**
 - Adenosine 3' – triphosphate
 - Adenosine – 3' – trio phosphite
 - Adenosine 5' – triphosphate
 - Adenosine 5' – triophosphite
- Compounds that are oxidised during the process of respiration is called? **(Pg. 227, E)**
 - Respiratory index
 - Reductory substrate
 - Respiratory quotient
 - Respiratory substrate
- Statement I – Only green plants and cyanobacteria can prepare their own food by photosynthesis.
Statement II – Only green plants and cyanobacteria can prepare their own food by converting chemical energy to light energy
Which of the statements is/are true? **(Pg. 227, M)**
 - Only I
 - Only II
 - Both of these
 - None of these
- “Ultimately all the food that is respired for life processes comes from photosynthesis.” The above statement is – **(Pg. 227, M)**
 - correct
 - incorrect
 - partially correct
 - can't be said as it is incomplete
- Which of the following cannot be used as respiratory substances in plants under any conditions? **(Pg. 227, E)**
 - fat
 - protein
 - carbohydrate
 - none of these

14.1 Do Plants Breathe?

- What are the byproducts of Respiration process? **(Pg. 227, E)**
 - Oxygen
 - Water
 - Carbon dioxide
 - Both B and C
- Respiration is a _____ process. **(Pg. 227, E)**
 - Anabolic
 - Catabolic
 - Both Anabolic as well as catabolic
 - None of the above
- Choose the correct equation- **(Pg. 228, E)**
 - $C_6H_{12}O_6 + 12O_2 \rightarrow 6H_2O + 6H_2O + \text{Energy}$
 - $C_6H_{12}O_6 + 3O_2 \rightarrow 2CO_2 + 3H_2O + \text{Energy}$

- C) $C_6H_{12}O_6 + 6CO_2 + 6H_2O + \text{Energy}$
 D) $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O + \text{Energy}$
 14. Respiration organs for plants are-
(Pg. 228, E)

- A) Lenticels
 B) Stomata
 C) Woody Bark
 D) Both of the above A and B
 15. Which among the following is wrong?
(Pg. 228, M)
 A) Roots, Leaves and Stem respire a for lower than animal do
 B) For plants to respire, availability of O_2 is a problem as O_2 is not released within the cell during photosynthesis
 C) There is very little transport of gases from one plant part to another
 D) None of the above

14.2 'Glycolysis'

16. Glycolysis is originated from- **(Pg. 228, E)**
 A) Latin word B) French word
 C) Italian word D) Greek word
 17. Meaning of glycolysis is-
 A) Splitting of water
 B) Splitting of sugar
 C) Splitting of fat
 D) Splitting of protein
 18. Glycolysis is also known as _____ pathway.
 A) ETS B) EMP
 C) ENP D) ELP
 19. The scheme of glycolysis was given by-
 A) Gustav Embden B) Otto Meyerhof
 C) J. Parnas D) All of the above
 20. The scheme of glycolysis was given by-
 A) Gustav Embden B) Alto Meyerhof
 C) J. Parnas D) All of the above
 21. Glycolysis occurs in which among the following?
 A) Aerobic organism
 B) Anaerobic organism
 C) Eukaryotes
 D) All of the above
 22. Sucrose is converted to __ (i) __ and __ (ii) __ using enzyme __ (iii) __

	(i)	(ii)	(iii)
A)	Glucose	Glucose	Hexokinase
B)	Glucose	Fructose	Hexokinase
C)	Glucose	Glucose	Invertase
D)	Glucose	Fructose	Invertase

23. What is the isomerised produce of glucose – 6 – phosphate in the steps of glycolysis?
(Pg 229, E)
 A) Fructose 1, 6 – bisphosphate
 B) Fructose –6 – phosphate
 C) Fructose –1, 3, 6 – triphosphate
 D) Fructose –3 – phosphate
 24. Glycolysis is a how many steps of process?
(Pg 229, E)
 A) Ten B) Eight
 C) Eleven D) Five
 25. End product of glycolysis is? **(Pg 229, E)**
 A) Pyruvate
 B) Phenol
 C) Prusic acid
 D) Phosphoenolpyruvate
 26. ATP is utilised in which steps of glycolysis.
(Pg 229, E)
 i) Conversion of BPGA to PGA
 ii) Conversion of glucose into glucose – 6– phosphate
 iii) Conversion fructose 6 – phosphate to fructose 1, 6 – bisphosphate
 iv) Conversion of PEP to pyruvate
 A) Only i B) Only iii
 C) Both ii and iii D) Only ii, iii, iv
 27. One molecule of glucose is converted into how many molecules of pyruvic acid?
(Pg 229, E)
 A) 1 B) 2
 C) 3 D) 4
 28. When PGAL is converted into BPGA in process of respiration there is formation of?
(Pg 229, E)
 A) 1 molecule of ATP
 B) 1 molecule of H_2O
 C) 1 molecule of $NADH + H^+$
 D) 1 molecule of ADP

29. PGAL get _____ and get converted to BPGA? **(Pg 229, E)**
 A) reduced B) hydrolysed
 C) oxidized D) all of these
30. Conversion of 2-phosphoglycerate to phosphoenolpyruvate leads of formation of? **(Pg 229, E)**
 A) ATP B) NADH₂
 C) H₂O D) ADP
31. What does PGAL stands for? **(Pg 229, E)**
 A) 3 – Phosphoglyceraldehyde
 B) 5 – Phosphoglyceraldehyde
 C) 3 – Phosphoglyceric acid
 D) 5 – Phosphoglyceric acid
32. What is the full form of PEP? **(Pg 229, E)**
 A) Pyroenol pyruvate
 B) Pyruvic pyruvate
 C) Phosphoenolpyruvate
 D) None of the above
33. Pyruvic acid is composed of how many carbon atom? **(Pg 229, E)**
 A) Two B) Three
 C) Four D) Five
34. Which among the following step in glycolysis yields energy? **(Pg 229, E)**
 i) Conversion of BPGA to PGA
 ii) Conversion of fructose – 6 –phosphate to fructose 1, 6 –bisphosphate
 iii) Conversion of PEP to pyruvic acid
 iv) Conversion of glucose – 6 –phosphate to fructose – 6 – phosphate
 A) Both ii and iv B) i, ii, iii
 C) Both i and iii D) All of the above
35. In glycolysis, fructose 1, 6 – bisphosphate get split into which of the following? **(Pg 229, E)**
 A) PGAL and BPGA
 B) Glyceraldehyde – 3 – phosphate and 3 – phosphoglyceric acid
 C) Glyceraldehyde – 3 – phosphate and Dihydroxy acetone phosphate
 D) None of the above
36. What is the net gain of ATP from one molecule of glucose in one complete glycolysis? **(Pg 229, M)**
 A) 4 B) 3
 C) 5 D) 2
37. How many ATP are utilized in complete process of glycolysis of one glucose molecule? **(Pg 229, M)**
 A) 2 B) 1
 C) 3 D) 4
38. How many molecules of NADH are produced in one complete process of glycolysis of one glucose molecule? **(Pg 229, M)**
 A) 1 B) 2
 C) 3 D) 4
39. How many molecules of ATP are directly produced in one complete glycolysis of one glucose molecule? **(Pg 229, E)**
 A) 1 B) 2
 C) 3 D) 4
40. Which among the following are correct about Glycolysis? **(Pg 229, E)**
 i) It is the only process that occurs in anaerobes for oxidation of glucose.
 ii) Glucose undergoes complete oxidation to form pyruvic acid.
 iii) At the end, there is a net gain of 4 ATP and 2 NADH.
 A) Only ii B) Both ii and iii
 C) Only i D) all of the above
41. For further complete oxidation of glucose, pyruvic acid enters to which among the following? **(Pg 229, E)**
 A) ETS B) Kreb's cycle
 C) EMP pathway D) None of the above

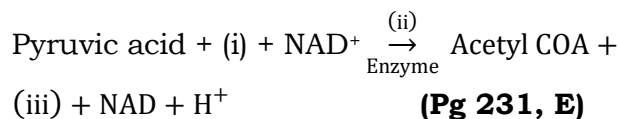
14.3 FERMENTATION

42. Fermentation occurs when there is **(Pg 230, E)**
 A) Complete supply of oxygen
 B) No supply of oxygen
 C) Complete supply of water
 D) No supply of water
43. In alcoholic fermentation, pyruvate is converted to which among the following? **(Pg 230, E)**
 A) Ethanol, CO₂, NADH
 B) CO₂ and Methanol
 C) CO₂ and Ethanol only
 D) CO₂ and Carboxylic acid
44. Which enzyme is responsible for alcoholic fermentation? **(Pg 230, E)**
 A) Pyruvic acid decarboxylase

- B) Lactate dehydrogenase
C) Alcohol dehydrogenase
D) More than one option is correct
45. Which enzyme is involved in lactic acid fermentation? **(Pg 230, E)**
A) Pyruvic acid decarboxylase
B) Lactate dehydrogenase
C) Alcohol dehydrogenase
D) More than one option is correct
46. Choose the correct option **(Pg 230, M)**
In the fermentation process:-
i) Oxidation of ADP to ATP takes place
ii) Reduction of ATP to ADP takes place
iii) Reducing agent NADH + H⁺ is reoxidised to NAD⁺
iv) Formation of NADH + H⁺ takes place by oxidation
A) ii and iv B) ii and iii
C) Both i and iii D) Only iii
47. How many statements are correct about fermentation? **(Pg 230, M)**
i) Very low amount of energy is released, < 7% of energy in glucose is released in fermentation
ii) In animal cells, when oxygen is inadequate acetic acid is formed during respiration
iii) It is dangerous process as it leads to acid and alcohol formation.
A) 0 B) 1
C) 2 D) 3
48. The range beyond which yeasts poison themselves to death in alcohol fermentation when the concentration of alcohol reaches to? **(Pg 230, E)**
A) 13% B) 15%
C) 12% D) 17%
49. Which among the following is the processes steps in, complete cellular respiration which don't need oxygen molecule (O₂)? **(Pg 231, E)**
A) Glycolysis
B) Tricarboxylic acid cycle
C) ETC
D) Both A and B

14.4 Aerobic Respiration

50. Complete the following reaction-



- A) (i) O₂ (ii) Mg²⁺ (iii) CO₂
B) (i) O₂ (ii) Na⁺ (iii) H₂O
C) (i) CoA (ii) Na⁺ (iii) CO₂
D) (i) CoA (ii) Mg²⁺ (iii) CO₂
51. Pyruvate enters to the mitochondrial matrix and undergoes. **(Pg 231, E)**
A) Reductive decarboxylation
B) Oxidative carboxylation
C) Reductive carboxylation
D) Oxidative decarboxylation
52. Which enzyme catalyse the reaction going on in mitochondrial matrix in respiration? **(Pg 231, E)**
A) Pyruvate carboxylase
B) Lactate dehydrogenase
C) Alcohol dehydrogenase
D) Pyruvate dehydrogenase
53. Who elucidated Tricarboxylic Acid cycle? **(Pg 231, E)**
A) Johns Elen B) Hans Krebs
C) Meyerhoff D) Elena Parker
54. Formation of Acetyl coenzyme A from Pyruvate in mitochondrial matrix yields which among the following? **(Pg 231, E)**
A) CO₂ B) H₂O
C) NADPH + H⁺ D) Both A and C
55. How many molecules of NADH + H⁺ are produced when pyruvate converts to Acetyl CoA in TCA cycle? **(Pg 231, E)**
A) 0 B) 1
C) 2 D) 3

14.4.1 'Tricarboxylic Acid Cycle'

56. Where does TCA cycle occurs? **(Pg 231, E)**
A) Cytoplasm
B) Mitochondria cell wall
C) Mitochondrial matrix
D) Chloroplast
57. What is the first product of TCA cycle? **(Pg 231, E)**
A) Acetyl CoA B) Citric acid
C) Isocitric acid D) OAA
58. What is the 1st step of TCA cycle? **(Pg 231, E)**
A) Formation of citrate from isocitrate

- B) Formation of citrate from the acetyl coenzyme A
 C) Formation of citrate from decarboxylation of succinic acid
 D) None of the above
59. Which enzyme catalyses the first step of TCA cycle? **(Pg 231, E)**
 A) Citrate Synthase
 B) Citrate Reductase
 C) Citrate Oxidase
 D) None of the above
60. What is the first member of TCA cycle that accepts Acetyl CoA? **(Pg 231, E)**
 A) Citrate
 B) CoA
 C) Oxaloacetic acid
 D) Both A and C
61. Which among the following is synthesised during the conversion of succinyl – CoA to succinic acid in TCA cycle? **(Pg 232, E)**
 A) FADH_2 B) GTP
 C) NADH_2 D) ATP
62. How many total CO_2 molecule are released from Pyruvate to completion of TCA cycle? **(Pg 232, E)**
 A) 0 B) 1
 C) 2 D) 3
63. How many total NADH_2 are produced from pyruvate to completion of TCA cycle? **(Pg 232, E)**
 A) 2 B) 3
 C) 4 D) 5
64. How many FADH_2 are produced in TCA cycle? **(Pg 232, E)**
 A) 1 B) 2
 C) 3 D) 4
65. One molecule of glucose synthesizes how many molecules of $\text{NADH} + \text{H}^+$ at the end of TCA cycle? **(Pg 232, E)**
 A) 6 B) 7
 C) 8 D) 10
66. How many molecules of FADH_2 are yielded from one glucose molecule at the end of TCA cycle? **(Pg 232, E)**
 A) 1 B) 2
 C) 3 D) 4
67. How many net ATP molecules are directly yielded from complete oxidation of one glucose (including ATP of TCA)? **(Pg 232, E)**
 A) 4 B) 2
 C) 3 D) 8
68. Which among the following is wrong? **(Pg 232, E)**
 (i) Glycolysis occurs in all living organism.
 (ii) TCA cycle and ETS only occurs in aerobes.
 (iii) Complete oxidation of pyruvate occurs by removal of all hydrogen atom in TCA cycle.
 A) (i) B) (ii)
 C) (iii) D) None of the above

14.4.2 Electron Transport System (ETS) and Oxidative Phosphorylation

69. ETS occurs in which place? **(Pg 232, E)**
 A) Outer membrane of mitochondria
 B) Cytoplasm
 C) Inner membrane of mitochondria
 D) Matrix of mitochondria
70. Energy stored in $\text{NADH} + \text{H}^+ \text{FADH}_2$ are released in ETS through _____. **(Pg 232, E)**
 A) Reduction of these molecules
 B) Oxidation of these molecules
 C) Hydrolysis of these molecules
 D) Both A & B
71. ETS stands for **(Pg 232, E)**
 A) Electrical Transport System
 B) Electron Transmission System
 C) Electron Transport System
 D) None of the above
72. When the electrons are passed onto O_2 in ETS it leads to formation of what? **(Pg 232, E)**
 A) CO_2 B) ATP
 C) H_2O D) $\text{NADH} + \text{H}^+$
73. Ubiquinone is located at _____. **(Pg 233, E)**
 A) inner membrane of mitochondria
 B) outer membrane of mitochondria
 C) inner membrane of nucleus

- D) outer membrane of nucleus
74. Ubiquinone receives electrons from which of the following? **(Pg 233, E)**
 i) From NADH produced in mitochondrial matrix during TCA.
 ii) From FADH_2 produced during oxidation of succinate in TCA.
 A) Only i B) Only ii
 C) Both i and ii D) None of the above
75. Electrons from NADH produced during TCA are oxidised by which enzyme? **(Pg 233, E)**
 A) NAD^+ hydrogenase
 B) NADH dehydrogenase
 C) NAD^+ hydroxylase
 D) NADH dehydroxylase
76. The reduced ubiquinone are also called what? **(Pg 233, E)**
 A) Ubiquinate B) Ubiquinase
 C) Ubiquinal D) Ubiquinol
77. Cytochrome c is _____? **(Pg 233, E)**
 A) Lipid B) Carbohydrate
 C) Protein D) Fat
78. What is the function of cytochrome c? **(Pg 233, E)**
 A) Act as donor of electron
 B) Passage for movement of e^-
 C) Act as a receptor of e^- between complex II and III
 D) Act as a mobile carrier for e^- transfer between complex III and IV
79. What does cytochrome c oxidase complex contains? **(Pg 233, E)**
 A) Cytochrome a
 B) Cytochrome a_3
 C) Two copper centres
 D) All of the above
80. When e^- passes from complex I to IV in ETS they are coupled to _____ for ATP production from ADP. **(Pg 233, E)**
 A) Cytochrome c B) Cytochrome bc_1
 C) ATP synthase D) Both A and B
81. Oxidation of one molecule of NADH_2 produces how many molecules of ATP? **(Pg 233, E)**
 A) 1 B) 2
 C) 3 D) 4
82. Oxidation of 2 molecule of FADH_2 produces how many molecules of ATP? **(Pg 233, E)**
 A) 1 B) 2
 C) 3 D) 4
83. Which among the following is the role of O_2 in whole respiration process? **(Pg 233, M)**
 i) Act as hydrogen removal from the system.
 ii) Act as final hydrogen acceptor.
 iii) It bond with C atom and released CO_2 , one of the byproduct of respiration.
 A) ii and iii B) iii only
 C) Both i and ii D) All of the above
84. ETS of respiration process is called **(Pg 233, E)**
 A) Reductive phosphorylation
 B) Oxidative phosphorylation
 C) Oxidative photophosphorylation
 D) Both B and C
85. Which among the following is wrong about ATP synthase? **(Pg 234, E)**
 i) It is also called complex V.
 ii) This is used to synthesis ATP by utilising the energy released during ETS.
 iii) It works on the basis of proton gradient.
 iv) It consist of two major components, F_1 and F_0 .
 A) Only ii B) Both i and iii
 C) i and iv D) None of the above
86. What is F_1 in ATP synthase? **(Pg 234, E)**
 A) It contain a site for protein synthesis.
 B) It contain a site for ADP synthesis from ATP.
 C) It contain a site for ATP production from ADP.
 D) It act as a channel through which proton cross the inner membrane.
87. What is the role of F_0 in ATP synthase? **(Pg 234, E)**
 A) It act as a channel through which e^- crosses the inner membrane.
 B) It act as a channel through which proton crosses the inner membrane.
 C) It act as a mobile protein carrier of electron across the inner membrane.
 D) Acts as site for ATP synthesis

88. For each ATP produced, _____ passes through F_0 from intermembrane space to the matrix down the electrochemical proton gradient. **(Pg 234, E)**

- A) H^+ B) $2H^+$
C) $3H^+$ D) $4H^+$

14.5 The Respiratory Balance Sheet

89. What is the net gain of ATP molecules during aerobic respiration of one glucose molecule? **(Pg 234, E)**

- A) 40 ATP B) 38 ATP
C) 36 ATP D) 34 ATP

90. Match the following **(Pg 234, H)**

1	Glycolysis	i	Mitochondrial matrix
2	TCA	ii	Cytoplasm
3	ETC	iii	Inner membrane of mitochondria

- A) 1-i, 2-ii, 3-iii
B) 1-ii, 2-i, 3-iii
C) 1-iii, 2-ii, 3-i
D) 1-ii, 2-iii, 3-i

91. The respiratory balance sheet is calculated on some assumptions.

Which of the following assumption is correct? **(Pg 234, M)**

- A) The pathway is sequential, with series of glycolysis, ETS and TCA cycle in the same order for a given molecule.
B) NADH is transferred to chloroplast where oxidative phosphorylation occurs, leading to formation of 3 ATP
C) Only glucose is the substrate and none other substrate or intermediate enters or leaves the pathway
D) None of these

92. In the balance sheet of fermentation, net gain is – **(Pg 234, M)**

- A) 12 ATP molecules B) 38 ATP molecules
C) 2 ATP molecules D) 8 ATP molecules

93. Oxidation of NADH to NAD^+ is –

(Pg 235, M)

- A) Slower in fermentation than aerobic respiration

B) Faster in fermentation than aerobic respiration

C) Equal in fermentation and aerobic respiration

D) Cannot be compared

14.6 Amphibolic Pathway

94. Which among the following is wrong?

Pg 235, M)

- i) Other than glucose, no other substrates can be used in respiratory process.
ii) Respiratory pathway is an amphibolic pathway.
iii) Different substrates enters at different stage in respiratory pathway.

- A) Only i B) Only iii
C) Only ii D) Both i and ii

95. Which among the following is wrong?

Pg 235, M)

- i) Other than glucose, no other substrates can be used in respiratory process.
ii) Respiratory pathway is an amphibolic pathway.
iii) Different substrates enters at different stage in respiratory pathway.

- A) Only i B) Only iii
C) Only ii D) Both i and ii

96. Fats as a respiratory substrate converts to which compound first? **Pg 235, M)**

- A) Dihydroxy Aceton Phosphate
B) Glycerol
C) Fatty acid
D) Both B and C

97. Match the following-

Pg 235, H)

1	Amino acids	i	Pyruvic acid
2	Fatty acid	ii	Dihydroxy Acetone Phosphate
3	Glycerol	iii	Acetyl CoA

- A) 1-i, 2-iii, 3-ii B) 1-ii, 2-i, 3-iii
C) 1-iii, 2-i, 3-ii D) 1-ii, 2-iii, 3-i

98. Choose the correct according to the correct sequence (from substrate to end product)

(Pg 235, M)

- i) Glucose 6 – phosphate
 - ii) Pyruvic acid
 - iii) Carbohydrate
 - iv) Fructose-1, 6-bisphosphate
 - v) Glucose
 - vi) Dihydroxy Acetone Phosphate $\rightleftharpoons$ Glyceraldehyde 3 – phosphate
- A) i, iii, iv, v, vi, ii B) iii, iv, v, ii, i, vi
C) iii, v, i, ii, iv, vi D) iii, v, i, iv, vi, ii

14.7 Respiratory Quotient

99. Which statement is true about RQ?

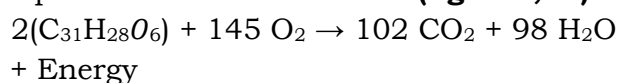
(Pg 236, M)

- i) It is also called respiratory ratio.
 - ii) It is the volume of O₂ released over the volume of CO₂ evolved during respiration.
 - iii) RQ of diff. substrate is different.
- A) Only i B) Only iii
C) Both i and iii D) All of the above

100. Choose the correct. (Pg 236, M)

- A) RQ = volume of CO₂ evolved/volume of O₂ consumed
- B) RQ = volume of O₂ consumed/volume of CO₂ evolved
- C) RQ = volume of O₂ evolved/volume of CO₂ consumed
- D) None of the above

101. What will be the RQ for the following equation (Pg 236, M)



- A) 0.9 B) 1
C) 0.8 D) 0.7

102. What is RQ if proteins are used as a respiratory substrate? (Pg 236, E)

- A) 1 B) 0.8
C) 0.9 D) 0.7

103. What is RQ if carbohydrates are used as a respiratory substrate? (Pg 236, E)

- A) 1 B) 0.8
C) 0.7 D) 0.9

104. Match the following- (Pg 236, E)

1	NADH + H ⁺	i	1 ATP
2	FADH ₂	ii	2 ATP
3	GTP	iii	3 ATP

- A) 1-i, 2-ii, 3-iii B) 1-i, 2-iii, 3-ii
C) 1-iii, 2-ii, 3-i D) 1-ii, 2-i, 3-iii

105. In ETS O₂ accept the electrons and get reduced to which of the following?

(Pg 236, E)

- A) Water B) Carbon dioxide
C) Palmitic acid D) None of the above

106. What is the final end product of TCA cycle? (Pg 236, E)

- A) 3 NADH + H⁺ B) 1 ATP
C) 1 FADH₂ D) All of the above

107. How many ATPs are produced through ETS only from 1 molecule of 3-phosphoglycerate in aerobic respiration

(Pg 236, E)

- A) 12 B) 14
C) 16 D) 15

ANSWER KEY

RESPIRATION IN PLANTS

Q	01	02	03	04	05	06	07	08	09	10
Ans	B	C	A	C	C	C	D	A	A	D
Q	11	12	13	14	15	16	17	18	19	20
Ans	D	C	D	D	B	D	B	B	D	D
Q	21	22	23	24	25	26	27	28	29	30
Ans	D	D	B	A	A	C	B	C	C	C
Q	31	32	33	34	35	36	37	38	39	40
Ans	A	C	B	C	C	D	A	D	D	C
Q	41	42	43	44	45	46	47	48	49	50
Ans	B	B	C	D	C	D	C	A	D	D
Q	51	52	53	54	55	56	57	58	59	60
Ans	D	D	B	A	B	C	B	B	A	C
Q	61	62	63	64	65	66	67	68	69	70
Ans	B	D	C	A	C	B	A	D	C	B
	71	72	73	74	75	76	77	78	79	80
Ans	C	C	A	C	B	D	C	D	D	C
Q	81	82	83	84	85	86	87	88	89	90
Ans	C	D	C	B	D	C	B	B	C	B
Q	91	92	93	94	95	96	97	98	99	100
Ans	C	C	A	A	B	D	A	D	C	A
Q	101	102	103	104	105	106	107			
Ans	D	C	A	C	D	D	B			

1. Development is (Pg. 239, E)
 A) Growth
 B) Differentiation
 C) Growth + differentiation
 D) Growth – differentiation

Paragraph 15.1

Growth

2. Growth of living being is/are- (Pg. 240, E)
 A) Irreversible
 B) Increase in size
 C) Increase in weight
 D) All of these
3. Swelling of piece of wood when placed in water is (Pg. 240, E)
 A) Growth but not development
 B) Development but not growth
 C) No growth and development
 D) Both growth & development

Paragraph 15.1.1

Plant Growth Generally is Indeterminate

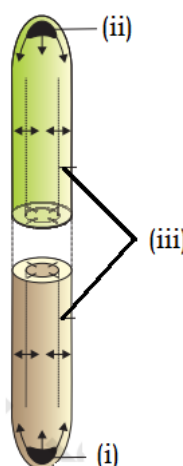
4. Plant grows (Pg. 240, E)
 A) For a limited time in life
 B) For a very long time in life
 C) For a very short time in a life
 D) For unlimited time throughout life
5. The given figure shows- (Pg. 240, M)



- A) Germination & development in bean
 B) Germination & development in maize
 C) Germination & development in pea
 D) Germination & development in gram
6. Plant grows throughout the life due to- (Pg. 240, E)
 A) Meristematic tissue
 B) Parenchyma tissue
 C) Epidermal tissue
 D) More than one option is correct
7. Open form of growth involves (Pg. 240, E)

- A) Continuous division in all cells forming new set of cells which divide further necessarily.
 B) Division in some cells forming new set of cells which do not divide further necessarily
 C) No division at all
 D) Division in some cells at the time of injury which forms new set of cells to heal the injury
8. Secondary growth does occur in- (Pg. 240, E)
 A) All angiosperms and no gymnosperms
 B) Some angiosperm and gymnosperms
 C) No angiosperm and only gymnosperms
 D) All angiosperm and all gymnosperms
9. Secondary growth does not mean- (Pg. 240, E)
 A) Increase in length of plant
 B) Increase in girth of plant
 C) Increase in diameter in plant
 D) Both A & C

10.



Choose the correct label-

(Pg. 241, E)

	(i)	(ii)	(iii)
A	Shoot apical meristem	Root apical meristem	Vascular cambium
B	Root apical meristem	Shoot apical meristem	Vascular cambium

C	Shoot parenchyma	Root parenchyma	Vascular bundle
D	Root parenchyma	Shoot parenchyma	Vascular bundle

Paragraph 15.1.2 Growth is Measurable

11. Growth can be measured by measuring increase in – **(Pg. 241, E)**
 A) Amount of protoplasm
 B) Dry weight
 C) Cell number
 D) Both B & C
12. Match the column in respect with the measurement growth- **(Pg. 241, E)**

	Column I		Column II
a	Maize	i	Length
b	Watermelon	ii	Surface area
c	Pollen tube	iii	Cell number
d	Dorsiventral leaf	iv	Cell size

- A) a-iii, b-iv, c-i, d-ii
 B) a-iii, b-ii, c-i, d-iv
 C) a-iv, b-iii, c-i, d-ii
 D) a-i, b-ii, c-iv, d-iii

Paragraph 15.1.3 Phases of Growth

13. The three phases of growth in correct order is- **(Pg. 241, E)**
 A) Meristematic, maturation, elongation
 B) Elongation, meristematic, maturation
 C) Meristematic, elongation, maturation
 D) Elongation, maturation, meristematic
14. Cells in meristematic phase of growth- **(Pg. 241, E)**
 A) Have small nuclei
 B) Have low plasmodesmatal connections
 C) Have thick cell wall
 D) Are rich in protoplasm
15. The phase of maturation lies- **(Pg. 241, E)**

- A) Proximal to cells undergoing elongation, towards the tip
 B) Proximal to cells undergoing elongation, away from the tip
 C) Proximal to cells of meristematic zone, away from the tip
 D) Proximal to cells of meristematic zone, towards the tip

16. Increased vacuolation is a characteristics of – **(Pg. 242, E)**

- A) Meristematic phase
 B) Maturation phase
 C) Elongation phase
 D) All of these

17. Thickest cell wall present in – **(Pg. 242, E)**

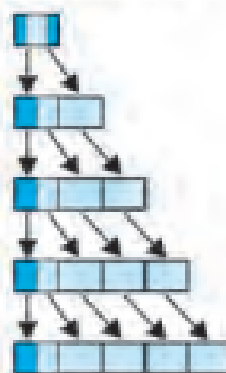
- A) Meristematic phase
 B) Maturation phase
 C) Elongation phase
 D) Both B & C

Paragraph 15.1.4 Growth rates

18. Increased growth per unit time is called **(Pg. 242, E)**

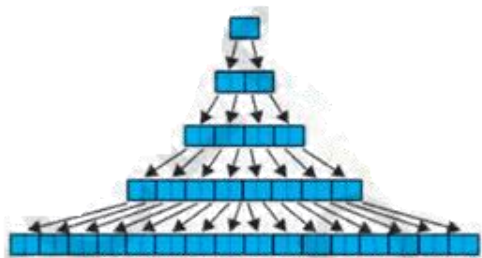
- A) Growth index
 B) Growth rate
 C) Growth efficiency index
 D) Both A & C

19. Identify the given figure **(Pg. 242, M)**



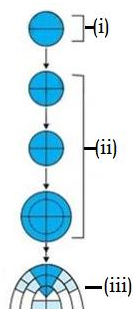
- A) Figure shows geometric growth with formula $L_t = L_0 + rt$
 B) Figure shows geometric growth with formula $W_t = W_0 e^{rt}$
 C) Figure shows arithmetic growth with formula $L_t = L_0 + rt$
 D) Figure shows arithmetic growth with formula $W_t = W_0 e^{rt}$

20. Identify the given figures (Pg. 242, M)



- A) Figure shows geometric growth with formula $L_t = L_o + rt$
- B) Figure shows geometric growth with formula $W_1 = W_o e^{rt}$
- C) Figure shows arithmetic growth with formula $L_t = L_o + rt$
- D) Figure shows arithmetic growth with formula $W_1 = W_o e^{rt}$

21. Choose the correct option with respect to given figures of stages of embryo development (Pg. 242, M)



- A) (i) is arithmetic growth phase
- B) (i) is geometric growth phase
- C) (ii) is arithmetic growth phase
- D) (ii) is geometric growth phase

22. Choose the correct set of option for size or weight of organ against time (Pg. 243, E)

- (i) $W_1 = W_o e^{rt}$
- (ii) $L_t = L_o + rt$
- (iii) Linear growth curve
- (iv) Sigmoid growth curve
- (v) Arithmetic growth
- (vi) Geometric growth

- A) (i), (iii), (iv) B) (ii), (iii), (vi)
- C) (i), (iv), (vi) D) (ii), (iv), (v)

23. The three phases of sigmoid growth occur in order are – (Pg. 243, E)

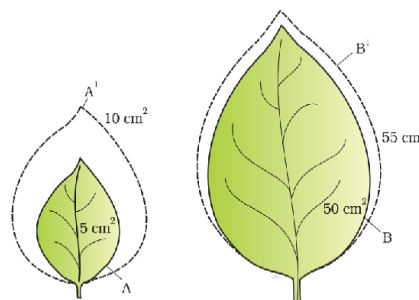
- A) Log, lag, stationary
- B) Log, stationary, lag
- C) Lag, log, stationary
- D) Lag, stationary, log

24. In the formula $W_1 = W_o e^{rt}$, r is –

(Pg. 243, E)

- A) Relative growth rate
- B) Efficiency index
- C) Ability of plant to produce new plant material
- D) All of these

25. choose the correct option – (Pg. 244, E)



- A) Absolute growth rate of A is more than that of B
- B) Absolute growth rate of B is more than that of A
- C) Relative growth rate of A is more than that of B
- D) Relative growth rate of B is more than that of A

Paragraph 15.1.5

Conditions growth

26. The factors affecting growth can be –

(Pg. 244, E)

- A) Water, temperature, light, gravity
- B) Water, temperature, light but not gravity
- C) Water, light but not temperature & gravity
- D) Water, light, gravity but not temperature

Paragraph 15.2

Differentiation, Dedifferentiation and Redifferentiation

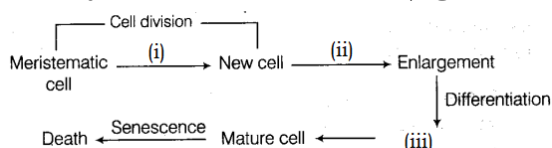
27. During differentiation (Pg. 245, E)

- A) Structural changes occur in nucleus and cytoplasm
- B) Functional changes occur in nucleus and cytoplasm

- C) Structural changes occur in cell wall and protoplasm
D) All of these
28. Dedifferentiation can be seen in formation of – **(Pg. 245, E)**
A) Intrafascicular parenchyma
B) Intrafascicular cambium only
C) Interfascicular cambium only
D) Entire vascular cambium
29. Read the following statements – **(Pg. 245, E)**
(i) Cork cambium is a layer of meristem formed from parenchyma cells
(ii) Intrafascicular cambium is a layer of parenchyma cells formed from meristem
(iii) Vascular cambium divide and produce cells that differentiate again
(iv) Plant growth can be determinate or indeterminate
(v) Final structure of cells are never determined by location of cells
(vi) The differentiation in plant cells are closed and dependent on position
- How many of the above statements are correct?
A) 3
B) 4
C) 5
D) 6

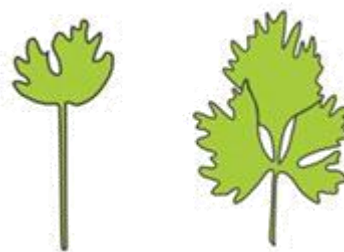
Paragraph 15.3 Development

30. identify the correct labels – **(Pg. 246, E)**

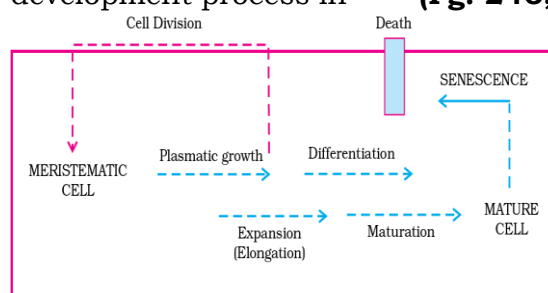


- A) (i)-Expansion, (ii)-Plasmatic growth, (iii)-Maturation
B) (ii)-Elongation, (i)-Plasmatic growth, (iii)-Maturation
C) (iii)-Elongation, (ii)-Plasmatic growth, (i)-Maturation
D) (iii)-Expansion, (i)-Plasmatic growth, (ii)-Maturation
31. Plasticity can be seen in – **(Pg. 246, E)**
A) Cotton
B) Coriander
C) Buttercup
D) All of these

32. Environmental heterophyly can be seen in – **(Pg. 246, E)**
A) Larkspur
B) Cotton
C) Coriander
D) Buttercup
33. The given figure show – **(Pg. 246, E)**



- A) Developmental heterophyly in buttercups
B) Environmental heterophyly in larkspur
C) Environmental heterophyly in buttercup
D) Developmental heterophyly in Larkspur
34. The figure shows sequence of the development process in **(Pg. 246, E)**



- A) A plant cell
B) Plant tissue
C) Plant organs
D) All of these
35. The given figure show – **(Pg. 246, E)**



- A) Developmental heterophyly in buttercups
B) Environmental heterophyly in larkspur
C) Environmental heterophyly in buttercup
D) Developmental heterophyly in larkspur

36. Intrinsic factors responsible for growth & development include – **(Pg. 246, E)**
 A) Intracellular (plant growth regulators)
 B) Intercellular (genetic)
 C) Intercellular (plant growth regulators)
 D) More than one option is correct

Paragraph 15.4 Plant Growth Regulation Paragraph 15.4.1 Characteristics

37. PGRs are – **(Pg. 247, E)**
 A) Small, simple, molecules of diverse chemical composition
 B) Large, simple molecules of diverse chemical composition
 C) Small, complex molecules of diverse chemical composition
 D) Large, complex molecules of diverse chemical composition
38. An example of adenine derivative PGR **(Pg. 247, E)**
 A) IAA
 B) Kinetin
 C) ABA
 D) Gibberellic acid
39. Gibberellic acid is – **(Pg. 247, E)**
 A) Indole compound
 B) Adenine compound
 C) Carotenoid derivative
 D) Terpene derivative
40. Absciscic acid is – **(Pg. 247, E)**
 A) Indole compound
 B) Adenine compound
 C) Carotenoid derivative
 D) Terpene derivative
41. Kinetin is – **(Pg. 247, E)**
 A) Indole compound
 B) Adenine compound
 C) Carotenoid derivative
 D) Terpene derivative
42. A gaseous PGR is **(Pg. 247, E)**
 A) ABA
 B) Ethylene
 C) GA₃
 D) IAA
43. The PGRs that play important role in plant responses to wounds are – **(Pg. 247, E)**
 A) Auxin
 B) Cytokinin
 C) Gibberellin
 D) Absciscic acid
44. PGR Ethylene can fit into – **(Pg. 247, E)**

- A) Group of plant growth promoters
 B) Group of plant growth inhibitors
 C) Both the groups of promoter & inhibitors but mostly inhibitor
 D) Both the groups of promoter and inhibitors but mostly promoter

Paragraph 15.4.2 The Discovery of PGR

45. Discovery of how many out of 5 major PGRs was accidental? **(Pg. 247, E)**
 A) 2
 B) 1
 C) 3
 D) 5
46. Match the scientist with the plant they worked on – **(Pg. 248, M)**

	Column I		Column II
a	F.W.Went	i	Canary grass
b	E. Kurosawa	ii	Avena(oat)
c	Charles & Francis Darwin	iii	Tobacco
d	F.S koog	iv	Rice

- A) a-iv, b-ii, c-iii, d-i
 B) a-iii, b-i, c-ii, d-iv
 C) a-ii, b-iv, c-i, d-iii
 D) a-i, b-iii, c-iv, d-ii
47. Cousins confirmed the release of a volatile substance (i), from ripened (ii) that hastened the ripening of stored unripe (iii). **(Pg. 247, E)**
 A) (i)-ABA, (ii)-banana, (iii)-orange
 B) (i)-ABA, (ii)-orange, (iii)-banana
 C) (i)-C₂H₄, (ii)-banana, (iii)-orange
 D) (i)- C₂H₄, (ii)- orange, (iii)-banana
48. Match the PGR with the plants which played role in their discovery – **(Pg. 247, M)**

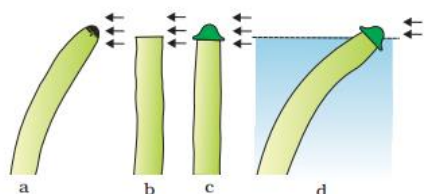
	Column I		Column II
a	Auxin	i	Tobacco
b	Gibberellin	ii	Rice
c	Cytokinin	iii	Orange
d	Ethylene	iv	Avena

- A) a-iii, b-i, c-ii, d-iv
 B) a-iv, b-ii, c-i, d-iii

- C) a-i, b-iii, c-iv, d-ii
D) a-ii, b-iv, c-iii, d-i
49. Abscissic acid was independently discovered by three different researchers and named as – **(Pg. 247, E)**
A) Inhibitor-A, abscission-III, dormin
B) Inhibitor-C, abscission-II, dormane
C) Inhibitor-B, abscission-II, dormin
D) Inhibitor-B, abscission-II, dormane
50. The term kinetin was given by – **(Pg. 248, E)**
A) Muller et al B) Kurosawa et al
C) Cousins et al D) None of these
51. The foolish seedling disease of rice is caused by – **(Pg. 248, E)**
A) Nematode B) Bacteria
C) Fungus D) Virus
52. Auxin was isolated by (i) from (ii) – **(Pg. 248, E)**

	(i)	(ii)
A	Francis Darwin	Wleoptile of oat seedling
B	Francis Darwin	Cleoptile of canary grass
C	F.W. Went	Cleoptile of oat seedling
D	F.W. Went	Cleoptile of canary grass

53. The figure shows – **(Pg. 248, E)**



- A) Experiment to show that tip of coleoptile produces gibberelin
B) Experiment to show that tip of coleorhiza produces gibberelin
C) Experiment to show that tip of coleorhiza produces auxin
D) Experiment to show that tip of coleoptile produces auxin

Paragraph 15.4.3.1

Auxin

54. Auxin was first isolated from – **(Pg. 248, E)**
A) Xylem sap B) Phloem sap
C) Human urine D) Root exudates
55. Synthetic auxins – **(Pg. 248, E)**
A) IAA B) IBA
C) NAA D) Both A & C
56. Auxin isolated from plant – **(Pg. 248, E)**
A) NAA B) IAA
C) 2, 4-D D) Both A & B
57. Auxins are generally produced by – **(Pg. 248, E)**
A) Growing apex of root & shoot
B) Epidermal tissue of shoots only
C) Xylem secondary cells
D) Endodermal cells of roots & shoot
58. Assertion: Auxin is used in plant propagation widely.
Reason: Auxin initiate rooting.
Choose the correct option - **(Pg. 248, M)**
A) Both Assertion and Reason are correct, and Reason is correct explanation of Assertion
B) Both Assertion and Reason are correct, but Reason doesn't explain Assertion
C) Assertion is correct but Reason is wrong
D) Both Assertion and Reason are incorrect
59. Auxin promote – **(Pg. 248, E)**
A) Rooting in stem cutting
B) Flowering in pineapple
C) Bolting in beet
D) Both A & B
60. Statement-I Auxin prevent fruit and leaf drop at early stage
Statement-II Auxin promote abscission of older mature leaves & fruits
Choose the appropriate option – **(Pg. 248, M)**
A) Statement-I is correct and Statement-II is incorrect
B) Statement-I is incorrect and Statement-II is correct
C) Both Statement-I & Statement-II are correct
D) Both Statement-I & Statement-II are incorrect

61. Auxin – **(Pg. 248, E)**
 A) Promotes apical dominance
 B) Prevent apical dominance
 C) Both promote & prevent apical dominance based on condition
 D) Can't say
62. In tea plantation and hedge -making **(Pg. 248, E)**
 A) Lateral buds are removed
 B) Shoot tips are removed
 C) Root tips are removed
 D) None of these
63. Auxin – **(Pg. 248, E)**
 A) Induces parthenocarp
 B) Act as herbicide
 C) Help in cell division
 D) All of these
64. 2, 4-D is used to – **(Pg. 248, E)**
 A) Kill gymnosperms usually
 B) Kill dicot usually
 C) Kill monocot usually
 D) Both A & B

Paragraph 15.4.3.2 **Gibberellins**

65. Gibberellins are **(Pg. 249, E)**
 A) Promotory PGR
 B) Inhibitory PGR
 C) Neither promotory nor inhibitory PGR
 D) Both promotory and inhibitory PGR
66. Which of the following statements are incorrect – **(Pg. 249, E)**
 A) There are more than 100 gibberellins reported
 B) GA₃ was one of the gibberellins to be discovered
 C) All GA are basic
 D) GAs are also reported in fungi
67. Gibberellins is used in grapes for – **(Pg. 249, E)**
 A) Increase in length of stalk
 B) Increase in girth of stalk
 C) Decrease in length of stalk
 D) Decrease in girth of stalk
68. Gibberellins – **(Pg. 249, E)**
 A) Promotes senescence
 B) Delay senescence

- C) Neither promote not delay senescence
 D) Both promote & delay senescence based on situation
69. Assertion: Spraying gibberellins on fruits extend its market period
 Reason: Gibberellins delays senescence
 Choose the best option – **(Pg. 249, M)**
 A) Both assertion & reason are correct and reason is correct explanation of assertion
 B) Both assertion & reason are correct but reason is not explanation of assertion
 C) Assertion is correct but reason is wrong
 D) Both assertion & reason are in correct
70. Which of these are correct – **(Pg. 249, E)**
 A) ABA shows the malting process in brewing industry
 B) ABA speeds the malting process in brewing industry
 C) GA₃ slows the malting process in brewing industry
 D) GA₃ speeds the malting process in brewing industry
71. Gibberellins is used to improve yields of – **(Pg. 249, E)**
 A) Apple
 B) Grape
 C) Sugarcane
 D) All of these
72. Assertion: Juvenile conifers are sprayed with GA
 Reason: GA delays senescence and malting period
 Which of the given options are correct? **(Pg. 249, E)**
 A) Both assertion & reason are correct and reason is correct explanation of assertion
 B) Both assertion & reason are correct but reason is not explanation of assertion
 C) Assertion is correct but reason is wrong
 D) Both assertion & reason are in correct
73. Bolting is – **(Pg. 249, E)**
 A) Yellowing of leaves
 B) Node elongation prior to flowering
 C) Early maturing and seed production
 D) None of these
74. GA promote bolting in – **(Pg. 249, E)**
 A) Beet
 B) Cabbage

- C) Plants with rosette habit
D) All of these

Paragraph 15.4.3.3

Cytokinins

75. Cytokinins were discovered as – **(Pg. 249, E)**

- A) Kinin B) Kinetin
C) Kinesin D) Zentin

76. Kinetin is a modified form of – **(Pg. 249, E)**

- A) Purine – guanine
B) Pyrimidine – cytosine
C) Purine – adenine
D) Pyrimidine – thymine

77. Kinetin was discovered from – **(Pg. 249, E)**

- A) Autoclaved herring egg DNA
B) Human urine
C) Corn kernel
D) None of these

78. Read the following statements regarding cytokinin – **(Pg. 249, E)**

- i) Kinetin occurs naturally in plants
ii) Kinetin was discovered from coconut milk
iii) Zeatin does not occur naturally in plants
iv) Zeatin was isolated from human DNA
How many of the statements are incorrect –

- A) 1 B) 2
C) 3 D) 4

79. Natural cytokinin may be synthesized in – **(Pg. 249, E)**

- A) Root apex
B) Developing shoot buds
C) Young fruits
D) More than one option is correct

80. Cytokinin helps to produce – **(Pg. 249, E)**

- A) Chloroplast in leaves
B) Elongation in sugarcane
C) Synchronized fruit set in pineapple
D) Flowering in pineapple

Paragraph 15.4.3.4

Ethylene

81. Ethylene is synthesized in large amounts by – **(Pg. 250, E)**

- A) ripening fruit
B) Tissues undergoing senescence
C) Newly developed leaves
D) More than one option is correct

82. Ethylene causes (i) growth of seedling, swelling of axis and apical hook formation in (ii) seedling **(Pg. 250, E)**

	(i)	(ii)
A)	Horizontal	Monocot
B)	Vertical	Dicot
C)	Horizontal	Dicot
D)	Vertical	Monocot

83. Ethylene promotes – **(Pg. 250, E)**

- A) Senescence and abscission of flowers
B) Senescence but not abscission of flowers
C) Abscission of flowers but not senescence
D) Neither senescence nor abscission of flowers

84. Ethylene in fruits causes – **(Pg. 250, E)**

- A) Rise in rate of respiration called respiratory anti-climactic
B) Rise in rate of respiration called respiratory climactic
C) Fall in rate of respiration called respiratory anti-climactic
D) Fall in rate of respiration called respiratory climactic

85. Ethylene – **(Pg. 250, E)**

- A) Promotes seed and bud dormancy
B) Promotes only seed dormancy
C) Promotes only bud dormancy
D) None of these

86. Statement-I Ethylene promotes internode/petiole elongation in deep water rice plants

Statement-II ethylene helps upper part of shoot to remain above water.

Choose the appropriate option –

(Pg. 250, E)

- A) Statement-I is correct and Statement-II is incorrect
B) Statement-I is incorrect and Statement-II is correct

- C) Statement-I and Statement-II are correct
D) Statement-I and Statement-II are incorrect
87. Ethylene – (Pg. 250, E)
A) Promotes root hair formation and increase in absorption surface
B) Demotes root hair formation and increase in absorption surface
C) Promotes root hair formation and decrease in absorption surface
D) Demotes root hair formation and decrease in absorption surface
88. Ethylene initiates – (Pg. 250, E)
A) Flowering in pineapple
B) Flowering in mango
C) Synchronizing fruit-set in pineapple
D) All of these
89. Most widely used source of ethylene – (Pg. 250, E)
A) Is ethepene
B) Hastens fruit ripening in tomato and apple
C) In aqueous solution is absorbed on the plant roots
D) More than one option is correct
90. Ethylene promotes – (Pg. 250, E)
A) Female flowers in cucumber, increasing the yield
B) Female flowers in cucumber, decreasing the yield
C) male flowers in cucumber, increasing the yield
D) male flowers in cucumber, decreasing the yield

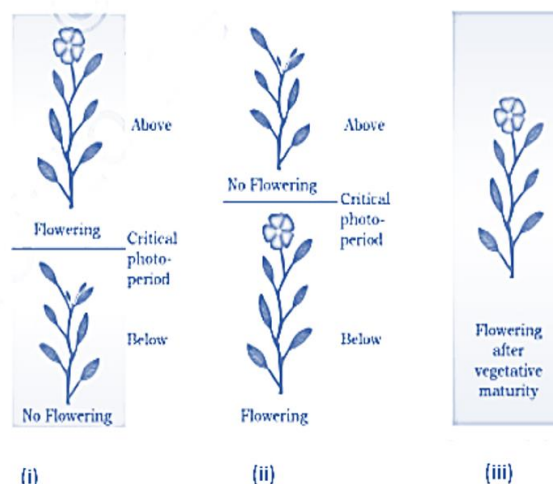
Paragraph 15.4.3.5 **Abscisic Acid**

91. ABA is – (Pg. 250, E)
A) Inhibitor of plant growth and metabolism
B) Inhibitor of plant growth but not metabolism
C) Inhibitor of plant metabolism but not growth
D) Inhibitor of neither plant growth nor metabolism

92. ABA – (Pg. 250, E)
A) Inhibit seed germination
B) Promote seed dormancy
C) Inhibit seed dormancy
D) Both A & B \
93. ABA is called stress hormone because (Pg. 250, E)
A) It causes stress to plant
B) It is released during stress in plant
C) It helps plant to fight stress conditions
D) More than one option is correct
94. ABA stimulates – (Pg. 251, E)
A) Stomata opening for more CO₂ exchange
B) Stomata closure to decrease transpiration
C) Stomata opening to cause transpiration & cooling effect
D) Both A & C
95. In most situation, ABA acts as an antagonist to- (Pg. 251, E)
A) Auxin
B) GA
C) Cytokinin
D) Ethylene

Paragraph 15.5 **Photoperiodism**

96. Identify the correct labels – (Pg. 251, E)



	(i)	(ii)	(iii)
A)	Long day plant	Day neutral plant	Short day plant

B)	Short day plant	Day neutral plant	Long day plant
C)	Long day plant	Short day plant	Day neutral plant
D)	Short day plant	Long day plant	Day neutral plant

D) Leaves

Paragraph 15.6 **Vernalization**

101. Vernalization is – **(Pg. 252, E)**
 A) Quantitative dependence of flowering on low temperature
 B) Qualitative dependence of flowering on low temperature
 C) Quantitative dependence of flowering on high temperature
 D) A and B are correct
102. Vernalization can be seen in – **(Pg. 252, E)**
 A) Spring varieties of rice
 B) Spring varieties of wheat
 C) Winter varieties of rice
 D) Winter varieties of wheat
103. Vernalization is also seen in – **(Pg. 252, E)**
 A) Biennials like – sugarbeet
 B) Biennials like maize
 C) Perennials like sugarbeet
 D) Perennials like maize

Paragraph 15.7 **Seed Dormancy**

104. Some seeds which do not germinate even when external conditions are favorable, are understood to be going through – **(Pg. 252, E)**
 A) Dormancy controlled by external environment
 B) Dormancy controlled endogenously
 C) Dormancy controlled by conditions within the seed
 D) More than one option is correct
105. Chemical inhibitions of germination are – **(Pg. 252, E)**
 A) Absciscic acid
 B) Phenolic acid
 C) Para-ascorbic acid
 D) All of these
106. Germination may not occur due to – **(Pg. 252, E)**
 i) Hard seed coat
 ii) Immature embryo
 iii) Chemical inhibitors
 iv) Harsh environment
 How many of above are correct?

97. Read the given statements – **(Pg. 251, E)**
 Statement-I Some plants require a periodic exposure to light to include flowering
 Statement-II Some plants are able to measure the duration of exposure to light
 Choose the correct statements –

- A) Both statements are correct and are about photoperiodism
 B) One of the statements is correct about photoperiodism
 C) Both statements are correct and is about vernalization
 D) One of the statements is correct about vernalization
98. For day neutral plants, there is **(Pg. 252, E)**
 A) No correlation between light duration and flowering
 B) Direct correlation between light duration and flowering
 C) Indirect correlation between light duration and flowering
 D) Direct correlation between light intensity and flowering
99. In photoperiodism – **(Pg. 252, E)**
 A) Duration of light period matters only
 B) Duration of dark period matters only
 C) Duration of light and dark period matters
 D) Duration of light or dark period doesn't matter
100. Photoperiods are perceived by – **(Pg. 252, E)**
 A) Shoot apices
 B) Flowering apices
 C) Nodal buds

- A) 1 B) 2
C) 4 D) 3
107. Seed coat dormancy is broken by –
(Pg. 252, E)
- A) Mechanical abrasions
B) Microbial actions in gut of animals
C) Certain chemicals

- D) More than one option is correct
108. Effects of inhibitory substances on dormancy is removed by application of certain chemicals are – **(Pg. 253, E)**
- A) Auxin B) Gibberellic acid
C) Cytokinin D) ABA

CLASS – XIIth

BOTANY

LINE BY LINE

ANSWER KEY: PLANT GROWTH AND DEVELOPMENT

Q	1	2	3	4	5	6	7	8	9	10
Ans	C	D	C	D	A	A	A	B	A	B
Q	11	12	13	14	15	16	17	18	19	20
Ans	D	A	C	D	B	C	B	B	C	B
Q	21	22	23	24	25	26	27	28	29	30
Ans	D	C	C	D	C	A	C	C	A	B
Q	31	32	33	34	35	36	37	38	39	40
Ans	D	B	D	A	A	D	A	B	D	C
Q	41	42	43	44	45	46	47	48	49	50
Ans	B	B	D	C	D	C	D	B	C	D
Q	51	52	53	54	55	56	57	58	59	60
Ans	C	D	D	C	D	B	A	B	D	C
Q	61	62	63	64	65	66	67	68	69	70
Ans	A	B	D	B	A	C	A	B	B	D
Q	71	72	73	74	75	76	77	78	79	80
Ans	C	C	D	D	B	C	D	D	D	A
Q	81	82	83	84	85	86	87	88	89	90
Ans	D	C	A	B	D	C	A	D	A	A
Q	91	92	93	94	95	96	97	98	99	100
Ans	A	D	D	B	B	C	A	A	C	D
Q	101	102	103	104	105	106	107	108		
Ans	D	D	A	D	D	C	D	B		

1. The end products of sexual reproduction is / are –

A) Fruit B) Seeds
C) Flower D) A & B both

Page No.-20, Easy

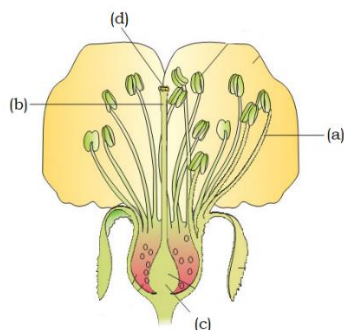
2.1 Flower

2. Floriculture deals with –

A) Flower B) Seed culture
C) Fruit D) Both B & C

Page No.-20, Easy

3.



	a	b	c	d
A	Style	Filament	Stigma	Ovary
B	Filament	Style	Ovary	Stigma
C	Filament	Style	Thalamus	Anther
D	Style	Filament	Stigma	Ovule

Page No.-20, Easy

2.2.2 The pistil, Megasporangium (Ovule) and Embryosac

4. Choose incorrect statement –

A) Several hormonal & structural changes are initiated which lead to redifferentiation and further development of the floral primordium.
B) Inflorescences are formed which bear the floral buds and then the flower
C) In the flower male and female reproductive structures, the androecium and the gynoecium differentiate and develop
D) None of these

Page No.-20, Easy

5. Reproductive organ of flower doesnot comprises-

A) Androecium B) Stamen
C) Gynoecium D) Tepals

Page No.-21, Easy

2.2.1 Stamen, Microsporangium & Pollen grains

6. A typical angiosperm anther is _____ with each lobe having _____ theca i.e. they are _____

A) Bilobed, two, ditheous
B) Ditheous, two, bilobed
C) Bilobed , four, ditheous
D) Ditheous, four, bilobed

Page No.-21, Easy

7. Often theca is separated by

A) Transverse groove
B) Longitudinal groove
C) Diagonal groove
D) All of these

Page No.-21, Easy

8. The ditheous consist of _____ microsporangia located at the corners, _____ in each lobe.

A) Two, one B) Two, two
C) Four, two D) Both A & C

Page No.-21, Easy

9. Arrange microsporangial wall in sequence of outside to inside

A) Epidermis, middle layer, endothecium, tapetum
B) Epidermis, endothecium, middle layer, tapetum
C) Epidermis, middle layer, tapetum, endothecium
D) Endothecium, middle layer, tapetum, epidermis

Page No.-21, Easy

10. How many of microsporangial wall perform function of protection and help in dehiscence of anther to release pollen

A) 1 B) 2
C) 3 D) 4

Page No.-21, Easy

11. _____ is responsible for nourishment of pollen grain.

A) Tapetum B) Endothecium

- C) Epidermis D) Middle layer

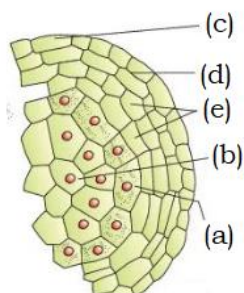
Page No.-21, Easy

12. Which of the following undergo meiotic division to form microspore tetrad

- A) Sporogenous tissue
B) Generative tissue
C) Microspore
D) A & B

Page No.-21, Easy

13.



	a	b	c	d	e
A	Tapetum	Microspore mother cell	endothecium	epidermis	Middle layer
B	Tapetum	Microspore mother cell	epidermis	endothecium	Middle layer
C	Tapetum	Middle layer	Microspore mother cell	endothecium	epidermis
D	epidermis	Middle layer	Microspore mother cell	endothecium	Tapetum

Page No.-22, Medium

14. Microsporogenesis –

- A) Process of formation of microspore
B) Development of pollen grain from pollen mother cell
C) It involve meiosis
D) All of these

Page No.-22, Easy

15. Pollen grain represents –

- A) Male gametophyte
B) Male sporophyte
C) Female gametophyte
D) Female sporophyte

Page No.-22, Easy

16. Choose correct about pollen grain wall-

- i) It has two layered prominent wall
ii) Hard outer layered prominent wall
iii) Exine is composed of sporopollenin
iv) Sporopollenin form continuous exine
A) i, ii, iii, iv B) i, ii, iii
C) i, iii D) i & iv

Page No.-22, Medium

17. Sporopollenin is absent in –

- A) Intine B) Germ pore
C) Exine D) A & B both

Page No.-23, Medium

18. Pollen grains are well preserved as fossil because of

- A) Presence of intine
B) Presence of germ pore
C) Presence of sporopollenin
D) All of these

Page No.-23, Medium

19. Sporopollenin is degraded by –

- A) Enzyme
B) High temperature
C) Strong acid & alkali
D) None of these

Page No.-23, Medium

20. Inner wall of pollen grain is –

- A) Intine, made up of cellulose & lignin
B) Thin discontinuous intine
C) Both A & B
D) None of these

Page No.-23, Medium

21. When pollen grain mature –

- A) It consist of two cell that are two male gamete only.
B) It consist of two cell that are generative & vegetative cell
C) It consist of two cell that are two male gamete arise from vegetative cell and one generative cell
D) It consist of three cell that are two male gamete develop meiotically from generative cell and one vegetative cell

Page No.-23, Easy

22. Choose incorrect statement among following:

- A) In over 60% of angiosperm, pollen grains are shed at 3 – cell stage

- B) In over 60% of angiosperm, pollen grains are shed at 2 – cell stage
 C) Both A & B
 D) None of these

Page No.-23, Easy

23. Pollen allergy is not correlated with-
 A) Cause of parthenium
 B) Cause chronic respiratory disorder
 C) Carrot grass that come into india as a contaminant with imported rice
 D) None of these

Page No.-24, Easy

24. Pollen grain of rice is viable upto-
 A) 30 min
 B) Several month
 C) Same as in sonaceae
 D) Both B & C

Page No.-24, Easy

25. Which temperature is correct to store semen for artificial insemination-
 A) 196°C B) -196°C
 C) 34°C D) 4°C

Page No.-24, Easy

2.2 Pre – fertilization : structure & events:

26. Papaver show-
 i) Multicarpellary
 ii) Apocarpous
 iii) Syncarpous
 iv) Monocarpellary
 A) i, ii B) i, iii
 C) iv, ii D) iv, iii

Page No.-24, Easy

27. Given diagram is of –



- A) Multicarpellary apocarpous gynoecium of michelia
 B) Multicarpellary synocarpous gynoecium of michelia
 C) Multicarpellary synocarpous gynoecium of papaver
 D) Multicarpellary apocarpous gynoecium of papaver

Page No.-25, Easy

28. Which of following serves as a landing platform for pollen grain?
 A) Stigma B) Style
 C) Anther D) Filament

Page No.-25, Easy

29. Choose correct statement:
 A) Inside the ovary is the ovarian cavity, also known as lodicule
 B) Megasporangia is commonly called ovules
 C) The placenta is located outside ovarian cavity
 D) A & C both

Page No.-25, Easy

30. Choose incorrect statement –
 A) The number of ovules in an ovary is one in paddy
 B) The number of ovules in an ovary is many in papaya
 C) The number of ovules in an ovary is one in orchid
 D) Wheat mango consist of one ovule

Page No.-25, Easy

31. Ovule is attached to placenta by –
 A) Funicle B) Integument
 C) Hilum D) Nucellus

Page No.-25, Easy

32. Hilum represents the junction between
 A) Ovule & ovary
 B) Ovule & funicle
 C) Ovule & integument
 D) None of these

Page No.-25, Easy

33. Chalaza end represent –
 A) Basal part of ovule
 B) Apical part of ovule
 C) Basal part of ovary
 D) Apical part of ovary

Page No.-25, Easy

34. Female gametophyte of angiosperm represented by –

- A) Nucellus B) Embryosac
C) Integument D) Both A & B

Page No.-25, Easy

35. An ovule generally has _____ embryo sac formed from a megaspore through _____ division

- A) Single, equational
B) Single, reductional
C) Four, meiotic
D) Four, mitotic

Page No.-25, Easy

36. Megasporogenesis is not related to –

- A) Formation of megaspore from megaspore mother cell
B) MMC undergoes meiotic division for megaspore
C) Formation of microspore
D) Both A & C

Page No.-25, Easy

37. Ovules generally differentiate a single megaspore mother cell in –

- A) Chalazal end B) Micropylar region
C) Both A & B D) Integument

Page No.-25, Easy

38. In a majority of flowering plants

- A) One of the megaspore is functional while other three degenerate
B) All four megaspore can develop into female gametophyte in almost all angiosperm
C) Three megaspore is functional while other one degenerated
D) Both A & B

Page No.-26, Easy

39. Monosporic embryo development involve –

- A) One functional megaspore
B) One haploid cell formed in egg apparatus
C) Four functional megaspore
D) None of these

Page No.-26, Easy

40. Choose correct statement –

- A) The nucleus of the functional megaspore divides mitotically to form

two nuclei which move to the opposite poles, forming the 2-nucleate embryo sac

- B) Two more sequential mitotic nuclear division in 2-nucleate embryo sac result in formation of 4-nucleate
C) Mitotic division in embryo sac formation upto 8-celled is strictly free nuclear
D) All of these

Page No.-26, Medium

41. How many of eight nuclei of typical embryo sac is surrounded by cell wall

- A) 2 B) 4
C) 6 D) 7

Page No.-26, Medium

42. Central cell of typical embryo sac is situated –

- A) Below egg apparatus
B) Above egg apparatus
C) At chalazal end
D) None of these

Page No.-26, Easy

43. Choose the correct about egg apparatus of typical embryo sac

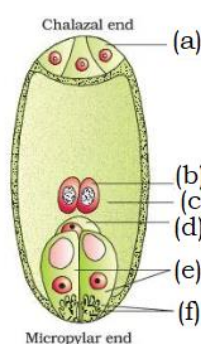
- A) Situated at micropylar end
B) Consist of three cells
C) Both A & B
D) Consist of all cells having special cellular thickening at micropylar tip

44. Typical embryo-sac of angiosperm at maturity is –

- A) 8 celled, 8 nucleate
B) 7 celled, 8 nucleate
C) 8 celled, 7 nucleate
D) 7 celled, 7 nucleate

Page No.-26, Easy

45.



	a	b	c	d	e	f
A	Antipodal	Polar nuclei	Central cell	Egg	Synergid	Filiform apparatus
B	Antipodal	Polar nuclei	Embryo sac	Egg	Synergid	Filiform apparatus
C	Antipodal	Polar nuclei	Egg	Embryo sac	Filiform apparatus	Synergid
D	Antipodal	Central cell	Polar nuclei	Egg	Filiform apparatus	Synergid

Page No.-26, Easy

2.2.3 Pollination

46. Pollination is-

- A) transfer of motile pollen to stigma
- B) transfer of non-motile anther to stigma
- C) transfer of motile anther to stigma
- D) transfer of non-motile pollen to stigma

Page No.-27, Easy

47. Transfer of pollen from anther to stigma of same flower is called-

- A) Autogamy
- B) Geitonogamy
- C) Xenogamy
- D) None of these

Page No.-27, Easy

48. Read the given statements-

- (i) Autogamy cannot occur in open flower.
- (ii) Geitonogamy cannot occur in closed flower.

Choose the appropriate answer-

- A) (i) is correct but (ii) is wrong
- B) (i) is wrong but (ii) is correct
- C) (i) and (ii) are both correct
- D) (i) and (ii) are both wrong

Page No.-28, Easy

49. Complete autogamy is rare in-

- A) Closed flower
- B) Open flower
- C) Both open and closed flower
- D) Neither open nor closed flower

Page No.-28, Easy

50. Flowers that do not open at all are called

- A) Chasmogamous
- B) Polygamous
- C) Cleistogamous
- D) Xenogamous

Page No.-28, Easy

51. Oxalis produce-

- A) Cleistogamous flowers
- B) Chasmogamous flowers
- C) Both (A) and (B)
- D) Can't say

Page No.-28, Easy

52. How many of the given characters are necessarily present in cleistogamous flower.

- (i) Anthex and stigma lie close to each other.
- (ii) There is synchrony in pollen release and stigma receptivity.
- (iii) Lengths of anther and stigma are very different.
- (iv) Flower is necessarily dioecious.
- (v) Assured seed-set even without pollinators.

- A) 1
- B) 2
- C) 3
- D) 4

Page No.-28, Easy

53. Geitonogamy is-

- A) Functionally self-pollination and genetically cross-pollination
- B) Genetically self-pollination and functionally cross-pollination
- C) Cross-pollination both genetically and functionally
- D) Self-pollination both genetically and functionally

Page No.-28, Easy

54. Xenogamy is-

- A) Functionally self-pollination and genetically cross-pollination
- B) Genetically self-pollination and functionally cross-pollination
- C) Cross-pollination both genetically and functionally
- D) Self-pollination both genetically and functionally

Page No.-28, Easy

55. Autogamy is-

- A) Functionally self-pollination and genetically cross-pollination
- B) Genetically self-pollination and functionally cross-pollination

- C) Cross-pollination both genetically and functionally
D) Self-pollination both genetically and functionally

Page No.-27, Easy

56. Genetically different type of pollen is brought to stigma by-

- A) Autogamy only
B) Geitonogamy only
C) Xenogamy only
D) More than one options

Page No.-28, Easy

57. (a) Pollination by abiotic agents is a chance factor.

(b) Pollen is produced in enormous amount as compared to number of ovules. Choose the best answer.

- A) a and b are correct and b is the reason for a
B) a and b are correct and a is the reason for b
C) a is incorrect and b is correct
D) b is incorrect and a is correct

Page No.-28, Easy

58. Which is more common abiotic agent for pollination-

- A) Wind B) Insect
C) Water D) Animal

Page No.-28, Easy

59. The pollen grains in wind pollinated plants should be-

- A) Heavy and sticky
B) Heavy and non-sticky
C) Light and sticky
D) Light and non-sticky

Page No.-28, Easy

60. Wind pollinated flowers often have ____ in each ovary and flowers are after ____.

	(i)	(ii)
A)	Single	Single
B)	Multiple	Single
C)	Single	packed in inflorescence
D)	multiple	packed in inflorescence

Page No.-28, Easy

61. The tassels in corn cob are-

- A) Filaments of anthers
B) Stigma and style
C) Reduced leaf
D) Stalk of ovule

Page No.-28, Easy

62. Match the columns.

Column-I		Column-II	
(i)	Wind pollination	(a)	Maize
(ii)	Water pollination	(b)	Hydrilla
(iii)	Biotic pollination	(c)	Monocots
(iv)	Freshwater pollination	(d)	Amorphophallus

- A) (i)-d, (ii)-b, (iii)-d, (iv)-c
B) (i)-c, (ii)-d, (iii)-a, (iv)-b
C) (i)-a, (ii)-c, (iii)-d, (iv)-b
D) (i)-b, (ii)-a, (iii)-c, (iv)-d

Page No.-28, Easy

63. (a) Distribution of some bryophytes & pteridophytes is limited.

(r) Transport of male gamete in bryophytes & pteridophyte is dependent on water.

Choose the correct options.

- A) a and r are correct but r is correct explanation for a
B) a and r are correct but r is not correct explanation for a
C) Both a and r are incorrect
D) a is correct but r is incorrect

Page No.-29, Easy

64. Aquatic plants pollinated by water are given, except-

- A) Zostera
B) Hydrilla
C) Water hyacinth
D) More than one option

Page No.-29, Easy

65. Pollination in water lily occurs by-

- A) Water B) Wind
C) Insects D) Both B and C

Page No.-29, Easy

66. Choose the correct statements for pollination in sea grasses-

- (i) Female flower reach surface of water.
(ii) Female flower remain submerged.

- (iii) Pollen released on water surface.
 - (iv) Pollen release inside water.
 - (v) Pollen grains are carried passively by water.
 - (vi) Pollen grains are carried actively in water.
 - (vii) Most of the pollen reach stigma.
 - (viii) Some of the pollen reach stigma.
- A) (i), (iii), (v), (vii)
 B) (ii), (iv), (vi), (vii)
 C) (ii), (iv), (v), (vii)
 D) (ii), (iv), (v), (viii)

Page No.-29, Easy

67. Choose correct statements for pollination in vallisneria-
- (i) Female flower reach surface of water.
 - (ii) Female flower remain submerged.
 - (iii) Pollen released on water surface.
 - (iv) Pollen release inside water.
 - (v) Pollen grains are carried passively by water.
 - (vi) Pollen grains are carried actively in water.
 - (vii) Most of the pollen reach stigma.
 - (viii) Some of the pollen reach stigma.
- A) (i), (iii), (v), (vii)
 B) (ii), (iv), (vi), (vii)
 C) (i), (iii), (v), (viii)
 D) (ii), (iv) (v), (viii)

Page No.-29, Easy

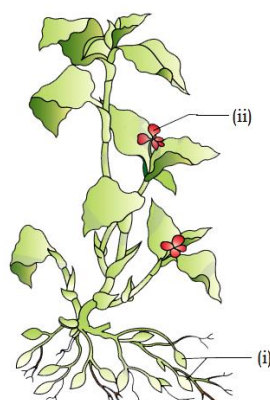
68. Requirement for pollen of water pollinated plants are-
- (i) Light pollen
 - (ii) Pollen with mucilagenous cover
 - (iii) Non-sticky pollen
 - (iv) Long ribbon-like pollen
- A) (i) and (iii) B) (iii) and (iv)
 C) (i) and (ii) D) (ii) and (iv)

Page No.-29, Easy

69. Majority of angiosperms use ____ for pollination-
- A) Wind B) Water
 C) Animals D) Both A and B

Page No.-28, Easy

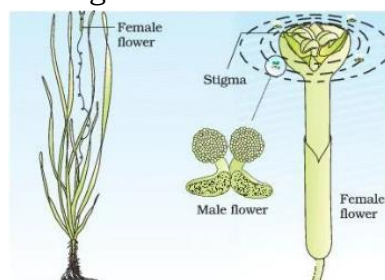
70. Identify the given labels-



	(i)	(ii)
A)	Chasmogamous, autogamy	Cleistogamous, allogamy
B)	Chasmogamous, allogamy	Cleistogamous, autogamy
C)	Cleistogamous, autogamy	Chasmogamous, allogamy
D)	Cleistogamous, allogamy	Chasmogamous, autogamy

Page No.-28, Easy

71. The figure shows-



- A) Wind pollination in freshwater Vallisneria
 B) Water pollination in marine Hydrilla
 C) Water pollination in marine Lostera
 D) Water pollination in freshwater Vallisneria

Page No.-29, Easy

72. Dominant biotic pollinating agents are-
- A) Bees B) Birds
 C) Butterflies D) Ants

Page No.-29, Easy

73. How many of the following may act as pollinators-?
 Bees, butterflies, wasps, beetles, leopard, bats, pigeon
- A) 5 B) 4
 C) 3 D) 2

74. Insect-pollinated flowers are-
 A) Large, colourful, rich in nectar
 B) Large, colourless, rich in nectar
 C) Small, clustered, fragrant, sticky
 D) More than one option is correct

Page No.-30, Easy

75. Floral rewards are-
 A) Nectar B) Pollen grains
 C) Both B and A D) None of these

Page No.-30, Easy

76. Floral reward in *Amorphophallus* is-
 A) Nectar
 B) Safe place to lay-eggs
 C) Colourful petals
 D) Fragrance to attract insects

Page No.-31, Easy

77. Which of the statements is true about
 (a) *Ponobdium* moth and (b) *Yucca* plant?
 A) (a) is dependent on (b) for life cycle but the opposite is not true
 B) (b) is dependent on (a) for life cycle but the opposite is not true
 C) Both (a) and (b) are interdependent on each other for their life cycle
 D) Both (a) and (b) are independent of each other for life cycle

Page No.-30, Easy

78. Outbreeding devices are used to prevent-
 A) Self-fertilization
 B) Cross-pollination
 C) Both self and cross pollination
 D) Xenogamy

Page No.-31, Easy

79. Inbreeding depression is a result of-
 A) Self-fertilization followed by cross-fertilization
 B) Cross-fertilization followed by self-fertilization
 C) Continued cross-fertilization
 D) Continued self-fertilization

Page No.-31, Easy

80. Self-pollination can be prevented by separation of anther and stigma in-
 A) time (maturity) B) place (position)
 C) none of these D) both of these

Page No.-31, Easy

81. Self-incompatibility is not-

- A) Genetic mechanism
 B) Positional separation of anther and stigma
 C) Prevention for geitonogamy
 D) More than one option

Page No.-31, Easy

82. Production of unisexual flowers on a plant assures prevention of-
 A) Autogamy only
 B) Autogamy and geitonogamy
 C) Geitonogamy only
 D) Autogamy and Xenogamy

Page No.-31, Easy

83. Monoecious plants assures-
 A) no autogamy
 B) no autogamy and geitonogamy
 C) no autogamy and xenogamy
 D) no geitonogamy and xenogamy

Page No.-31, Easy

84. Dioecious plants assures-
 A) no autogamy
 B) no autogamy and geitonogamy
 C) no autogamy and xenogamy
 D) no geitonogamy and xenogamy

Page No.-31, Easy

85. If a wrong pollen (from other species or self-incompatible) lands on stigma-
 A) Pollen germinates but pollen tube cannot grow in style
 B) Pollen germinates, grows in style but cannot enter ovary
 C) Does not germinate at all
 D) Both A and C

Page No.-31, Easy

86. When pollen grain germinates and produce pollen tubes
 A) Content of pollen grain is distributed uniformly
 B) Content of pollen grain move into pollen tube
 C) Content of pollen grain is distributed non-uniform, more in pollen grain
 D) Content of pollen grain is distributed non-uniformly, more in pollen tube

Page No.-31, Easy

87. Filiform apparatus is present at-
 A) Micropylar part of synergid

- B) Chalazal part of synergid
- C) Micropylar part of antipodal
- D) Chalazal part of antipodal

Page No.-32, Easy

88. Emasculation is done in-

- A) Male parent
- B) Female parent
- C) Both male and female parent
- D) Depends on the project

Page No.-33, Easy

89. The emasculated flowers are bagged to-

- A) Protect flower from strong sunlight
- B) Protect flower from rain
- C) Protect flower from unwanted pollen
- D) Protect flower from insects

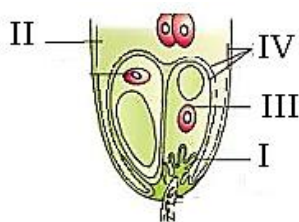
Page No.-33, Easy

90. If female parent produces unisexual flowers, there is-

- A) no need of emasculation & bagging
- B) need of emasculation & bagging
- C) no need of emasculation but bagging is needed
- D) no need of bagging but emasculation is needed

Page No.-33, Easy

91. Identify the filiform apparatus in given figure-



- A) I
- B) II
- C) III
- D) IV

Page No.-32, Easy

2.3 Double Fertilization

92. Pollen tube release male gametes into-

- A) Cytoplasm of Egg cell
- B) Nucleus of Egg cell
- C) Cytoplasm of Synergids
- D) Cytoplasm of Antipodals

Page No.-34, Easy

93. Which of the following is incorrect about double fertilization?

- A) One male gamete fuses with nucleus of egg cell
- B) Syngamy results into dyad of cells
- C) Second male gamete move toward polar nuclei
- D) Triple fusion results into PEN

Page No.-34, Easy

94. Triple fusion is-

- A) Fusion of third male gamete with polar nuclei
- B) Fusion of three haploid cells
- C) Fusion of second male gamete with egg cell
- D) Fusion of three haploid nuclei

Page No.-34, Easy

95. Which of these is correct?

- A) Syngamy = Triple fusion + Double fertilization
- B) Double fertilization = Syngamy + Triple fusion
- C) Triple fusion = Double fertilization – Syngamy
- D) More than one option is correct

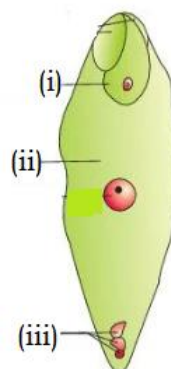
Page No.-34, Easy

96. Central cell after double fertilization becomes-

- A) Zygote
- B) PEN
- C) PEC
- D) Embryo

Page No.-34, Easy

97. Identify the correct labels.

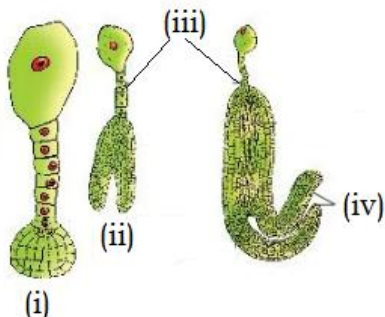


	(i)	(ii)	(iii)
A)	Zygote	PEN	Degenerating antipodals
B)	Zygote	PEC	Degenerating antipodals
C)	Zygote	PEN	Degenerating synergids

D)	Zygote	PEC	Degenerating synergids
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Page No.-34, Easy

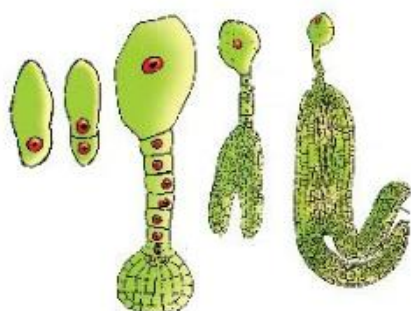
98. Identify the correct labels.



	(i)	(ii)	(iii)	(iv)
A	Globular embryo	Heart-shaped embryo	Suspensor	Cotyledon
B	Heart-shaped embryo	Globular embryo	Cotyledon	Suspensor
C	Globular embryo	Heart-shaped embryo	Cotyledon	Suspensor
D	Heart-shaped embryo	Globular embryo	Suspensor	Cotyledon

Page No.-34, Easy

99. The figure shows stages in-



- A) Embryo development in dicot
 B) Embryo development in monocot
 C) Embryo development in gymnosperm
 D) Both A and B

Page No.-34, Easy

2.4 Post Fertilization : Structure and Events

100. Post fertilization includes how many of the following events-

- (i) endosperm development

- (ii) zygote formation
 (iii) embryo development
 (iv) seed formation
 (v) fruit formation

- A) 5
 B) 4
 C) 3
 D) 2

Page No.-34, Easy

2.4.1 Endosperm

101. Select correct statement-

- A) Endosperm development proceeds embryonic development
 B) Endosperm development precedes embryo development
 C) Embryo development precedes endosperm development
 D) More than one option is correct

Page No.-35, Easy

102. Endosperm tissue is-

- A) Haploid
 B) Diploid
 C) Triploid
 D) Tetraploid

Page No.-35, Easy

103. In free-nuclear endosperm-

- A) PEN undergoes successive nuclear divisions
 B) PEC undergoes successive cellular divisions
 C) PEN undergoes successive cellular divisions
 D) More than one option is correct

Page No.-35, Easy

104. Cells of endosperm tissue are filled with-

- A) reserve food materials for plant cells
 B) reserve food material for embryo
 C) reserve food material for developing zygote
 D) more than one option is correct

Page No.-35, Easy

105. Coconut water from tender coconut is ____ and white kernel is ____.

	(i)	(ii)
A)	Cellular endosperm	Free-nuclear endosperm
B)	Free nuclear endosperm	Cytoplasmic endosperm
C)	Free-nuclear endosperm	Cellular endosperm

D)	Cytoplasmic endosperm	Cellular endosperm
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Page No.-35, Easy

106. Endosperm is completely consumed by developing embryo before seed maturation in-
- A) Groundnut B) Castor
C) Coconut D) All of these

Page No.-35, Easy

107. Endosperm persists in mature seeds in-
- A) Castor
B) Pea
C) Beans
D) More than one option is correct

Page No.-35, Easy

2.4.2 Embryo

108. Embryo develops at
- A) micropylar end
B) chalazal end
C) either micropylar or chalazal end
D) neither microplar nor chalazal end

Page No.-35, Easy

109. Choose the correct order of embryo development in dicots-
- (i) Zygote
(ii) Heart-shaped embryo
(iii) Mature embryo
(iv) Proembryo
(v) Globular embryo
- A) i-iv-ii-v-ii B) i-iv-ii-v-iii
C) i-iv-iii-ii-v D) ii-iv-v-ii-iii

Page No.-35, Easy

110. How many of the given parts are present in dicot embryo-
Embryonal axis, Cotyledons, Scutellum, Hypocotyl, Root cap
- A) 5 B) 4
C) 3 D) 2

Page No.-35, Easy

111. How many of the given parts are present in monocot embryo-
Cotyledon, scutellum, Coleoptile, Radicle, Root cap
- A) 5 B) 4
C) 3 D) 2

Page No.-35, Easy

112. Hypocotyl terminates in-
- A) Plumule
B) Radicle
C) Root tip
D) More than one option is correct

Page No.-35, Easy

113. (i) In dicot embryo, root tip is covered by root cap.
(ii) In dicot embryo, scutellum is situated towards one side of embryonal axis.
(iii) Cylindrical portion below the level of cotyledons is hypocotyl in dicots embryo.
(iv) In dicot embryo, epicotyl terminates with stem tip.

How many of the above statements is incorrect?

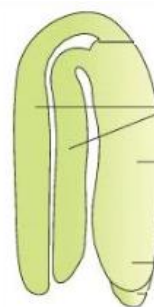
- A) Zero B) One
C) Two D) Three

Page No.-35, Easy

114. In grass family, the scutellum is-
- A) Cotyledon B) Root tip
C) Epiblast D) Shot tip

Page No.-35, Easy

115. Identify the given figures-



(i)

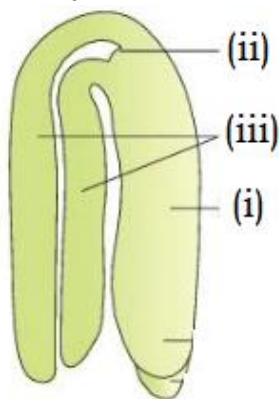


(ii)

- A) (i) is embryo of grass
 B) (ii) is embryo of dicots
 C) (ii) is embryo of monocot
 D) More than one option is correct

Page No.-35, Easy

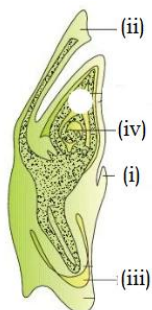
116. Identify the correct labels-



	(i)	(ii)	(iii)
A)	Cotyledon	Plumule	Hypocotyl
B)	Radicle	Cotyledon	Plumule
C)	Hypocotyl	Plumule	Cotyledon
D)	Cotyledon	Plumule	Epicotyl

Page No.-35, Easy

117. Identify the correct labels-



	(i)	(ii)	(iii)	(iv)
A	Epiblast	Scutellum	Coleoptile	Root cap
B	Scutellum	Epiblast	Shoot apex	Radicle
C	Epiblast	Scutellum	Root cap	Shoot apex
D	Scutellum	Epiblast	Radicle	Coleoptile

Page No.-35, Easy

118. Coleoptile is-

- A) hollow structure
 B) solid structure
 C) sometimes hollow and sometimes solid structure
 D) semi-solid

Page No.-35, Easy

119. Coleorhiza is-

- A) hollow structure
 B) foliar structure
 C) undifferentiated sheath
 D) more than one option is correct

Page No.-36, Easy

2.4.3 Seed

120. Read the following statements-

- (i) Seed is final product of sexual reproduction in plant.
 (ii) Seed is fertilized ovule.
 (iii) Seed is formed inside fruit.
 (iv) Seed consists of seed coat(s), cotyledon(s) and embryo axis.

How many of the statements is incorrect?

- A) Zero
 B) One
 C) Two
 D) Three

Page No.-36, Easy

121. Non-albuminous seeds-

- A) have residual endosperm
 B) retain a part of endosperm
 C) is found in castor
 D) None of these

Page No.-36, Easy

122. Groundnut is-

- A) Albuminous
 B) Non-albuminous
 C) Has residual endosperm in mature seed
 D) More than one option is correct

Page No.-36, Easy

123. Perisperm is-

- A) Persistent nucleus
 B) Found in beet
 C) Residual endosperm
 D) More than one option

Page No.-36, Easy

124. Integument of ovules mature into-

- A) Ovary wall
 B) Pericarp
 C) Seed coat
 D) Perisperm

Page No.-36, Easy

125. Micropyle is-

- A) Absent in seed
 B) Present inside seed
 C) Present on surface of seed
 D) Present on seed coat

Page No.-36, Easy

126. Micropyle plays role of-
- Stalk for seed
 - Scar of stalk
 - Facilitating entry of water into seed
 - Facilitating escape of seed metabolites

Page No.-36, Easy

127. Mature seed has-
- More water content and more metabolism
 - Less water content and more metabolism
 - Less water content and less metabolism
 - More water content and more metabolism

Page No.-36, Easy

128. The embryo in a mature seed-
- Germinates essentially
 - May enter dormancy
 - Always enters dormancy first, followed by germination
 - Both B and C

Page No.-36, Easy

129. Choose the correct match regarding the maturing of flower into fruit-
- Wall of ovule – pericarp
 - Nucellus – periderm
 - Ovary – seed
 - None of these

Page No.-36, Easy

130. Fleshy fruit is-
- Mustard
 - Groundnut
 - Guava
 - More than one

Page No.-36, Easy

131. In false fruits, select incorrect statement-
- Floral parts other than ovary are involved
 - Thalamus may contribute to fruit formation
 - Examples include apple, cashew, groundnut
 - Fruit does not develop from ovary

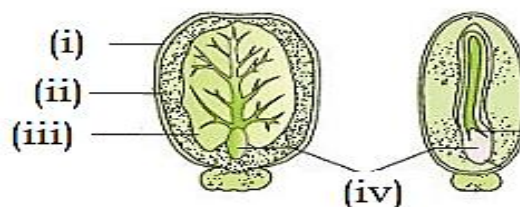
Page No.-36, Easy

132. Which of these is incorrect about parthenocarpy-
- Plant formed without fertilization
 - Banana is example

- Induced by application of growth hormones
- Such fruits are seed less

Page No.-36, Easy

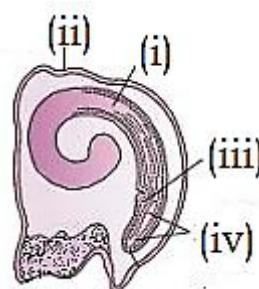
133. Identify the endosperm in the given figure –



- I
- II
- III
- IV

Page No.-37, Easy

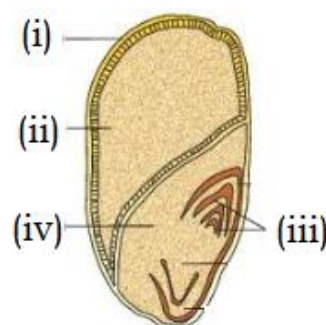
134. Identify cotyledon in the given figure of seed



- I
- II
- III
- IV

Page No.-37, Medium

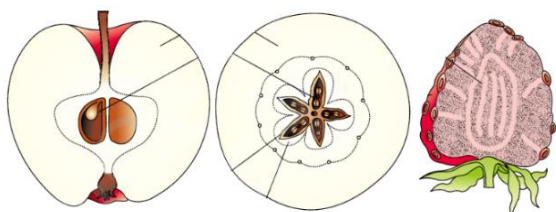
135. Identify scutellum in the given figure –



- I
- II
- III
- IV

Page No.-37, Medium

136. The given figure shows –



- A) Eucarp of apple and lithi
- B) Pseudocarp of apple litchi
- C) Eucarp of apple and strawberry
- D) Pseudocarp of apple and strawberry

Page No.-37, Medium

137. In angiosperm, pollination and fertilization are –

- A) Both independent of water
- B) Both dependent of water
- C) Only pollination is essentially on water
- D) Only fertilization is dependent on water

Page No.-37, Medium

138. For storage of seeds –

- A) Dehydration is important
- B) Dormancy is important
- C) Neither dehydration nor dormancy is needed
- D) Both dehydration and dormancy are crucial

Page No.-37, Easy

139. The oldest yet viable seed found is –

- A) Lupinus from arctic tundra
- B) Phoenix from arctic tundra
- C) Lupinus from king herod's palace
- D) Phoenix from king herod's palace

Page No.-37, Easy

140. *Phoenix dactylifera* is commonly known as –

- A) Fig
- B) Coconut
- C) Cashew
- D) None of these

Page No.-37, Easy

2.5 Apomixis and Polyembryony

141. Apomixis is –

- A) Fruit without fertilization

- B) Seed without fertilization
- C) Plant without fertilization
- D) More than one option

Page No.-38, Easy

142. Apomixis is –

- A) A form of sexual reproduction that mimics asexual reproduction
- B) A form of asexual reproduction that mimics sexual reproduction
- C) Both of the above
- D) None of these

Page No.-38, Easy

143. Apomixis is found in –

- A) Solanaceae
- B) Liliaceae
- C) Asteraceae
- D) Brassicaceae

Page No.-38, Easy

144. Mango contains –

- A) Multiple ovaries in a flower
- B) Multiple ovules in an ovary
- C) Multiple embryo in an ovule
- D) More than one option is correct

Page No.-38, Easy

145. What is the major constraint associated with hybrides?

- A) Hybrides are not accepted by farmers
- B) Hybrides are costly
- C) Hybrid seeds have to be produced every year and the seeds from hybrid cannot be sown
- D) More than one option is correct

Page No.-38, Easy

146. What is the problem with sowing seeds from hybrid plant?

- A) Seeds will not germinate (low germination rate)
- B) Progeny will be unhealthy
- C) Hybrid characters will be lost due to segregation
- D) All of these

Page No.-38, Easy

Answer Key

SEXUAL REPRODUCTION IN FLOWERING PLANT

Q	1	2	3	4	5	6	7	8	9	10
Ans	D	A	B	A	D	A	B	C	B	C
Q	11	12	13	14	15	16	17	18	19	20
Ans	A	A	B	D	A	B	D	C	D	D
Q	21	22	23	24	25	26	27	28	29	30
Ans	B	A	C	A	B	B	A	A	B	C
Q	31	32	33	34	35	36	37	38	39	40
Ans	A	B	A	B	B	C	B	A	A	D
Q	41	42	43	44	45	46	47	48	49	50
Ans	C	A	C	B	A	D	A	A	B	C
Q	51	52	53	54	55	56	57	58	59	60
Ans	C	C	B	C	D	C	B	A	D	C
Q	61	62	63	64	65	66	67	68	69	70
Ans	B	C	A	C	D	D	D	C	C	C
Q	71	72	73	74	75	76	77	78	79	80
Ans	D	A	A	D	C	B	C	A	D	D
Q	81	82	83	84	85	86	87	88	89	90
Ans	B	A	A	B	D	B	A	B	C	C
Q	91	92	93	94	95	96	97	98	99	100
Ans	A	C	B	D	D	C	B	A	A	B
Q	101	102	103	104	105	106	107	108	109	110
Ans	B	C	A	D	C	A	A	A	D	B
Q	111	112	113	114	115	116	117	118	119	120
Ans	B	D	B	A	C	C	C	A	C	A
Q	121	122	123	124	125	126	127	128	129	130
Ans	D	B	B	C	D	C	C	B	D	C
Q	131	132	133	134	135	136	137	138	139	140
Ans	A	A	B	A	D	D	A	D	A	D
Q	141	142	143	144	145	146				
Ans	B	B	C	C	D	C				

TG: @Chalnaayaaar

Mendel's Laws of Inheritance

- Genetics is the subject that deals with **(Pg. 69, E)**
 - inheritance
 - variation of characteristics
 - reproduction
 - both (a) and (b)
- The basis of heredity is **(Pg. 69, E)**
 - variation
 - inheritance
 - mutation
 - linkage
- Humans knew from as early as 8000–1000 BC that one of the causes of variation was hidden in **(Pg. 69, E)**
 - sexual reproduction
 - asexual reproduction
 - vegetative propagation
 - none of these
- Choose the incorrect statement from the following. **(Pg. 69, M)**
 - Humans knew from very early that sexual reproduction is one of the causes of variation.
 - They exploited the variation to obtain plants and animals of desirable characters through selective breeding.
 - Sahiwal cows were obtained through artificial selection and domestication from ancestral wild cows.
 - Our ancestors were very well aware about the scientific basis of inheritance of characters and variation.
- Which one from the following is the period for Mendel's hybridization experiments? **(Pg. 70, E)**
 - 1840–1850
 - 1857–1869
 - 1870–1877
 - 1856–1863
- Who proposed the 'Laws of Inheritance' in living organisms? **(Pg. 70, E)**
 - Mendel
 - Morgan
 - de Vries
 - Correns
- Match Column-I with Column-II and choose the correct answer from the codes given below. **(Pg. 70, M)**

Column-I		Column-II	
(A)	Genetics	(1)	Process of passing characters from parent to offspring
(B)	Inheritance	(2)	Laws of inheritance
(C)	Variation	(3)	A branch of Biology
(D)	Mendel	(4)	Degree of difference of progeny from their parents

Codes-

	A	B	C	D
A)	1	4	2	3
B)	4	2	3	1
C)	3	1	4	2
D)	2	3	1	4

- Mendel investigated characters in the garden pea plant that were manifested as two **(Pg. 70, E)**
 - linked traits
 - opposing traits
 - similar traits
 - none of these
- How many pairs of contrasting characters in pea plants were studied by Mendel in his experiments? **(Pg. 70, E)**
 - Six
 - Eight
 - Seven
 - Four
- Which contrasting trait was not studied by Mendel during his experiments? **(Pg. 70, E)**
 - Seed colour
 - Leaf colour
 - Flower colour
 - Stem height
- Among the following, which one is not a dominating trait? **(Pg. 70, E)**
 - Axial position of flower
 - Green colour of pod
 - Violet colour of flower
 - Green colour of seed
- A true-breeding line is one that **(Pg. 70, E)**
 - has undergone continuous self-pollination
 - shows stable trait inheritance

C) shows expressions of trait for several generations

D) all of these

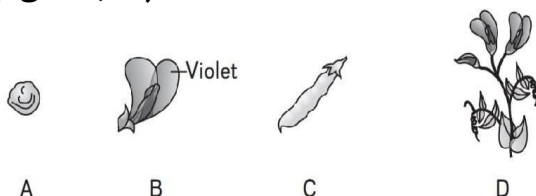
13. Match Column-I with Column-II and choose the correct option from the codes given below. **(Pg. 70, M)**

Column-I		Column-II	
(A)	Axial flower	(1)	Undergone continuous self-pollination
(B)	Terminal flower	(2)	Father of genetics
(C)	Mendel	(3)	Dominant trait
(D)	True-breeding line	(4)	Recessive trait

Codes-

	A	B	C	D
A)	3	4	2	1
B)	4	3	1	2
C)	1	2	4	3
D)	2	1	3	4

14. Refer to the given figures (A-D) showing traits of pea plant studied by Mendel. Among these, choose the dominant trait. **(Pg. 70, M)**



- A) B
C) D
B) A
D) C

15. Which technique was used by Mendel during his experiments on pea plant? **(Pg. 70, E)**

- A) Artificial pollination
B) Cross pollination
C) Self-pollination
D) All of these

16. Choose the correct statement(s) from the following. **(Pg. 70, M)**

- (I) During Mendel's investigation, statistical analysis and mathematical logic were applied to problems in Biology.

(II) Mendel investigated characters in the garden pea plant that were manifested as two opposing traits.

(III) Mendel conducted artificial pollination experiments using several true-breeding pea lines.

(IV) Mendel selected eight true-breeding pea plant varieties as pairs.

- A) I and II
B) III and IV
C) I, II and III
D) All of these

17. The contrasting trait(s) selected by Mendel was/were **(Pg. 70, E)**

- A) smooth or wrinkled seed
B) yellow or green seed
C) smooth or inflated pods
D) all of these

18. Assertion: Mendel conducted hybridization experiments on garden pea plant.

Reason: He proposed laws of inheritance in living organisms. **(Pg. 70, M)**

- A) Both assertion and reason are true and reason is the correct explanation of assertion.
B) Both assertion and reason are true but reason is not correct explanation of assertion.
C) Assertion is true, but reason is false.
D) Both assertion and reason are false.

19. Assertion: Mendel used contrasting traits for his studies.

Reason: He used *Ocimum* plant for his experiments. **(Pg. 70, M)**

- A) Both assertion and reason are true and reason is the correct explanation of assertion.
B) Both assertion and reason are true but reason is not correct explanation of assertion.
C) Assertion is true, but reason is false.
D) Both assertion and reason are false.

20. Assertion: Mendel used true-breeding pea lines for his experiments.

Reason: A true-breeding line is one that has undergone continuous self-pollination. **(Pg. 70, M)**

- A) Both assertion and reason are true and reason is the correct explanation of assertion.
 B) Both assertion and reason are true but reason is not correct explanation of assertion.
 C) Assertion is true, but reason is false.
 D) Both assertion and reason are false.

Inheritance of one Gene

21. The first hybrid generation of Mendel's experiment is known as **(Pg. 71, E)**
 A) Filial₁ progeny
 B) F₁-generation
 C) Father generation
 D) Both (A) and (B)
22. When Mendel crossed true-breeding tall and dwarf plants, in F₁-generation all tall plants were obtained. On self-crossing in the F₂ generation, he obtained **(Pg. 71, E)**
 A) 1/4th dwarf and 3/4th tall plants
 B) 3/4th dwarf and 1/4th tall plants
 C) 2/4th dwarf and 2/4th tall plants
 D) All dwarf plants
23. During the study of inheritance of one character in F₂ generation, Mendel obtained phenotype in **(Pg. 71, E)**
 A) 2 : 1 ratio B) 3 : 1 ratio
 C) 1 : 2 : 1 ratio D) 1 : 1 : 1 : 1 ratio
24. The 'factors' of Mendel are today known as **(Pg. 71, E)**
 A) genome B) gene
 C) DNA D) allele
25. The slightly different forms of the same genes are called **(Pg. 71, E)**
 A) genome B) DNA
 C) allele D) cistron
26. Alleles are **(Pg. 72, E)**
 A) true-breeding homozygotes
 B) different molecular forms of a gene
 C) heterozygotes
 D) different phenotype
27. What would be the phenotype of a plant that had a genotype 'Tt'? Here 'T' represent tall trait while 't' represents dwarf trait. **(Pg. 72, E)**
 A) Tall
 B) Intermediate height

- C) Dwarf
 D) None of these
28. In homozygous condition, a particular gene has **(Pg. 72, E)**
 A) different alleles on homologous chromosomes.
 B) no alleles on homologous chromosomes.
 C) same alleles on homologous chromosomes.
 D) none of these
29. Tall and dwarf are the two alleles of gene of height. The dominant trait is **(Pg. 72, E)**
 A) dwarf
 B) tall
 C) both are equally dominant
 D) both are recessive
30. Match Column-I with Column-II and choose the correct option from the codes given below. **(Pg. 72, M)**

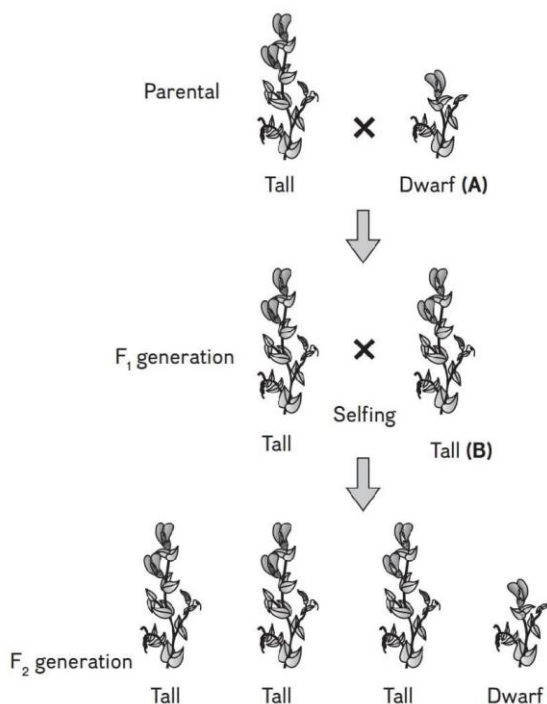
Column-I		Column-II	
(A)	Genes	(1)	Slightly different forms of the same gene
(B)	Alleles	(2)	Genetic composition of an organism
(C)	Genotype	(3)	Physical appearance of an organism
(D)	Phenotype	(4)	Unit of inheritance

Codes–

	A	B	C	D
A)	4	1	2	3
B)	1	4	3	2
C)	3	2	4	1
D)	2	3	1	4

31. A cross that is performed for the study of a single character is **(Pg. 72, E)**
 A) dihybrid cross
 B) test cross
 C) monohybrid cross
 D) back cross
32. The given figure is the diagrammatic representation of a monohybrid cross. In the figure, some plants are mentioned as A

and B. What will be the genotype of these plants? **(Pg. 72, E)**



- A) A – tt, B – Tt
 B) A – Tt, B – tt
 C) A – TT, B – TT
 D) A – Tt, B – Tt
33. Choose the incorrect statement about Mendel's monohybrid cross. **(Pg. 73, E)**
- A) The recessive parental trait is expressed without any blending in F₂ generation.
 B) The alleles of parental pair segregate from each other and both alleles are transmitted to a gamete.
 C) The segregation of alleles is a random process.
 D) There is a 50% chance of a gamete containing either allele.
34. The production of gametes by the parents the formation of zygotes, the F₁ and F₂ plants, can be understood by using **(Pg. 73, E)**
- A) Wenn diagram
 B) Pie diagram
 C) A pyramid diagram
 D) Punnett square
35. Select the correct statement. **(Pg. 73, E)**
- A) Franklin Stahl coined the term 'linkage'.
 B) Punnett square was developed by a British scientist.
 C) Spliceosomes take part in translation.
 D) Transduction was discovered by S Altman.
36. In the test cross, organism whose genotype is to be determined, is crossed with the **(Pg. 74, E)**
- A) recessive parent
 B) dominant parent
 C) both parents one by one
 D) none of these
37. On crossing two tall plants, in F₁-generation few dwarf offspring were obtained. What would be the genotype of the both the parent? **(Pg. 74, E)**
- A) TT and Tt B) Tt and Tt
 C) TT and TT D) TT and tt
38. Based on his observations of monohybrid cross, Mendel proposed which law of inheritance? **(Pg. 74, E)**
- A) Law of dominance
 B) Law of segregation
 C) Law of independent assortment
 D) Both (A) and (B)
39. According to Mendel, characters are controlled by discrete units called **(Pg. 74, E)**
- A) genes B) factors
 C) alleles D) allelomorph
40. Choose the incorrect statement about law of dominance. **(Pg. 74, E)**
- A) It is used to explain the expression of only one of the parental characters in a monohybrid cross in F₁-generation.
 B) It does not explain the expression of both parental characters in F₂-generation.
 C) It also explains the proportion of 3: 1 obtained in F₂-generation.
 D) It states that characters are controlled by discrete units called factors.
41. Match Column-I with Column-II and choose the correct option from the codes given below. **(Pg. 73, M)**
- | Column-I | | Column-II | |
|----------|--------------------------|-----------|--------------------|
| (A) | First law of inheritance | (1) | Law of segregation |

(B)	Second law of inheritance	(2)	3: 1
(C)	Monohybrid cross	(3)	Law of dominance
(D)	Test cross	(4)	1: 1

Codes-

	A	B	C	D
A)	3	1	2	4
B)	1	3	4	2
C)	2	3	1	4
D)	4	2	3	1

42. The second law of inheritance, i.e., law of segregation is based on the fact that **(Pg. 74, E)**
 A) alleles do not show any blending.
 B) both characters are recovered as such in F₂ generation.
 C) one allele dominates the other allele.
 D) Both (A) and (B)
43. The factor controlling any character is discrete and independent. It was concluded on the basis of **(Pg. 75, E)**
 A) results of F₃-generation of a cross.
 B) observations of a cross made between the plants having two contrasting traits where offspring shows only one trait without any blending.
 C) self-pollination of F₁-offspring.
 D) cross pollination of parental generations.
44. In *Antirrhinum* (Snapdragon), a red flower was crossed with a white flower and in F₁ generation, pink flowers were obtained. When pink flowers were selfed, the F₂ generation showed white, red and pink flowers. Choose the incorrect statement from the following. **(Pg. 75, E)**
 A) The experiment does not follow the principle of dominance.
 B) Pink colour in F₁ is due to incomplete dominance.
 C) Ratio of F₂ is $\frac{1}{4}$ (Red): $\frac{2}{4}$ (Pink): $\frac{1}{4}$ (white).
 D) Law of segregation does not apply in this experiment.
45. It was being observed that sometimes, the F₁ shows a phenotype that does not resemble either of the two parents and remains in between the two. It can be explained by **(Pg. 75, E)**
 A) Law of dominance
 B) Law of segregation
 C) Law of incomplete dominance
 D) None of these
46. The genotypic ratio obtained in incomplete dominance is **(Pg. 76, E)**
 A) 3 : 1
 B) 1 : 1 : 2
 C) 2 : 1 : 1
 D) 1 : 2 : 1
47. In case of co-dominance, the F₁ progeny **(Pg. 77, E)**
 A) resembles either of the two parents
 B) is in between of parents
 C) resembles both the parents
 D) none of these
48. A person of AB blood group has I_A and I_B genes. It is an example of **(Pg. 77, E)**
 A) pleiotropy
 B) segregation
 C) co-dominance
 D) None of these
49. In a marriage between male with blood group A and female with blood group B, the progeny had either blood group AB or B. What could be the possible genotype of parents? **(Pg. 77, E)**
 A) I_Ai (Male); I_Bi (Female)
 B) I_Ai (Male); I_BI_B (Female)
 C) I_AI_A (Male); I_BI_B (Female)
 D) I_AI_A (Male); I_Bi (Female)
50. A person has 'O' blood group. His mother has 'A' while father has 'B' blood group. What would be the genotype of mother and father? **(Pg. 77, E)**
 A) Mother is homozygous for 'A' blood group and father is heterozygous for 'B' blood group.
 B) Mother is heterozygous for 'A' blood group and father is homozygous for 'B' blood group.
 C) Both mother and father are homozygous for 'A' and 'B' blood groups respectively.
 D) Both mother and father are heterozygous for 'A' and 'B' blood groups respectively.
51. Which of the following characteristics represent 'inheritance of blood groups' in humans? **(Pg. 77, E)**

- (I) Dominance
 (II) Co-dominance
 (III) Multiple dominance
 (IV) Incomplete dominance
 (V) Polygenic inheritance
 A) II, III and V B) I, II and III
 C) II, IV and V D) I, III and V

52. A man with blood group 'A' marries a woman with blood 'B'. What are all possible blood groups of their offsprings? **(Pg. 77, E)**

- A) A, B and AB only
 B) A, B, AB and O
 C) O only
 D) A and B only

53. The genotypes of a husband and wife are $I_A I_B$ and $I_A i$. Among the blood types of their children, how many different genotypes and phenotypes are possible? **(Pg. 77, E)**

- A) 3 genotypes: 4 phenotypes
 B) 4 genotypes: 3 phenotypes
 C) 4 genotypes: 4 phenotypes
 D) 3 genotypes: 3 phenotypes

54. Multi alleles are present **(Pg. 77, E)**

- A) at different loci on the same chromosome
 B) at the same locus of the chromosome
 C) on non-sister chromatids
 D) on different chromosome

55. Match Column-I with Column-II and choose the correct answer from the codes given below. **(Pg. 74-78, M)**

Column-I		Column-II	
(A)	Dominance	(1)	ABO blood group
(B)	Co-dominance	(2)	Appearance of pink flowers in snapdragon in F1 generation
(C)	Incomplete dominance	(3)	Starch synthesis in pea seeds
(D)	Pleiotropy	(4)	Appearance of violet flowers in F1 generation in garden pea

Codes-

	A	B	C	D
A)	4	1	2	3

B)	1	4	3	2
C)	3	2	4	1
D)	2	3	1	4

56. ABO blood grouping is a good example of **(Pg. 77, E)**

- A) incomplete dominance
 B) mutation
 C) multiple alleles
 D) pleiotropy

57. Sometimes a single gene product may produce more than one effect. This phenomenon is known as **(Pg. 77, E)**

- A) mosaicism B) pleiotropy
 C) multiple allelism D) polygeny

58. Starch synthesis in pea seeds is an example of **(Pg. 77, E)**

- A) multiple allelism
 B) incomplete dominance
 C) co-dominance
 D) pleiotropy

59. Pea seeds having Bb genotype produce starch grains of **(Pg. 78, E)**

- A) large size
 B) small size
 C) intermediate size
 D) they do not produce starch.

60. Choose the incorrect statement from the following about pleiotropy. **(Pg. 78, E)**

- A) In pleiotropy, a single gene produces more than one effect.
 B) Starch synthesis in pea seeds is controlled by one gene.
 C) Pea seeds having BB genotypes, produce small starch grains.
 D) bb homozygotes of pea produce wrinkled seeds.

61. Assertion: The law of dominance is used to explain the expression of only one of the parental characters in a monohybrid cross.

Reason: It also explains the proportion of 3: 1 obtained at F2 generation. **(Pg. 78, H)**

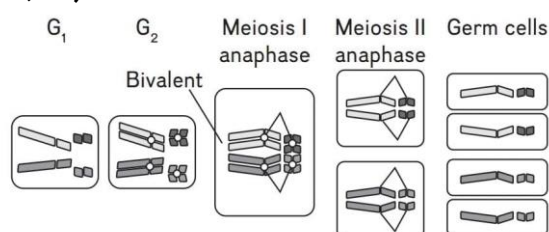
- A) Both assertion and reason are true and reason is the correct explanation of assertion.

- B) Both assertion and reason are true but reason is not correct explanation of assertion.
 C) Assertion is true, but reason is false.
 D) Both assertion and reason are false.
62. Assertion: The pink flower of dog plant show incomplete dominance.
 Reason: In pink flowers, both alleles are expressed equally. **(Pg. 78, E)**
 A) Both assertion and reason are true and reason is the correct explanation of assertion.
 B) Both assertion and reason are true but reason is not correct explanation of assertion.
 C) Assertion is true, but reason is false.
 D) Both assertion and reason are false.
63. Assertion: A person having $I_A I_B$ genotype has AB blood group.
 Reason: I_A and I_B alleles are co-dominant **(Pg. 78, E)**
 A) Both assertion and reason are true and reason is the correct explanation of assertion.
 B) Both assertion and reason are true but reason is not correct explanation of assertion.
 C) Assertion is true, but reason is false.
 D) Both assertion and reason are false.
67. The ratio 9: 3: 3: 1 of a dihybrid cross denotes that **(Pg. 79, E)**
 A) it is a multigenic inheritance.
 B) the alleles of two genes are interacting with each other.
 C) it is a case of multiple allelism.
 D) the alleles of two genes are segregating independently.
68. The numbers of phenotypes and genotypes in F_2 generation of a Mendelian dihybrid cross are **(Pg. 79, E)**
 A) phenotypes 4: genotypes 16
 B) phenotypes 4: genotypes 8
 C) phenotypes 9: genotypes 4
 D) phenotypes 4: genotypes 9
69. Mendel's law of independent assortment is true for the genes situated on the **(Pg. 79, E)**
 A) same chromosome
 B) non-homologous chromosomes
 C) homologous chromosomes
 D) extra nuclear genetic element
70. Genes A and B are linked. The F_1 heterozygote of a dihybrid cross involving these genes is crossed with homozygous recessive parental type (aabb). What would be the ratio of offspring in the next generation? **(Pg. 80, E)**
 A) 1: 1
 B) 1: 1: 1: 1
 C) 9: 3: 3: 1
 D) 3: 1

Inheritance of two Genes

64. Crosses that are performed to study two contrasting characters at a time are called **(Pg. 78, E)**
 A) monohybrid cross
 B) dihybrid cross
 C) test cross
 D) back cross
65. The phenotypic ratio obtained by Mendel in his dihybrid cross was **(Pg. 79, E)**
 A) 1 : 2 : 1 : 2
 B) 3 : 2 : 2 : 1
 C) 9 : 3 : 3 : 1
 D) 2 : 3 : 1 : 2
66. The third law of inheritance proposed by Mendel is **(Pg. 79, E)**
 A) Law of dominance
 B) Law of independent assortment
 C) Law of incomplete dominance
 D) Law of segregation
71. Mendel's work remained unrecognized for many years. Find out the true reason for the same. **(Pg. 81, H)**
 (I) Mendel's concept of genes was not accepted by his contemporaries as an explanation for the continuous variation seen in nature.
 (II) The approach of using mathematics was new and unacceptable by other biologists.
 (III) He could not provide any physical proof for the existence of factors. (IV) Communication was not easy in those days and his work could not be widely published.
 A) I and II
 B) II and III
 C) III and IV

- D) All of these
72. Mendel's results on the inheritance of characters were rediscovered by: **(Pg. 81, E)**
 A) de Vries B) Correns
 C) von Tschermak D) all of these
73. Among the following, who noted that the behaviour of chromosomes was parallel to the behavior of genes?
 A) Walter Sutton B) Theodore Boveri
 C) Von Tschermak D) Both (A) and (B)
74. Refer to the given figure showing meiosis and germ cell formation in a cell with four chromosomes. Which law of Mendel can be effectively explained by this figure? **(Pg. 81, M)**



- A) Law of dominance
 B) Law of segregation
 C) Law of independent assortment
 D) All of these
75. The chromosomal theory of inheritance was proposed by **(Pg. 83, E)**
 A) Sutton B) Boveri
 C) Morgan D) Both (A) and (B)
76. Match Column-I with Column-II and choose the correct option from the codes given below. **(Pg. 83, M)**

	Column-I		Column-II
(A)	Mendel	(1)	Rediscovery of Mendel's law
(B)	Correns, Tschermak and Vries	(2)	Worked on Drosophila melanogaster
(C)	Sutton and Boveri	(3)	Law of independent assortment
(D)	T. H. Morgan	(4)	Chromosomal theory of inheritance

Codes-

TG: @Chalnaayaaar

	A	B	C	D
A)	3	1	4	2
B)	1	4	3	2

C)	2	3	1	4
D)	4	2	3	1

77. Morgan performed his experiments on **(Pg. 83, E)**
 A) Garden pea B) Drosophila
 C) Snapdragon D) None of these
78. When two genes are located on the same chromosome, the proportion of parental gene combination is **(Pg. 83, E)**
 A) higher than non-parental
 B) lower than non-parental
 C) equal to non-parental
 D) None of these
79. Genes which are present on the same chromosome **(Pg. 83, E)**
 A) do not form any linkage group.
 B) affect the phenotype by forming interactive groups.
 C) form a linkage group.
 D) form different groups depending upon their relative distance.
80. The term used to describe the generation of nonparental gene combination is **(Pg. 83, E)**
 A) linkage B) recombination
 C) mutation D) none of these
81. Which type of relationship is found between the distance of genes and percentage of recombination? **(Pg. 83, E)**
 A) Inverse B) Parallel
 C) Direct D) None of these
82. Among the following which will not cause variations among siblings? **(Pg. 83, H)**
 A) Linkage
 B) Independent assortment of genes
 C) Crossing over
 D) Mutation
83. Match Column-I with Column-II and choose the correct answer from the codes given below. **(Pg. 83, H)**

	Column-I		Column-II
(A)	Linkage	(1)	Non-parallel gene combination
(B)	Recombination	(2)	Genetic map
(C)	Sturtevant	(3)	Unit of distance between genes

(D)	Centimorgan	(4)	Physical association of genes
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Codes-

	A	B	C	D
A)	3	2	4	1
B)	2	3	1	4
C)	4	1	2	3
D)	1	4	3	2

84. What map unit (centimorgan) is adopted in the construction of genetic maps? (**Pg. 85, E**)

- A) A unit distance between two expressed genes, representing 10% cross over.
- B) A unit distance between two expressed genes, representing 100% cross over.
- C) A unit distance between genes on chromosomes, representing 1% cross over.
- D) A unit distance between genes on chromosomes, representing 50% cross over.

85. The concept of genetic map was given by (**Pg. 85, E**)

- A) de Vries B) Morgan
- C) Sturtevant D) Mendel

86. Assertion: Mendel proposed the law of independent assortment on the basis of results of dihybrid cross.

Reason: When two pairs of traits are combined in a hybrid, segregation of one pair of characters is independent of the other pair of characters. (**Pg. 85, H**)

- A) Both assertion and reason are true and the reason is the correct explanation of assertion.
- B) Both assertion and reason are true but the reason is not the correct explanation of assertion.
- C) Assertion is true but reason is false.
- D) Both assertion and reason are false.

87. Assertion: The chromosomal theory of inheritance was proposed by T. H. Morgan. Reason: Morgan worked on garden pea plants to give this theory. (**Pg. 85, H**)

A) Both assertion and reason are true and the reason is the correct explanation of assertion.

B) Both assertion and reason are true but the reason is not the correct explanation of assertion.

C) Assertion is true but reason is false.

D) Both assertion and reason are false.

88. Assertion: Morgan coined the term linkage to describe the physical association of genes on a chromosome.

Reason: Linkage shows more non-parental type combination of genes. (**Pg. 85, H**)

A) Both assertion and reason are true and the reason is the correct explanation of assertion.

B) Both assertion and reason are true but the reason is not the correct explanation of assertion.

C) Assertion is true but reason is false.

D) Both assertion and reason are false.

Sex Determination

89. X-body was discovered by (**Pg. 85, E**)

- A) Mendel B) Morgan
- C) Henking D) de Vries

90. In XO type of sex determination, who does possess the X chromosome? (**Pg. 86, E**)

- A) Female
- B) Male
- C) Sometimes female and sometimes male
- D) None of these

91. X-chromosome is designated as (**Pg. 86, E**)

- A) autosome
- B) sex chromosome
- C) somatic chromosome
- D) none of these

92. Which type of sex determination is found in grasshoppers? (**Pg. 86, E**)

- A) XX – XY type B) XX – XO type
- C) ZZ – ZW type D) None of these

93. In a specific taxon of insects, some possess 17 chromosomes while others have 18 chromosomes. These 17 and 18 chromosomes bearing organisms are [NCERT Exemplar]

A) All males

B) All females

- C) Females and males, respectively
D) Males and females, respectively
94. In *Drosophila*, males possess (Pg. 86, E)
A) XO chromosomes
B) XX chromosomes
C) XY chromosomes
D) YY chromosomes
95. Match Column-I with Column-II and choose the correct option from the codes given below. (Pg. 86, M)

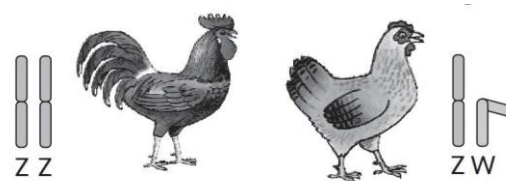
	Column-I		Column-II
(A)	X-body	(1)	Autosomes
(B)	X and Y chromosome	(2)	Henking
(C)	Somatic chromosome	(3)	Grasshopper
(D)	XO-types of sex determination	(4)	Allosomes

Codes-

	A	B	C	D
(a)	2	4	1	3
(b)	4	2	1	3
(c)	3	1	4	2
(d)	1	3	2	4

96. XY type of sex determination is found in (Pg. 86, E)
A) *Drosophila* B) humans
C) grasshopper D) both (A) and (B)
97. Choose the incorrect statement about XY type of sex determination. (Pg. 86, E)
A) Both males and females have same number of chromosomes.
B) The counter part of X chromosome is distinctly smaller and called Y chromosome.
C) Males and females possess different number of autosomes.
D) This type of sex determination is found in *Drosophila*.
98. Male heterogamety is found in (Pg. 86, E)
A) grasshopper B) *Drosophila*
C) humans D) all of these
99. In female heterogamety, females
A) one type of gametes
B) two types of gametes

- C) three types of gametes
D) none of these
100. ZZ/ZW type of sex determination is the characteristics feature of [NCERT Exemplar]
A) platypus B) snails
C) peacock D) cockroach
101. Among the following, which has a different mechanism of sex determination? (Pg. 87, E)
A) Birds B) Humans
C) *Drosophila* D) None of these
102. Refer to the given figure which is followed by few statements. Choose the incorrect statement about it.



- A) It shows male heterogamety.
B) Both possess same types of autosomes.
C) The sex of progeny is determined by females.
D) This type of sex determination is different from humans.
103. In humans, sex is determined by (Pg. 87, E)
A) females
B) males
C) environmental factors
D) none of these
104. Match Column-I with Column-II and choose the correct option from the codes given below. (Pg. 86-87, E)

	Column-I		Column-II
(A)	XO-type	(1)	<i>Drosophila</i>
(B)	XY-type	(2)	Grasshopper
(C)	ZZ-ZW type	(3)	Birds
		(4)	Humans progeny from their parents

Codes-

	A	B	C
(a)	1,4	2	3
(b)	2	1,4	3
(c)	3,2	1	4
(d)	4	3	2,1

105. Match the items of Column I with Column II. (Pg. 87, E)

	Column-I		Column-II
(A)	XX-XO method of sex determination	(1)	Turner's syndrome
(B)	XX-XY method of sex determination	(2)	Female heterogametic
(C)	Karyotype-45	(3)	Grasshopper
(D)	ZW-ZZ method of sex determination	(4)	Female homogametic

Codes-

	A	B	C	D
A)	4	2	1	3
B)	2	4	1	3
C)	1	4	2	3
D)	3	4	1	2

106. Select the incorrect statement. (Pg. 87, M)

- A) Male fruit fly is heterogametic.
- B) In male grasshoppers, 50% of sperms have no sex chromosome.
- C) In domesticated fowls, sex of progeny depends on the type of sperm rather than egg.
- D) Human males have one of their sex chromosome much shorter than the other.

107. Assertion: Grasshoppers show male heterogamety.

Reason: Male grasshoppers produce two types of gametes. (Pg. 87, H)

- A) Both assertion and reason are true and the reason is the correct explanation of assertion.
- B) Both assertion and reason are true but the reason is not the correct explanation of assertion.
- C) Assertion is true but reason is false.
- D) Both assertion and reason are false.

108. Assertion: In fruitfly, sex of progeny is decided by females.

Reason: Females produce two types of gametes. (Pg. 87, H)

- A) Both assertion and reason are true and the reason is the correct explanation of assertion.

B) Both assertion and reason are true but the reason is not the correct explanation of assertion.

C) Assertion is true but reason is false.

D) Both assertion and reason are false.

109. Assertion: Birds show female heterogamety.

Reason: In birds, the sex of progeny is determined by males. (Pg. 87, H)

- A) Both assertion and reason are true and the reason is the correct explanation of assertion.
- B) Both assertion and reason are true but the reason is not the correct explanation of assertion.
- C) Assertion is true but reason is false.
- D) Both assertion and reason are false.

Mutation and Genetic Disorders

110. The phenomenon which results in alteration of DNA sequences is (Pg. 88, E)

- A) mutation
- B) transpiration
- C) transcription
- D) translation

111. Chromosomal aberrations are commonly observed in (Pg. 88, E)

- A) cardiac cells
- B) cancer cells
- C) skeletal cells
- D) none of these

112. A classical example of point mutation is (Pg. 88, E)

- A) gout
- B) night blindness
- C) sickle cell anaemia
- D) Turner's syndrome

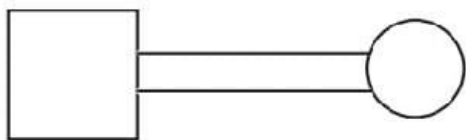
113. The factors that cause mutations are called (Pg. 88, E)

- A) mutagens
- B) teratogens
- C) allergens
- D) none of these

114. An analysis of traits in several of generations of a family is called (Pg. 88, E)

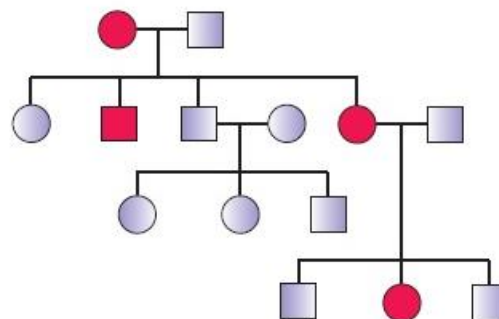
- A) mutation
- B) pedigree analysis
- C) genetic map formation
- D) none of these

115. In a pedigree analysis, the given symbol represents (Pg. 88, E)



- A) affected individuals
B) mating
C) consanguineous mating
D) unspecified sex
116. Pedigree analysis is used to study the inheritance pattern of a gene over generations. The character that is studied in the pedigree analysis is equivalent to [NCERT Exemplar]
A) Mendelian trait
B) Maternal trait
C) Polygamic trait
D) Quantitative trait
117. Mendelian disorders are mainly determined by alteration or mutation in the (Pg. 89, E)
A) chromosomes
B) single gene
C) array of genes
D) none of these
118. Among the following which one is a Mendelian disorder? (Pg. 89, E)
A) Haemophilia
B) Sickle cell anaemia
C) Cystic fibrosis
D) All of these
119. Choose the incorrect statement about Mendelian disorders. (Pg. 89, E)
A) These are usually caused by mutation in a single gene.
B) These disorders are transmitted to the offspring according to the laws of inheritance.
C) Mendelian disorders are always sex linked.
D) The trait in question can be dominant or recessive.
120. A genetic disease transmitted from a carrier female that is phenotypically normal to only some male progeny is [NCERT Exemplar]
A) sex-linked dominant
B) sex-linked recessive

- C) autosomal dominant
D) autosomal recessive
121. Refer to the given pedigree analysis. It is related to the analysis of (Pg. 89, E)



- A) autosomal dominant trait
B) autosomal recessive trait
C) sex-linked dominant trait
D) sex-linked recessive trait
122. Haemophilia is a/an (Pg. 90, E)
A) sex-linked recessive disease
B) sex-linked dominant disease
C) autosomal recessive disease
D) autosomal dominant disease
123. The possibility of a female becoming a haemophilic is (Pg. 90, E)
A) extremely high B) extremely rare
C) equal to a male D) none of these
124. Haemophilia A and B are due to deficiencies of respectively clotting factor (Pg. 90, E)
A) VIII and IX B) IX and VIII
C) VII and IX D) X and VII
125. Sickle cell anaemia is a/an (Pg. 90, E)
A) sex-linked recessive disease
B) sex-linked dominant disease
C) autosomal recessive disease
D) autosomal dominant disease
126. In sickle cell anaemia, valine replaces glutamic acid. This valine is coded by the triplet [NCERT Exemplar]
A) AAG B) GGG
C) GUG D) GAA
127. Sickle Cell Anaemia (SCA) is transferred from parents to offspring when (Pg. 90, E)
A) father is affected and mother is normal.
B) father is normal and mother is carrier.
C) father is normal and mother is affected.
D) both mother and father are carrier.

128. Match Column-I with Column-II and choose the correct option from the codes given below. (Pg. 90, E)

	Column-I		Column-II
(A)	Myotonic dystrophy	(1)	Autosomal recessive
(B)	Sickle cell anaemia	(2)	Sex-linked recessive
(C)	Haemophilia	(3)	Sex-linked dominant
(D)	Rett syndrome	(4)	Autosomal dominant

Codes-

	A	B	C	D
(a)	4	1	2	3
(b)	4	2	3	1
(c)	3	4	1	2
(d)	2	3	4	1

129. Thalassemia and sickle cell anaemia are caused due to a problem in globin molecule synthesis. Select the correct statement. (Pg. 90, E)

- A) Both are due to a quantitative defect in globin chain synthesis.
 B) Thalassemia is due to less synthesis of globin molecules.
 C) Sickle cell anaemia is due to quantitative problem of globin molecules.
 D) Both are due to qualitative defect in globin chain synthesis.

130. The person suffering from phenylketonuria disease lacks enzyme (Pg. 91, E)

- A) phenylalanine hydroxylase
 B) phosphates
 C) enolase
 D) none of these

131. Phenylketonuria is an inborn error in which affected individual lacks an enzyme that converts (Pg. 91, E)

- A) phenylalanine into tyrosine
 B) tyrosine into phenylalanine
 C) glutamic acid into valine
 D) valine into glutamic acid

132. Phenylketonuria is a/an (Pg. 91, E)

- A) autosomal dominant trait
 B) autosomal recessive trait

- C) sex-linked dominant trait
 D) sex-linked recessive trait

133. If a colourblind man marries a woman who is homozygous for normal colour vision, the probability of their son being colour blind is (Pg. 89, E)

- A) 0.75 B) 1
 C) 0 D) 0.5 25.

134. The chromosomal disorders are

- A) absence of one or more chromosomes
 B) excess of one or more chromosomes
 C) abnormal arrangement of chromosomes
 D) all of these

135. Condition of having $2n \pm 1$ or $2n \pm 2$ chromosomes is called [NCERT Exemplar]

- A) polyploidy B) aneuploidy
 C) allopolyploidy D) monosomy

136. An increase in a whole set of chromosomes in an organism is called (Pg. 91, E)

- A) aneuploidy B) linkage
 C) polyploidy D) none of these

137. Condition ($2n + 1$) of chromosomes is known as (Pg. 88, E)

- A) trisomy B) monosomy
 C) polyploidy D) haploidy

138. Match Column-I with Column-II and choose the correct option from the codes given below. (Pg. 88, E)

	Column-I		Column-II
(A)	Deletion	(1)	Loss of a gene or a segment of chromosome
(B)	Duplication	(2)	A segment of chromosome is turned around 180° within a chromosome
(C)	Inversion	(3)	Presence of a gene or segment of chromosome more than once
(D)	Translocation	(4)	Exchange of segments between two homologous chromosomes

Codes-

	A	B	C	D
--	---	---	---	---

A)	1	3	2	4
B)	4	2	3	1
C)	3	1	4	2
D)	2	4	1	3

139. Match Column-I with Column-II and choose the correct option from the codes given below. **(Pg. 91, E)**

	Column-I		Column-II
(A)	Aneuploidy	(1)	An increase in whole set of chromosomes
(B)	Polyploidy	(2)	$2n + 1$
(C)	Trisomy	(3)	Gain or loss of a chromosome
(D)	Monosomy	(4)	$2n - 1$

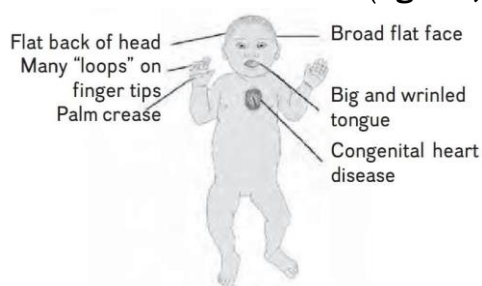
Codes-

	A	B	C	D
A)	1	3	4	2
B)	3	1	2	4
C)	4	2	3	1
D)	2	4	1	3

140. A disease caused by an autosomal primary nondisjunction is **(Pg. 91, E)**

- A) Klinefelter's syndrome
- B) Turner's syndrome
- C) Sickle cell anaemia
- D) Down's syndrome

141. Refer to the given figure. It is showing the characteristic features of **(Pg. 92, E)**



- A) Down's syndrome
- B) Turner's syndrome
- C) Klinefelter's syndrome
- D) None of these

142. The disease caused by the trisomy of chromosome number 21 is **(Pg. 92, E)**

- A) Turner's syndrome
- B) Haemophilia
- C) Klinefelter's syndrome
- D) Down's syndrome

143. An abnormal human baby with 'XXX' sex chromosomes was born due to **(Pg. 92, E)**

- A) formation of abnormal ova in the mother.
- B) fusion of two ova and one sperm.
- C) fusion of two sperms and one ovum.
- D) formation of abnormal sperms in the father.

144. What is the genetic disorder in which an individual has an overall masculine development, gynaecomastia and is sterile? **(Pg. 92, E)**

- A) Turner's syndrome
- B) Klinefelter's syndrome
- C) Edward's syndrome
- D) Down's syndrome

145. In which genetic condition, each cell in the affected person, has three sex chromosomes XXY? **(Pg. 92, E)**

- A) Turner's syndrome
- B) Thalassemia
- C) Klinefelter's syndrome
- D) Phenylketonuria

146. A disorder caused due to the absence of one of the X chromosomes is **(Pg. 92, E)**

- A) Turner's syndrome
- B) Down's syndrome
- C) Klinefelter's syndrome
- D) Edward's syndrome

147. Assertion: The possibility of a female becoming a haemophilic is extremely rare. Reason: For being haemophilic, the mother of such a female has to be at least carrier and the father should be haemophilic. **(Pg. 92, H)**

- A) Both assertion and reason are true and the reason is the correct explanation of assertion.
- B) Both assertion and reason are true but the reason is not the correct explanation of assertion.
- C) Assertion is true but reason is false.
- D) Both assertion and reason are false.

148. Assertion: Aneuploidy is the gain or loss of chromosomes.

Reason: It is caused due to the failure of cytokinesis after telophase stage of cell division. **(Pg. 92, H)**

- A) Both assertion and reason are true and the reason is the correct explanation of assertion.
 - B) Both assertion and reason are true but the reason is not the correct explanation of assertion.
 - C) Assertion is true but reason is false.
 - D) Both assertion and reason are false.
149. Assertion: Klinefelter's syndrome is caused due to the presence of an additional copy of X-chromosome.

Reason: Such individuals are sterile. (**Pg. 92, H**)

- A) Both assertion and reason are true and the reason is the correct explanation of assertion.
- B) Both assertion and reason are true but the reason is not the correct explanation of assertion.
- C) Assertion is true but reason is false.
- D) Both assertion and reason are false.

TG: @Chalnaayaaar

Answer Key

PRINCIPLE OF INHERITANCE AND VARIATION

Q	01	02	03	04	05	06	07	08	09	10
Ans	D	B	A	D	D	A	C	B	C	B
Q	11	12	13	14	15	16	17	18	19	20
Ans	D	D	A	A	D	C	D	B	C	B
Q	21	22	23	24	25	26	27	28	29	30
Ans	D	A	B	B	C	B	A	C	B	A
Q	31	32	33	34	35	36	37	38	39	40
Ans	C	A	B	D	B	A	B	D	B	B
Q	41	42	43	44	45	46	47	48	49	50
Ans	A	D	B	D	C	D	C	C	B	D
Q	51	52	53	54	55	56	57	58	59	60
Ans	B	B	B	B	A	C	B	D	C	C
Q	61	62	63	64	65	66	67	68	69	70
Ans	B	C	A	B	C	B	D	D	C	B
Q	71	72	73	74	75	76	77	78	79	80
Ans	D	D	D	D	D	A	B	A	C	B
Q	81	82	83	84	85	86	87	88	89	90
Ans	C	A	C	C	C	B	D	C	C	A
Q	91	92	93	94	95	96	97	98	99	100
Ans	B	B	D	C	A	D	C	D	B	C
Q	101	102	103	104	105	106	107	108	109	110
Ans	A	A	B	B	D	C	A	D	C	A
Q	111	112	113	114	115	116	117	118	119	120
Ans	B	C	A	B	C	A	B	D	C	D
Q	121	122	123	124	125	126	127	128	129	130
Ans	A	A	B	A	C	C	D	A	B	A
Q	131	132	133	134	135	136	137	138	139	140
Ans	A	B	C	D	B	C	A	A	B	D
Q	141	142	143	144	145	146	147	148	149	
Ans	A	D	A	B	C	A	A	C	B	

TG: @Chalnaayaaar

15

Molecular Basis of Inheritance

- Monomer of nucleic acids are – (Pg. 95, E)
 - Peptides
 - Nucleosides
 - Ribonucleosides
 - None of these
- DNA and RNA are types of – (Pg. 95, E)
 - Nucleotides
 - Nucleosides
 - Nucleic acids
 - Nucleamides

Paragraph 6.1**The DNA**

- Length of DNA is usually defined as- (Pg. 96, E)
 - Number of nucleotides present in it
 - Number of pair of nucleotides present in it
 - Number of base pairs present in it
 - All of these
- Match the length of DNA with the correct organisms – (Pg. 96, M)

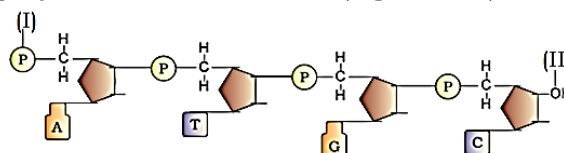
	A		B
I	$\Phi \times 174$	1	4.6×10^6 bp (base pairs)
II	Bacteriophage γ	2	3.3×10^9 bp
III	E. coli	3	48502 bp
IV	Human DNA (haploid)	4	5386 nucleotides

	I	II	III	IV
A)	4	3	1	2
B)	3	4	2	1
C)	4	3	2	1
D)	3	4	1	2

Paragraph 6.1.1**Structure of polynucleotides chain**

- A nucleotides contains – (Pg. 96, E)
 - Hexose sugar + nitrogenous base + phosphate group
 - Pentose sugar + nitrogenous base + phosphate group
 - Hexose sugar + nitrogenous base + sulphate group
 - Pentose sugar + nitrogenous base + sulphate group

- Which of these is a purine – (Pg. 96, E)
 - Cytosine
 - Adenine
 - Thiamine
 - More than one is correct
- Which of these is a pyrimidine – (Pg. 96, E)
 - Adenine
 - Thymine
 - Guanine
 - None of these
- Which of these is a correct combination for a DNA nucleotides (Pg. 96, E)
 - Oxyribose + Phosphate + Uracil
 - Oxyribose + Phosphate + Thymine
 - Deoxyribose + Phosphate + Uracil
 - Deoxyribose + Phosphate + Thymine
- All the given nucleotides exists, except (Pg. 96, E)
 - Deoxy uridine
 - Thymine
 - Both A & B
 - None of these
- Nitrogenous base is linked to which carbon of pentose sugar (Pg. 96, E)
 - 1'C
 - 2'C
 - 3'C
 - 5'C
- Nitrogenous base is linked to pentose sugar by which bond – (Pg. 96, E)
 - N – Glycosidic bond
 - Phosphoester bond
 - Phosphodiester bond
 - Peptide bond
- Phosphate group is linked to which carbon of pentose sugar (Pg. 96, E)
 - 1'C
 - 2'C
 - 3'C
 - 5'C
- Identify the free ends of given polynucleotides chain – (Pg. 96, E)



	I	II
A)	3' phosphate	5' hydroxyl
B)	5' hydroxyl	3' phosphate
C)	5' phosphate	3' hydroxyl
D)	3' hydroxyl	5' phosphate

14. Backbone of polynucleotide chain is formed due to – **(Pg. 97, E)**
 - A) Sugar and N-base
 - B) Sugar and phosphate
 - C) Phosphate and N – Base
 - D) All of these
15. Which is correct about thymine & uracil – **(Pg. 97, E)**
 - A) Uracil is 5-methyl thymine
 - B) Thymine is 5-methyl uracil
 - C) Uracil is 5-ethyl thymine
 - D) Thymine in 5-ethyl uracil
16. DNA is – **(Pg. 97, E)**
 - A) Acidic and positively charged
 - B) Basic and positively charged
 - C) Acidic and negatively charged
 - D) Basic and negatively charged
17. Name of DNA as 'Nuclein' was given by – **(Pg. 97, E)**
 - A) Francis crick
 - B) Erwin Chargaff
 - C) Friedrich Meischer
 - D) Rosalind Franklin
18. Double Helix for structure of DNA model was proposed by – **(Pg. 97, E)**
 - A) Wilkins and Franklin based on their X-ray diffraction data
 - B) Watson and Crick based on their X-ray diffraction data
 - C) Chargaff based on their X-ray diffraction data
 - D) None of these
19. The proposition of base pairing between the two stands of polynucleotide chain in double Helix model of DNA was based on observation of – **(Pg. 97, E)**
 - A) Maurice Wilkins
 - B) Rosalind Franklin
 - C) Erwin Chargaff
 - D) Both A & B
20. The two chains of double Helix DNA have – **(Pg. 97, E)**
 - A) Parallel polarity
 - B) Anti-parallel polarity
 - C) No polarity
 - D) Depends on organism
21. The bases in two stands of DNA are paired through **(Pg. 97, E)**
 - A) Hydrogen bond
 - B) Peptide bond
 - C) Glycosidic bond
 - D) Sulfide bond
22. Which of the following is true about base pairing in DNA – **(Pg. 97, E)**
 - A) Adenine forms two hydrogen bond with Guanine
 - B) Adenine forms three hydrogen bond with Guanine
 - C) Adenine forms two hydrogen bond with Thymine
 - D) Adenine forms three hydrogen bond with Thymine
23. Which of the following is true about base pairing in DNA – **(Pg. 97, E)**
 - A) Guanine forms two H-bond with Cytosine
 - B) Guanine forms three H-bond with Cytosine
 - C) Guanine forms two H-bond with Adenine
 - D) Guanine forms three H-bond with Adenine
24. Uniform distance between two stands of Helix is due to – **(Pg. 97, E)**
 - A) Double and triple bond formed between base pairs
 - B) Sugar – phosphate backbone
 - C) Purine – pyrimidine base pairing
 - D) None of these
25. How many of the following statements about Double – helix structure of DNA is correct – **(Pg. 97, E)**
 - i) Two chains are coiled in right – handed fashion
 - ii) Pitch of helix is 3.6 nm
 - iii) There are roughly 10 bp in each turn
 - iv) Plane of one base pair stacks over the other
 - A) 1
 - B) 2
 - C) 3
 - D) 4
26. Pitch of helix in double helix DNA is – **(Pg. 98, E)**
 - A) 3.6 nm
 - B) 3.4 nm
 - C) 3.2 nm
 - D) 3.8 nm
27. Central dogma in molecular biology was proposed by – **(Pg. 98, E)**
 - A) Crick
 - B) Watson
 - C) F. Meischar
 - D) Chragaff
28. Identify correct labels – **(Pg. 98, E)**



	(i)	(ii)	(iii)
A)	Replication	Translation	Transcription
B)	Replication	Transcription	Translation
C)	Transcription	Replication	Translation
D)	Translation	Replication	Transcription

Paragraph 6.1.2

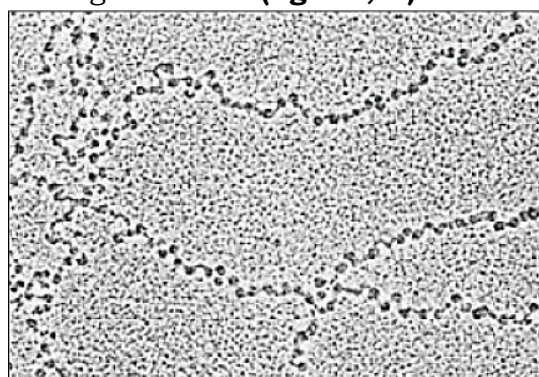
Packaging of DNA Helix

29. If length of *E. coli* DNA is 1.36 mm, calculate number of base pair in *E. coli*? Given – distance between consecutive base pairs is 0.34×10^{-9} m. – **(Pg. 99, E)**
- A) 4×10^6 B) 4×10^9
 C) 4×10^{-6} D) 4×10^{12}
30. **Assertion** : In *E. coli*, DNA is scattered throughout the cell
Reason : In *E. coli*, there is no defined nucleus **(Pg. 99, M)**
- A) Both Assertion & Reason are correct & Reason is correct explanation for Assertion
 B) Both Assertion & Reason are correct but Reason is not correct explanation for Assertion
 C) Assertion is correct and Reason is incorrect
 D) Reason is correct and Assertion is incorrect
31. Histones are – **(Pg. 99, E)**
- A) Positive and acidic in eukaryotes
 B) Positive and acidic in prokaryotes
 C) Positive and basic in eukaryotes
 D) Positive and basic in prokaryotes
32. **Assertion** – Histones are positively charged
Reason – Histones are rich in basic amino acid residues lysine and arginine **(Pg. 99, M)**
- A) Assertion & Reason are correct and Reason is correct explanation for Assertion
 B) Assertion & Reason are correct and Reason is not the correct explanation for Assertion

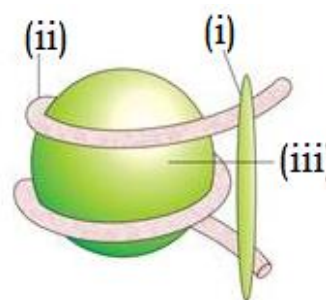
C) Assertion is correct and Reason is wrong

D) Both Assertion and Reason are wrong

33. Histones are organized into – **(Pg. 99, E)**
- A) Hexamer B) Octamer
 C) Tetramer D) Dimer
34. A typical nucleosome contain ____ bp of DNA has **(Pg. 99, E)**
- A) 200 B) 400
 C) 600 D) 800
35. Repeating unit of chromatin – **(Pg. 99, E)**
- A) Are nucleosomes
 B) Are seen as 'beads-on-string' under electron microscope
 C) Are packed to form fibres
 D) All of these
36. The figure show – **(Pg. 99, E)**



- A) Beads-on-string
 B) A nucleosome
 C) Chromatin
 D) More than one option is correct
37. Identify the correct label for given figure **(Pg. 99, M)**



	(i)	(ii)	(iii)
A)	H ₂ histone	DNA	Histone octamer
B)	H ₁ histone	Histone octamer	DNA
C)	H ₂ histone	Histon octamer	DNA
D)	H ₁ histone	DNA	Histone octamer

38. Chromosomes are connected chromatin fibres present – **(Pg. 99, E)**
 A) At all times in cell
 B) Only during cell division – formed at prophase
 C) Only during cell division – formed at metaphase
 D) Only during cell division – formed at Interphase
39. In a typical nucleus, euchromatin & heterochromatin are present. Choose the correct set of characters for heterochromatin – **(Pg. 99, E)**
 i) Loosely packed
 ii) Densely packed
 iii) Light stain
 iv) Dark stain
 v) Inactive chromatin
 vi) Active chromatin
 A) i, iii, v B) ii, iv, vi
 C) i, iii, vi D) ii, iv, v
40. Choose correct set of characters for euchromatin **(Pg. 99, E)**
 i) Loosely packed
 ii) Densely packed
 iii) Light stain
 iv) Dark stain
 v) Inactive chromatin
 vi) Active chromatin
 A) i, iii, v B) ii, iv, vi
 C) i, iii, vi D) ii, iv, v

6.2 The Search for Genetic Material

Transforming Principle

41. Griffith's experiments were conducted in- **(Pg. 100, E)**
 A) 1928 B) 1958
 C) 1978 D) 1968
42. The experiment of Griffith was performed in- **Pg. 100, E)**
 A) *Diplococcus pneumoniae*, bacteria
 B) *Haemophilus influenzae*, fungi
 C) *Streptococcus pneumoniae*, fungi
 D) None of these
43. Match the given columns- **Pg. 100, M)**

I	II	III
---	----	-----

i.	R-strain	(a)	Smooth	(1)	Mucous coat
ii.	S-strain	(b)	Rough colonies	(2)	No mucous coat

- A) (i)-(a)-(1) B) (i)-(b)-(1)
 C) (ii)-(a)-(1) D) (ii)-(a)-(2)
44. Which strain of the microbe used Griffith is virulent- **Pg. 100, E)**
 A) S-strain B) R-strain
 C) Both D) None
45. Griffith observed that the mice died surprisingly the following combination of strains was used, which was unusual- **Pg. 100, E)**
 A) S-strain heat killed
 B) Heat killed S-strain
 C) Heat killed R-strain + Live S-strain
 D) Heat killed S-strain + Live R-strain
46. In Griffith experiment **(Pg. 100, E)**
 A) R-strain transformed to S-strain and became virulent
 B) R-strain transformed to S-strain and lost virulence
 C) S-strain transformed to R-strain and became virulent
 D) S-strain transformed to R-strain and lost virulence
47. Griffith claimed that- **(Pg. 100, E)**
 A) Some protein was transferred among bacteria
 B) Some DNA was transferred among bacteria
 C) Some carbohydrates was transferred among bacteria
 D) None of these

Biochemical Characterization of Transforming Principle

48. Prior to work of Avery, Macleod and McCarty, genetic material was thought to be- **(Pg. 100, E)**
 A) Protein B) DNA
 C) RNA D) None
49. Avery, Macleod & McCarty discovered that- **(Pg. 100, E)**
 A) DNA caused transformation
 B) RNA caused transformation
 C) Protein caused transformation

- D) Lipid caused transformation
50. Which enzyme inhibited the transformation-**(Pg. 101, E)**
- A) Protease B) RNase
C) DNase D) All

6.2.1 The Genetic Material is DNA

51. Unequivocal proof that DNA is genetic material came from experiments of-**(Pg. 101, E)**
- A) Avery, Macleod & McCarty
B) Hershey and Chase
C) de Vries, Correns and Tschermak
D) Sutton and Boveri
52. The scientists of Q-11 worked with- **(Pg. 101, E)**
- A) a virus B) a bacteria
C) a fungi D) a nematode
53. In the experiment performed for proving DNA as genetic material, the bacteriophages were grown on medium containing- **(Pg. 101, E)**
- A) radioactive sulfur
B) radioactive nitrogen
C) radioactive phosphorous
D) More than one option
54. The bacteriophages growing in presence of radioactive phosphorous __ (i) __ contained radioactive __ (ii) __. **(Pg. 101, E)**

(i) **(ii)**

- A) P₃₂ DNA
B) P₃₅ Protein
C) P₃₂ Protein
D) P₃₅ DNA

55. Bacteriophages grown on radioactive Sulphur __ (i) __ contained radioactive __ (ii) __. **(Pg. 101, E)**

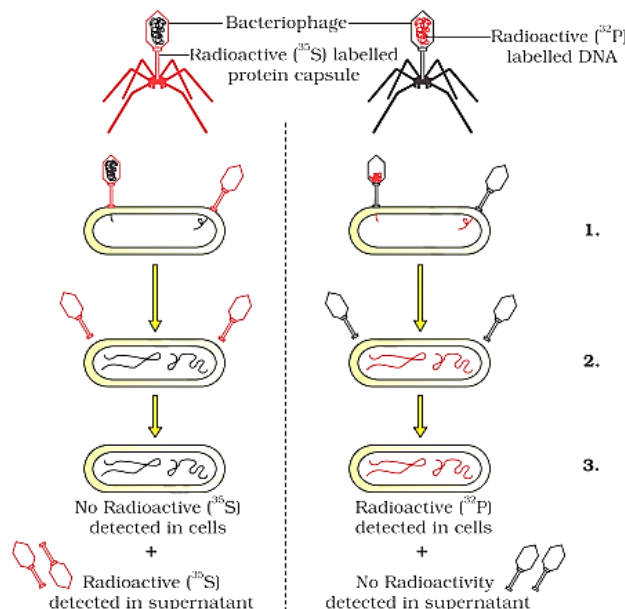
(i) **(ii)**

- A) S₃₂ DNA
B) S₃₂ Protein
C) S₃₅ DNA
D) P₃₅ Protein

56. The bacteria involved in Hershey & chase experiment of 1952 was- **(Pg. 102, E)**
- A) Bacteriophage
B) E. coli
C) S. pneumoniae
D) C. butyliwm

57. Bacteria infected with virus that showed radioactivity had- **(Pg. 102, E)**
- A) radioactive DNA (S₃₂)
B) radioactive DNA (S₃₅)
C) radioactive DNA (P₃₂)
D) radioactive DNA (P₃₅)

58. **(Pg. 102, E)**



Identify the correct label.

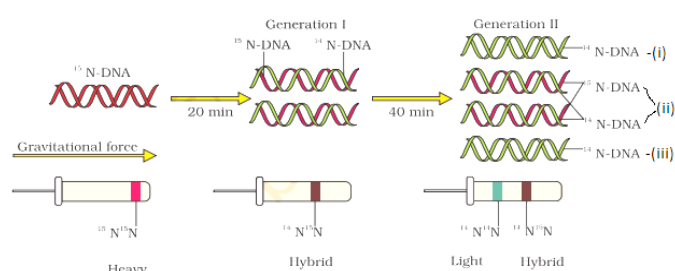
	1	2	3
A)	Blending	Infection	Centrifugation
B)	Infection	Blending	Centrifugation
C)	Centrifugation	Infection	Blending
D)	Blending	Centrifugation	Infection

6.2.2 Properties of Genetic Material (DNA vs RNA)

59. RNA is genetic material in- **(Pg. 102, E)**
- A) TMV
B) QB Bacteriophage
C) Both A and B
D) None of these
60. Properties of genetic material include- **(Pg. 103, E)**
- A) Stable B) Mutable
C) Replicable D) All of these
61. A - Stability as a property of genetic material was very evident in Griffith's transforming principle.

- A) UV rays
B) Ethidium bromide solution
C) Centrifugation in CsCl density gradient
D) PCR technique
73. In Meselson & Stahl experiment, first they- **(Pg. 105, E)**
A) grew bacteria on heavy isotope of N medium followed by normal one
B) grew bacteria on normal isotope of N medium followed by heavy one
C) grew bacteria on radioactive N followed by Heavy one
D) grew bacteria on heavy isotope of N followed by radioactive one

74. **(Pg. 105, E)**



Identify the correct label

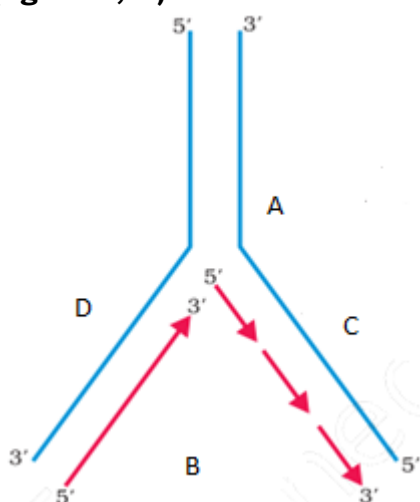
	(i)	(i)	(iii)
A)	Light	Heavy	Hybrid
B)	Heavy	Hybrid	Light
C)	Light	Hybrid	Light
D)	Heavy	Hybrid	Heavy

75. In Meselson & Stahl expt a bacteria after dividing in 20 minutes had a hybrid DNA. What will be the ratio of Hybrid to Light after 80 minutes? **(Pg. 105, E)**
A) 2 : 14
B) 14 : 2
C) 16 : 2
D) 2 : 16
76. Similar experiment on Vicia faba was conducted by ____ to detect distribution of newly synthesized DNA in chromosomes. **(Pg. 106, E)**
A) Taylor
B) Stahl
C) Gamow
D) Nirenberg
77. Experiment on Vicia faba involved use of- **(Pg. 106, E)**
A) Radioactive uridine
B) Radioactive thymidine
C) Radioactive adenosine
D) Radioactive cytidine

6.4.2 The Machinery and the Enzymes

78. The main enzyme of replication is-**(Pg. 106, E)**
A) RNA dependent RNA polymerase
B) RNA dependent DNA polymerase
C) DNA dependent DNA polymerase
D) DNA dependent RNA polymerase
79. Choose correct statement with regard with efficiency of DNA polymerase. **(Pg. 106, E)**
A) 4.6×10^6 bp of E. coli replicate within 46 minutes
B) The average rate of polymerization of DNA polymerase has to be approximately 2000 bp/minute
C) The polymerization accuracy is very high and very fast
D) All of these
80. What is function of deoxyribonucleoside triphosphate-**(Pg. 106, E)**
A) It act as substrate
B) Provide energy for polymerization
C) A and B both
D) It is product formed after polymerization
81. Assertion : The two strands of DNA cannot be separated in their length.
Reason : Separation required very high energy. **(Pg. 106, E)**
A) Both Assertion & Reason are correct and reason is correct explanation of assertion
B) Both Assertion & Reason are correct and reason is not correct explanation of assertion
C) Assertion is correct, Reason is false
D) Assertion & Reason are false
82. Polymerization by DNA polymerase is in- **(Pg. 106, E)**
A) 3' → 5' direction only
B) 5' → 3' direction only
C) A and B both
D) Random
83. The template of replication fork with polarity 5' → 3' is ____ while 3' → 5' is _____. **(Pg. 106, E)**
A) continuous, continuous
B) continuous, discontinuous
C) discontinuous, continuous
D) discontinuous, discontinuous
84. DNA ligase act on-**(Pg. 106, E)**
A) 5' → 3' template strand

- B) 3' → 5' template strand
 C) Both A and B
 D) Ligate RNA with vector of 3' → 5' polarity
85. The replication in eukaryotes takes place in- **(Pg. 106, E)**
 A) M-phase B) G₁ phase
 C) S-phase D) G₂ phase
86. Polyploidy results from- **(Pg. 106, E)**
 A) A failure in cell division after DNA replication
 B) A failure in DNA replication after cell division
 C) A failure in cell division before DNA replication
 D) A and C both
87. **(Pg. 107, E)**



Correct label of A, B, C, D is-

- (i) A = Template parental strand
 (ii) B = Newly synthesized strand
 (iii) D = Continuous strand
 (iv) C = Discontinuous strand
- A) i, ii only B) iii, iv only
 C) i, ii, iii, iv D) None of these

6.5 Transcription

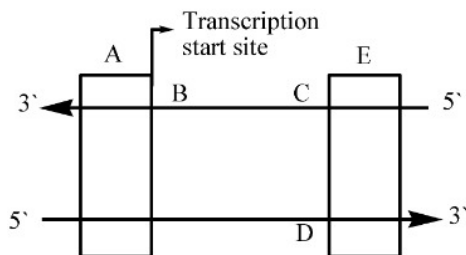
88. Transcription is- **(Pg. 107, E)**
 A) The process of copying genetic information from both strands of DNA into RNA
 B) The process of copying genetic information from one strand of DNA into RNA
 C) The process of copying genetic information from RNA into DNA
 D) A and B both

89. In transcription, adenosine binds with **(Pg. 107, E)**
 A) Thymine B) Uracil
 C) Cytosine D) A and B both
90. Why are both strands of DNA not copied during transcription- **(Pg. 107, E)**
 A) If both strands act as a template, they would code for RNA molecules with the same sequence
 B) RNA formed by transcription of both strands, when coding for protein, the sequence of amino acids in the protein are the same
 C) The two RNA molecules if produced simultaneously would be complementary to each other
 D) All of these
91. Translation of RNA would be prevented if- **(Pg. 107, E)**
 A) RNA is a single strand
 B) RNA is double-stranded
 C) RNA is produced by both strands of DNA
 D) B and C both

6.5.1 Transcription Unit

92. A transcription unit primarily consists of- **(Pg. 107, E)**
 A) 1 region B) 2 regions
 C) 3 regions D) None of these
93. Transcription primarily requires- **(Pg. 107, E)**
 A) RNA dependent RNA polymerase
 B) DNA dependent RNA polymerase
 C) DNA dependent DNA polymerase
 D) RNA dependent DNA polymerase
94. The template strand of a transcription unit is/are- **(Pg. 108, E)**
 A) 5' → 3' strand of DNA
 B) 3' → 5' strand of DNA
 C) Site of catalysis of the enzyme required for transcription
 D) B and C both
95. What is the coding strand of the given template strand
 3' – AGCATGCA – 5' **(Pg. 108, E)**
 A) 5' – TACGTACGT – 3'
 B) 5' – UACGUACGU – 3'
 C) 3' – UACGUACGU – 5'
 D) 3' – TACGTACGT – 5'

96. Label A, B, C, D, E of given diagram. (Pg. 108, E)



	a	b	c	d	e
A)	Promoter	Structural gene	Template strand	Coding strand	Terminator
B)	Terminator	Structural gene	Coding strand	Template strand	Promoter
C)	Promoter	Template strand	Coding strand	Structural gene	Terminator
D)	None of these				

97. Promoter is located-(Pg. 108, E)

- (i) 3' end
- (ii) 5' end
- (iii) upstream of structural gene
- (iv) downstream of structural gene
- A) i, iii
- B) ii, iii
- C) i, iv
- D) ii, iv

98. Terminator is located at (Pg. 108, E)

- (i) 3' end
- (ii) 5' end
- (iii) upstream of structural gene
- (iv) downstream of structural gene
- A) i, iii
- B) ii, iii
- C) i, iv
- D) ii, iv

6.5.2 Transcription unit and the gene

99. A gene is defined as- (Pg. 108, E)

- A) Functional unit of inheritance
- B) Non-functional region of DNA that haven't any information
- C) A and B both
- D) None of these

100. Cistron is- (Pg. 109, E)

- A) Segment of DNA coding for a polypeptide
- B) Segment of RNA coding for a polypeptide

C) Segment of DNA that are non-coding sequence

D) Segment of RNA have not any coding sequence

101. Choose the correct statement. (Pg. 109, E)

- A) Monocistronic eukaryotic structural gene have interrupted coding sequence.
- B) Polycistronic prokaryotic structural gene have interrupted coding sequence.
- C) Monocistronic prokaryotic structural gene have interrupted coding sequence.
- D) A and B both

102. Exons are- (Pg. 109, E)

- A) Coding sequence
- B) Non-coding sequence
- C) Expressed sequence
- D) A and C both

103. Intron- (Pg. 109, E)

- A) appear is mature or processed RNA
- B) do not appear in mature or processed RNA
- C) appear is prokaryotes
- D) B and C both

6.5.3 Types of RNA & Process of Transcription

104. Which of following play role is protein synthesis of prokaryote? (Pg. 109, E)

- A) r-RNA
- B) t-RNA
- C) m-RNA
- D) All of these

105. The function of some RNA are given below choose the incorrect one. (Pg. 109, E)

- A) mRNA provide template strand
- B) mRNA provide non-template strand
- C) tRNA bring amino acid
- D) rRNA play structural & catalytic role

106. How many polymerase required is bacteria for transcription of all type of RNA?

(Pg. 109, E)

- A) One
- B) Two
- C) Three
- D) Five

107. Choose incorrect step about transcription.

(Pg. 109, E)

- A) RNA polymerase binds to promoter and initiate transcription.

- B) Nucleotide triphosphate act as substrate and polymerization in a template.
 C) A short stretch of RNA remains bound to enzyme.
 D) Last step is termination.
108. Initiation factor and termination factor are- **(Pg. 110, E)**
 A) Sigma and Rho factor respectively.
 B) Rho and Sigma factor respectively.
 C) Rho and Rho factor respectively.
 D) Sigma and Sigma factor respectively.
109. Translation & transcription in eukaryote occur in **(Pg. 110, E)**
 A) Cytoplasm & nucleus respectively
 B) Nucleus & cytoplasm respectively
 C) Cytosol
 D) Nucleus
110. Which of following can be coupled in bacteria? **(Pg. 110, E)**
 A) Replication & transcription
 B) Transcription & translation
 C) Replication & translation
 D) None of these
111. Transcription of 18 s rRNA is done by ____ in eukaryote. **(Pg. 111, E)**
 A) RNA pol. I B) RNA pol. II
 C) RNA pol. III D) All of these
112. Choose incorrect statement. **(Pg. 111, E)**
 A) 5.8 s r-RNA and 5 s-RNA transcribes by same RNA polymerase in eukaryote.
 B) hnRNA & mRNA transcribe by same RNA polymerase in eukaryote.
 C) tRNA & snRNA transcribes by same RNA polymerase in eukaryote.
 D) None of these
113. Splicing is required to- **(Pg. 111, E)**
 A) remove intron in eukaryote
 B) remove exon in eukaryote
 C) remove exon in prokaryote
 D) remove intron in prokaryote
114. Capping is- **(Pg. 111, E)**
 A) Addition of methyl guanosine triphosphate at 5' end
 B) addition of adenylate residue at 3' end
 C) addition of methyl guanosine triphosphate at 3' end
 D) addition of adenylate residue at 5' end
115. The fully processed hnRNA is- **(Pg. 111, E)**
 A) tRNA B) mRNA

- C) rRNA D) None of these

6.6 Genetic Code

116. George Gamow argued- **(Pg. 111, E)**
 A) There are only 5 bases and if they have code for 20 amino acid the code should constitute a combination of bases
 B) There are only 4 bases and if they have code for 20 amino acid the code should constitute a combination of bases
 C) Genetic code is triplet
 D) B and C
117. Which of following have maximum codon in genetic code-**(Pg. 112, E)**
 A) Leu B) Met
 C) Cal D) Phe
118. Which of following is/are showing dual function-**(Pg. 112, E)**
 A) UUU B) AUG
 C) UGA D) GUA
119. Least number of codon is for- **(Pg. 112, E)**
 A) Met B) Phe
 C) Glu D) Gly

6.6.1 Mutations and Genetic Code

120. Sickle cell anaemia is classical example of- **(Pg. 113, E)**
 A) point mutation
 B) frameshift mutation
 C) deletion mutation
 D) addition mutation
121. In sickle cell anaemia, there are changes in gene for- **(Pg. 113, E)**
 A) alpha globin chain
 B) beta globin chain
 C) gamma globin chain
 D) delta globin chain
122. In sickle cell anaemia, resultant effect of mutation is change of amino acid residue- **(Pg. 113, E)**
 A) Valine to alanine
 B) Valine to glutamic acid
 C) Alanine to valine
 D) Glutamic acid to valine
123. The following is an example of- **(Pg. 113, E)**
 BIG RED CAP $\Rightarrow$ BIG REM DCA P
 A) Deletion mutation
 B) Point mutation
 C) Addition mutation

D) More than one option

124. RAM HAS CAP $\Rightarrow$ RAM HAS BIG CAP
(Pg. 113, E)

The given example shows-

- A) Addition mutation
- B) Deletion mutation
- C) Substitution mutation
- D) More than one option

6.6.2 tRNA – the Adapter Molecule

125. tRNA has- (Pg. 114, E)

- A) Codon loop
- B) Anticodon loop
- C) Both
- D) Neither

126. The presence of adapter molecule to read the code on DNA and bind to amino acids was postulated by- (Pg. 114, E)

- A) James Watson
- B) Francis Crick
- C) Friedrich Meisher
- D) Both A and B

127. tRNA was also called- (Pg. 114, E)

- A) s RNA (soluble RNA)
- B) s RNA (single RNA)
- C) s RNA (smart RNA)
- D) s RNA (simple RNA)

128. The amino acid acceptor end of tRNA is- (Pg. 114, E)

- A) 5'
- B) 3'
- C) Can be any of these
- D) Free end

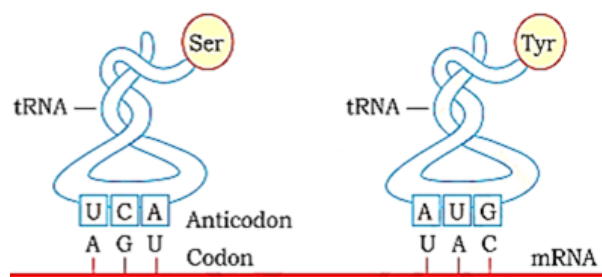
129. For initiation translation, (Pg. 114, E)

- A) Only tRNA carries initiator amino acid to the site.
- B) Specific rRNA carries initiator amino acid to the site.
- C) Any rRNA carries initiator amino acid to the site.
- D) Specific tRNA carries initiator amino acid to the site.

130. For stop codon- (Pg. 114, E)

- A) There are specific tRNAs with amino acids.
- B) There are specific tRNAs which do not bind to any amino acids.
- C) There are no tRNA.
- D) There are tRNAs which may or may not bind to amino acids.

131. (Pg. 114, E)



The given figure shows-

- A) Secondary structure of tRNA – Clover-leaf
- B) Primary structure of tRNA – clover-leaf
- C) Secondary structure of tRNA – inverted-L
- D) Primary structure of tRNA – inverted-L

6.7 Translation

132. Translation refers to process of- (Pg. 114, E)

- A) Making RNA from DNA
- B) Making DNA from RNA
- C) Polymerization of nucleotide to form a DNA
- D) Polymerization of amino acid to form a polypeptide

133. The order and sequence of amino acid during translation are defined by- (Pg. 114, E)

- A) The sequences of bases in r-RNA
- B) The sequences of bases in t-RNA
- C) The sequences of bases in m-RNA
- D) All of these

134. Which of following bond is formed during translation? (Pg. 115, E)

- A) Glycosidic bond
- B) Phosphodiester bond
- C) Peptide bond
- D) All of these

135. First phase of translation does not involve- (Pg. 115, E)

- A) Charging of RNA
- B) Amino acids are activated in presence of ATP
- C) Activated amino acid are linked to their cognate tRNA
- D) None of these

136. Initiation or first phase of translation is- (Pg. 115, E)

- A) Amino acylation of tRNA
- B) Amino acylation of mRNA

- C) Both A and B
D) Deamino acylation of mRNA
137. The cellular factory responsible for synthesizing protein is- (**Pg. 115, E**)
A) Ribosome B) Lysosome
C) Peroxisome D) None of these
138. In inactive state, protein factory of cell exist in (**Pg. 115, E**)
A) Two state
B) 4 state in prokaryote
C) 6 state in eukaryote
D) B and C both
139. Which of following is sign as beginning of translation? (**Pg. 115, E**)
A) When the large subunit of protein factory of cell encounters an mRNA.
B) When the small subunit of protein factory of cell encounters an mRNA.
C) When the small subunit of protein factory of cell encounter a tRNA.
D) When the large subunit of protein factory of cell encounters a tRNA.
140. The bond formation (peptide) between charged tRNA is accomplished due to- (**Pg. 115, E**)
A) Presence of ATP and catalyst
B) Two such charged tRNA are brought close by two site in large subunit of ribosome
C) Two charged tRNA are brought close by two site in small subunit of ribosome & presence of ATP along with catalyst
D) A and B both
141. The ribosome act as catalyst during bond formation (peptide) as in- (**Pg. 115, E**)
A) 28 s rRNA in bacteria
B) 23 s rRNA in bacteria
C) 23 s rRNA in eukaryote
D) 28 s tRNA in bacteria
142. Choose the correct statement- (**Pg. 115, E**)
A) A translational unit in mRNA is sequence of RNA that is flanked by start codon and stop codon and codes for polypeptide.
B) A translational unit is sequence of DNA that is flanked by start codon & codes for polypeptide.
C) A transcriptional unit in tRNA is the sequence of RNA that is flanked by start codon and stop codon and codes for polypeptide.
D) A transcriptional unit in rRNA is the sequence of RNA that is flanked by start codon (AUG) and stop codon and codes for polypeptide.
143. UTR is/are- (**Pg. 115, E**)
(i) Untranslated region of mRNA
(ii) It present at both 5' end (start codon) and 3' end (before stop codon)
(iii) They are required for efficient translation process
(iv) It present at both 3' end (before start codon) and 3' end (after stop codon)
A) i, ii, iii are correct
B) i, ii, iii and iv are correct
C) i, iii, iv are correct
D) i, iii are correct
144. Initiator tRNA binds with (**Pg. 115, E**)
A) AUG codon of mRNA
B) at initiation of protein synthesis
C) ATG codon of dsDNA
D) A and B both
145. Choose the correct about elongation of translation- (**Pg. 115, E**)
A) Complexes composed of an amino acid linked to tRNA, sequentially bind to appropriate codon in mRNA by forming complementary base pairs with the tRNA anticodon
B) The ribosome moves from codon to codon along the mRNA in (3' → 5').
C) Complexes composed of an amino acid linked to tRNA, sequentially bind to appropriate anticodon in mRNA by forming complementary base pair with tRNA codon.
D) A and B both
146. Termination of translation complex is done when- (**Pg. 115, E**)
A) Release factor binds with stop codon (AUG)
B) Release factor binds with UGA like codon
C) Complete translation of DNA including UTR occurs in eukaryotes
D) B and C both

6.8 Regulation of Gene Expression

147. Gene regulation in eukaryotes is exerted at- **(Pg. 115, E)**
 A) Formation of primary transcript
 B) Transport of mRNA from nucleus to cytoplasm
 C) A and B both
 D) Regulation of splicing of tRNA
148. β -galactosidase is used to catalyze the hydrolysis of **(Pg. 116, E)**
 A) Lactose into galactose and glucose
 B) Lactose into fructose & glucose
 C) Lactose into fructose & fructose
 D) None of these
149. E. coli do not have lactose around them to utilize for energy source, they would- **(Pg. 116, E)**
 A) No longer require the synthesis of enzyme α -galactosidase
 B) Synthesized enzyme β -galactosidase
 C) Die due to lack of carbon source and energy source
 D) None of these
150. In prokaryotes, predominant site for control of gene expression is- **(Pg. 116, E)**
 A) Control of rate of transcriptional initiation
 B) Control of rate of translational
 C) Control of rate of transcriptional elongation
 D) B and C both
151. Given below are statements. Choose the incorrect statement. **(Pg. 116, M)**
 A) The development and differentiation of embryo into adult organisms are result of coordinated regulation of expression of several sets of genes.
 B) Regulatory proteins act positively in activator.
 C) In a transcriptional unit the activity of RNA polymerase at a given promoter is in turn regulated by interaction with accessory protein.
 D) None of these
152. Operator- **(Pg. 116, E)**
 A) Region adjacent to sequence by which repressor mRNA formed
 B) Bind with repressor protein
 C) Bind with inducer
 D) A and B both
153. Each operon has- **(Pg. 116, E)**

- A) Same operator and same repressor
 B) Same operator but specific repressor
 C) Specific operator but same repressor
 D) Specific operator and specific repressor

6.8.1 The Lac operon

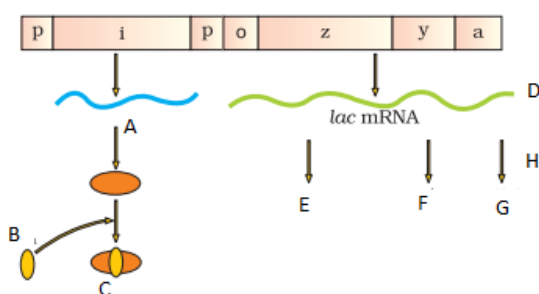
154. Lac operon was studied first by- **(Pg. 116, E)**
 A) Francois Jacob
 B) Jacques Monod
 C) Geneticist and Biochemist
 D) None of these
155. Lac operon is/are- **(Pg. 116, E)**
 A) Monocistronic structural gene is regulated by a common promoter & regulatory genes.
 B) Polycistronic structural gene is regulated by a common promoter & regulatory genes.
 C) Consist of one regulatory gene, monocistronic structural gene having five genes along with promoter & operator.
 D) A and C both
156. Regulatory gene of lac-operon is- **(Pg. 116, E)**
 A) p-gene
 B) i-gene
 C) o-gene
 D) z-gene
157. i in i-gene stands for- **(Pg. 116, E)**
 A) inducer
 B) inhibitor
 C) A and B both
 D) Inactive repressor
158. Match Column-I & Column-II. **(Pg. 116, E)**

Column-I (Gene)		Column-II (Product)	
(a)	Z-gene	(i)	Repressor mRNA
(b)	a-gene	(ii)	β -gal
(c)	Y-gene	(iii)	Permease
(d)	i-gene	(iv)	Transacetylase

- | | | | | |
|----|----------|----------|----------|----------|
| | a | b | c | d |
| A) | (iii) | (ii) | (iv) | (i) |
| B) | (iv) | (iii) | (ii) | (i) |
| C) | (i) | (ii) | (iv) | (iii) |
| D) | (ii) | (iv) | (iii) | (i) |

159. The monomeric product of lactose is chiefly hydrolyzed by- **(Pg. 116, E)**

- A) i-gene B) z-gene
C) a-gene D) y-gene.
160. Lac in lac-operon is for **(Pg. 116, E)**
A) Monosaccharide
B) Disaccharide
C) Polysaccharide
D) Insect
161. In absence of preferred carbon source, if lactose is provided in growth medium of bacteria, the lactose is transported into cell through by action of product formed by- **(Pg. 117, E)**
A) i-gene B) z-gene
C) a-gene D) y-gene
162. Allolactose is- **(Pg. 117, E)**
A) Inducer of lac-operon
B) Inductive repressor
C) Form of lactose that bind with product of repressor mRNA and inhibit transcription of structural gene
D) All of these
163. Lac operon is- **(Pg. 117, E)**
A) Negative regulation operon
B) Positive regulation operon
C) A and B both
D) None of these
164. Inducer of lac-operon is- **(Pg. 117, E)**
A) Glucose B) Galactose
C) Lactose D) Fructose
165. **(Pg. 117, M)**



- A) The given diagram is in presence of lactose
B) The given diagram is in absence of lactose
C) The given diagram is of gene off
D) D and H is same process

6.9 6.9 Human Genome Project (HGP)

166. HGP was launched in- **(Pg. 118, E)**
A) 1980 B) 1970
C) 1990 D) 2000

167. HGP was called a- **(Pg. 118, E)**
A) Minor project
B) Hexagonal project
C) Mega project
D) None of these
168. Human genome has approx. _____ bp. **(Pg. 118, E)**
A) 3×10^9 B) 3×10^6
C) 6×10^9 D) 6×10^6
169. If cost of sequencing required is US \$ 3 per bp, then total cost of sequencing human genome as per 8-3 will be: **(Pg. 118, E)**
A) US \$ 18 billion
B) US \$ 9 billion
C) US \$ 18 million
D) US \$ 9 million

Goals of HGP

170. There were approx. ____ genes in human DNA, as per the goals of HGP **(Pg. 118, E)**
A) 20,000 – 25,000
B) 40,000 – 45,000
C) 10,000 – 15,000
D) 50,000 – 60,000
171. HGP was a ____ year project **(Pg. 118, E)**
A) 15 B) 12
C) 13 D) 14
172. HGP was coordination by- **(Pg. 118, E)**
A) US department of engineering & national institute of health
B) US department of engineering and national institute of biotechnology
C) US department of energy and national institute of biotechnology
D) US department energy and National Institute of Health
173. The ____ of U.K was a major partner of HGP **(Pg. 118, E)**
A) Wellcome trust
B) Health trust
C) Social trust
D) Welcome trust
174. Project was completed in- **(Pg. 118, E)**
A) 2005 B) 2004
C) 2003 D) 2002
175. Additional contributes to HGP was- **(Pg. 118, E)**
A) Japan B) China
C) Germany D) All of these
176. Caenorhabditis elegans is a- **(Pg. 119, E)**

- A) Fungi B) Nematode
C) Bacteria D) Virus
177. *Caenorhabditis elegans* is- **(Pg. 119, E)**
A) Free living , non-pathogenic
B) Parasitic , pathogenic
C) Free living , pathogenic
D) Parasitic , non-pathogenic
178. Methods / approaches of HGP include- **(Pg. 119, E)**
A) Excess sequence tags
B) Expressed sequence tags
C) Exercise sequence tags
D) Exerted sequence tags
179. Sequence annotations refer to- **(Pg. 119, E)**
A) Identifying all genes expressed as RNA and then sequencing then
B) Sequencing the whole set of genome and then assigning different regions with functions
C) Identifying and sequencing the genome simultaneously
D) More than one option is correct
180. For sequencing, the DNA is- **(Pg. 119, E)**
A) Partially extracted from cell
B) Totally isolated from cell
C) Not needed to isolated from cell
D) None of these
181. The DNA for sequencing is converted to fragments of small size. The fragments are made- **(Pg. 119, E)**
A) On a pre – decided basis
B) On a pre – defined basis
C) Randomly
D) Depending upon organism
182. The step in DNA sequencing after fragmentation of DNA is- **(Pg. 119, E)**
A) Cloning in host using vectors
B) Cloning in vectors using host
C) Amplification of DNA fragments
D) More than one option
183. Commonly used hosts for DNA cloning include- **(Pg. 119, E)**
A) Bacteria B) BAC
C) YAC D) Both A and C
184. BAC stands for- **(Pg. 119, E)**
A) Bacterial artificial colour
B) Binominal artificial characterization
C) Bacterial artificial chromosome
D) Bacterial articular chromosome
185. Fragments were sequenced using automated DNA sequence that worked on principle of a method developed by- **(Pg. 119, E)**
A) Erwin Chargaff
B) Marshal Nirenberg
C) Frederick Sanger
D) George Gamow
186. Method for determination of amines acid sequence in protein was developed by- **(Pg. 119, E)**
A) Erwin Chargaff
B) Marshal Nirenberg
C) Frederick Sanger
D) George Gamow
187. The last of the 24 human chromosomes to be sequenced was- **(Pg. 120, E)**
A) Chromosome 1
B) Chromosome X
C) Chromosome 22
D) Chromosome Y

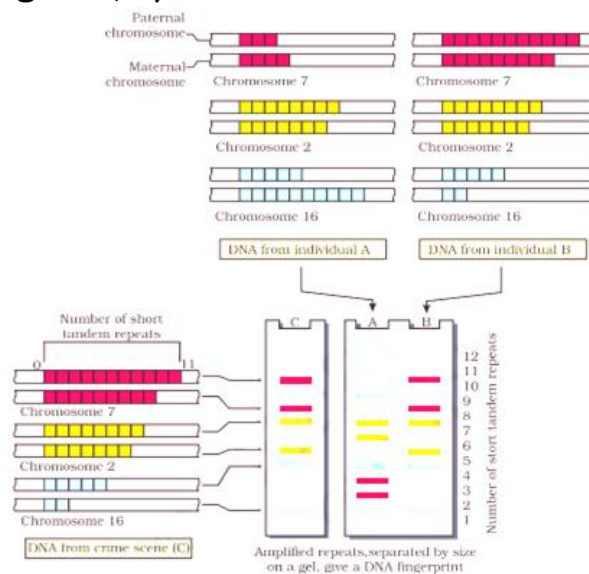
6.9.1 Salient Features of Human Genome

188. According to HGP, human genome contains-
A) ~ 3000 million bp
B) ~ 6000 million bp
C) ~ 9000 million bp
D) ~ 1000 million bp
189. Dystrophin was found to be-
A) Largest known human gene with 2.4 million bases
B) Smallest known human gene with 2.4 million bases
C) Largest known human gene with 4.8 million bases
D) Smallest known human gene with 4.8 million bases
190. Which chromosome was found to have most genes- **(Pg. 120, E)**
A) Chr 22 B) Chr 1
C) Chr 5 D) Chr Y
191. Which chromosome was found to have fewest genes- **(Pg. 120, E)**
A) Chr X B) Chr Y
C) Chr 1 D) Chr 5

6.10 DNA Finger printing

192. The DNA sequence in which small stretch of DNA is repeated many times is called- **(Pg. 121, E)**
 A) SNP
 B) Repetitive DNA
 C) Polymorphic DNA
 D) More than one option
193. Satellite DNA classified into different categories like micro - satellite , mini - satellite , etc based on- **(Pg. 121, E)**
 A) Length of segment
 B) Number of repetitive
 C) Base composition
 D) All of these
194. Polymorphism arises due to- **(Pg. 121, E)**
 A) Mutation – inheritable
 B) Stability of genetic material
 C) Mutation - non-heritable
 D) All of these
195. DNA polymorphism is observed more in- **(Pg. 122, E)**
 A) non-coding DNA sequence as its mutation affects reproduction
 B) coding DNA sequence as its mutation affects reproduction
 C) non-coding DNA sequence as its mutation may not affect reproduction ability
 D) Coding DNA sequence as its mutation may not affect reproduction ability
196. Technique of DNA fingerprinting was initially developed by- **(Pg. 122, E)**
 A) James Watson B) Jansley

- C) Alec Jeffreys D) Maheshwari
197. VNTR stands for- **(Pg. 122, E)**
 A) Various number of Tendon Repeats
 B) Variable Number of Tendon Repeats
 C) Various Number of Tandem Repeats
 D) Variable Number of Tandem Repeats
198. VNTR belongs to- **Pg. 122, E)**
 A) Micro-satellite
 B) Macro-satellite
 C) Mini-satellite
 D) All of these
199. **Pg. 123, E)**



In the given figure if 'C' is the DNA collected from crime site and 'A' & 'B' are samples from suspects, then who is the criminal?

- A) B B) A
 C) Both A and B D) None of these

ANSWER KEY

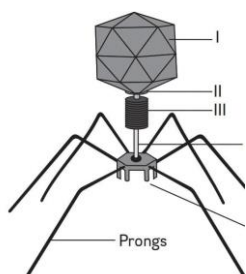
MOLECULAR BASIS OF INHERITENCE

TG: @Chalnaayaaar

Q	01	02	03	04	05	06	07	08	09	10
Ans	D	C	D	A	B	B	B	D	D	A
Q	11	12	13	14	15	16	17	18	19	20
Ans	A	D	C	B	B	C	C	A	C	B
Q	21	22	23	24	25	26	27	28	29	30
Ans	A	C	B	C	C	B	A	B	A	D
Q	31	32	33	34	35	36	37	38	39	40
Ans	C	A	B	A	D	D	D	C	D	C
Q	41	42	43	44	45	46	47	48	49	50
Ans	A	D	C	A	D	A	D	A	A	C
Q	51	52	53	54	55	56	57	58	59	60
Ans	B	A	D	A	D	B	C	B	C	D
Q	61	62	63	64	65	66	67	68	69	70
Ans	C	A	B	A	C	A	C	B	B	C
Q	71	72	73	74	75	76	77	78	79	80
Ans	A	C	A	C	A	A	B	C	C	C
Q	81	82	83	84	85	86	87	88	89	90
Ans	A	B	C	A	C	A	C	B	B	C
Q	91	92	93	94	95	96	97	98	99	100
Ans	D	C	B	D	A	A	B	C	A	A
Q	101	102	103	104	105	106	107	108	109	110
Ans	C	D	B	D	B	A	B	A	A	B
Q	111	112	113	114	115	116	117	118	119	120
Ans	A	A	A	A	B	B	A	B	A	A
Q	121	122	123	124	125	126	127	128	129	130
Ans	B	D	D	A	B	B	A	B	D	C
Q	131	132	133	134	135	136	137	138	139	140
Ans	A	D	C	C	D	A	A	A	B	D
B	141	142	143	144	145	146	147	148	149	150
Ans	B	A	D	D	A	B	C	A	D	A
Q	151	152	153	154	155	156	157	158	159	160
Ans	D	B	D	C	B	B	B	D	B	B
D	161	162	163	164	165	166	167	168	169	170
Ans	D	A	C	C	A	C	C	A	B	A
	171	172	173	174	175	176	177	178	179	180
Ans	C	D	A	C	D	B	A	B	B	B
Q	181	182	183	184	185	186	187	188	189	190
Ans	C	D	A	C	C	C	A	A	A	B
Q	191	192	193	194	195	196	197	198	199	
Ans	B	B	D	A	C	C	D	C	A	

Microbes in Household Products and Beverages

- Which of the following statements is incorrect? **(Pg. 179, E)**
 - Besides microscopic plants and animals, microbes are the major components of biological systems on this earth.
 - Microbes are present everywhere even in the harsh environments such as deep inside the geysers (thermal vents) where the temperature may be as high as 1000C.
 - Microbes are diverse—protozoa, bacteria, fungi and microscopic plant viruses, viroids and also prions.
 - Prions are proteinaceous non-infectious agents.
- Which of the following statements is correct? **(Pg. 179, E)**
 - Microbes like protozoa can be grown on nutritive media to form colonies.
 - Microbes can cause diseases in animals not plants.
 - Microbes are not found in highly acidic environments.
 - All microbes are not harmful; several microbes are useful to human beings in diverse ways.
- Following is the image of a bacteriophage. **(Pg. 180, E)**



Which of the following options correctly labels its various parts?

- I: Head, II: Neck, III: Collar
- I: Collar, II: Head, III: Tail
- I: Collar, II: Tail, III: Head
- I: Tail, II: Collar, III: Head

- The organisms responsible for converting milk into curd is- **(Pg. 180, E)**
 - Lactobacillus
 - Propionibacterium sharmanii
 - LAB
 - Both (a) and (c)
- Which of the following statements is not incorrect? **(Pg. 181, E)**
 - LAB produces acids that coagulate and completely digest the milk proteins.
 - A small amount of cheese is added to the fresh milk as inoculum or starter contain millions of LAB,
 - LAB multiply at a suitable temperature, thus converting curd to milk, which also improves its nutritional quality by increasing vitamin B12 in our stomach.
 - LAB plays very beneficial role in checking disease causing microbes.
- The vitamin whose content increases during curd formation by lactic acid bacteria is **(Pg. 181, E)**
 - Vitamin C
 - Vitamin D
 - Vitamin B₁₂
 - Vitamin E
- The small amount of curd added to the fresh milk to convert it into curd is called **(Pg. 181, E)**
 - starter
 - inoculum
 - implant
 - both (A) and (B)
- How many of the following statements are correct? **(Pg. 181, E)**
 - The dough which is used for making food such as dosa and idli is also fermented by yeast.
 - The puffed-up appearance of dough is due to the production of CO₂ gas.
 - The dough which is used for making bread, is fermented using brewer's yeast
 - 'Toddy', a traditional drink of some parts of Southern India is made by fermenting fruits from palms
 - Microbes are also used to ferment fishes, soyabean and bamboo-roots to make foods.

- A) 4 B) 3
C) 2 D) 1
9. Choose the incorrect statement among the following. **(Pg. 181, E)**
- A) Different varieties of cheese are known by their characteristic texture, flavour and taste, the specificity coming from the microbes used.
- B) Large holes in 'Swiss cheese' are due to production of a large amount of SO_2 by a bacterium named *Propionibacterium sharmanii*.
- C) The 'Roquefort cheese' are ripened by growing a specific fungi named *Penicillium roqueforti* which gives them a particular flavour.
- D) Adenovirus is diamond like in structure and causes respiratory infections.
10. Yeast is used in the production of **(Pg. 181, E)**
- A) citric acid and lactic acid
B) lipase and pectinase
C) bread and beer
D) cheese and butter
11. Big holes in Swiss cheese are made by a **(Pg. 181, E)**
- A) a machine
B) methanogens
C) the bacterium *Propionibacterium sharmanii* producing a large amount of carbon dioxide
D) *Lactobacillus*
12. How many of the following beverages are produced by distillation of the fermented broth?
Whisky, wine, rum, brandy, beer **(Pg. 181, E)**
- A) 5 B) 4
C) 3 D) 1

Microbes in Industrial Products **(excluding beverages)**

13. Which of the following statements is incorrect? **(Pg. 181, E)**
- A) Very large vessels in which microbes are grown for the purpose of

production of beverages and antibiotics on industrial scale are termed as fermenters.

- B) Microbes especially yeasts have been used from time immemorial for the production of beverages like wine, beer, whisky, brandy or rum.
- C) For this purpose the same yeast *Saccharomyces cerevisiae* used for bread-making and commonly called brewer's yeast, is used for fermenting malted cereals and fruit juices, to produce ethanol.
- D) Antibiotics produced by microbes are regarded as one of the most significant discoveries of the 19th century and have greatly contributed towards the welfare of the human society
14. How many of the following statements are not incorrect? **(Pg. 182, E)**
- I. Anti is a Greek word that means 'against', and bio means 'life', together they mean 'against life'.
- II. Antibiotics are chemical substances, which are produced by some microbes and can kill or retard the growth of other (disease-causing) microbes.
- III. Penicillin is the first antibiotic to be discovered.
- IV. Alexander Fleming discovered Penicillin while working on a *Staphylococci bacteria*.
- V. The full potential as an effective antibiotic was established much later by Ernest Chain and Howard Florey.
- A) 5 B) 4
C) 3 D) 1
15. Which of the following statements is correct? **(Pg. 182, E)**
- A) Penicillin was used to treat American soldiers wounded in World War I.
- B) Fleming, Chain and Florey were awarded the Nobel Prize in 1954, for this discovery.
- C) Before Penicillin, antibiotics were also purified from other microbes.
- D) Antibiotics have greatly improved our capacity to treat deadly diseases such

as plague, whooping cough, diphtheria and leprosy.

16. Microbes are used for commercial and industrial production of certain chemicals like organic acids, alcohols and enzymes. Which of the following is incorrect regarding this? **(Pg. 183, E)**

A) *Aspergillus* – fungus – citric acid
B) *Acetobacter aceti* – bacteria – vinegar
C) *Clostridium butylicum* – protozoan – butyric acid
D) *Lactobacillus* – bacteria – lactic acid.

17. The substance which is used in detergent formulations and helpful in removing oily stains are – **(Pg. 183, E)**

A) Pectinases B) Proteases
C) Lipases D) Statins

18. Bottled juices are clarified by the enzyme- **(Pg. 183, E)**

A) Pectinase and lipases
B) Pectinase and peptidase
C) Pectinase and protease
D) Pectinase only

19. Match the following columns: **(Pg. 183, M)**

	Column-I		Column-II
a)	Cyclosporin A	1	Blood Cholesterol lowering agent
b)	Streptokinase	2	Immunosuppressive agent
c)	Statins	3	Clot buster for removing clots
d)	<i>Saccharomyces</i>	4	Production of ethanol

Which of the following is the correct option?

	a	b	c	d
A)	1	3	4	2
B)	3	2	1	4
C)	2	3	1	4
D)	4	3	2	1

20. How many of the following statements are correct? **(Pg. 183, H)**

I. A bioactive molecule, cyclosporin A, is produced by the fungus *Trichoderma polysporum*.

II. Statins are produced by the fungus *Monascus purpureus*.

III. Statins act by competitively inhibiting the enzyme responsible for synthesis of cholesterol.

IV. Streptokinase is used to remove clots from the blood vessels of patients who have undergone myocardial infarction leading to heart attack.

A) 3 B) 4
C) 2 D) 1

21. A good producer of citric acid is **(Pg. 183, E)**

A) *Pseudomonas* B) *Clostridium*
C) *Saccharomyces* D) *Aspergillus*

22. Which of the following is correctly matched for the product produced by them? **(Pg. 183, E)**

A) *Acetobacter aceti*: Antibiotics
B) *Methanobacterium*: Lactic acid
C) *Penicillium notatum*: Acetic acid
D) *Saccharomyces cerevisiae*: Ethanol

23. Which of the following is wrongly matched in the given table? **(Pg. 183, M)**

	Microbe		Product		Application
A	<i>Trichoderma polysporum</i>	i	Cyclosporin A	1	Immunosuppressive
B	<i>Monascus purpureus</i>	ii	Statins	2	Blood Cholesterol lowering agent
C	<i>Streptococcus</i>	iii	Streptokinase	3	Removal of clot from blood vessels
D	<i>Clostridium acetobutylicum</i>	iv	Lipase	4	Removal of oil stains

24. Match Column-I with Column-II and select the correct option using the codes. **(Pg. 183, E)**

	Column-I		Column-II
(a)	Citric acid	(1)	<i>Trichoderma</i>
(b)	Cyclosporin	(2)	<i>Clostridium</i>
(c)	Statins	(3)	<i>Aspergillus</i>
(d)	Butyric acid	(4)	<i>Monascus</i>

Which of the following is the correct option?

	a	b	c	d
A)	3	1	4	2
B)	4	3	1	2
C)	2	1	4	3
D)	2	3	1	4

25. Match the following list of microbes and their importance: **(Pg. 183, M)**

	Column-I		Column-II
(a)	Saccharomyces	(1)	Production of immunosuppressive agents
(b)	Monascus purpureus	(2)	Ripening of Swiss cheese
(c)	Trichoderma polysporum	(3)	Commercial production of ethanol
(d)	Propionibacterium sharmanii	(4)	Production of blood cholesterol-lowering agent

Which of the following is the correct option?

	a	b	c	d
A)	2	4	1	3
B)	4	3	1	2
C)	2	1	4	3
D)	3	4	1	2

Microbes in Sewage Treatment

26. How many of the following are not incorrect with respect to wastewater treatment? **(Pg. 183, E)**

- I. A major component of waste water is human excreta.
- II. The municipal waste-water is called sewage which contains large amounts of inorganic matter and microbes. Many of which are pathogenic.
- III. Sewage is treated in sewage treatment plants (STPs) to make it non- polluting.
- IV. Treatment of waste water is done by the aerobic microbes naturally present in the sewage.

A) 4

B) 3

C) 2

D) 1

27. Which of the following statements is correct with respect to wastewater treatment? **(Pg. 184, E)**

A) Treatment of wastewater is carried out in three stages- Primary, Secondary and Biological Treatment.

B) Primary treatment basically involves physical removal of particles – large and small – from the sewage through sedimentation then filtration.

C) All solids that settle form the primary sludge, and the supernatant forms the effluent.

D) The sludge from the primary settling tank is taken for secondary treatment.

28. Which of the following statements is incorrect with respect to wastewater treatment? **(Pg. 184, E)**

A) The primary effluent is passed into large aeration tanks where it is constantly agitated mechanically and air is pumped into it. This allows vigorous growth of useful aerobic microbes into flocs.

B) Flocs are masses of bacteria associated with fungal filaments to form mesh like structures.

C) While growing, microbes consume the major part of the organic matter in the effluent. This significantly elevates the BOD (biochemical oxygen demand) of the effluent.

D) BOD refers to the amount of the oxygen that would be consumed if all the organic matter in one liter of water were oxidised by bacteria.

29. Which of the following statements is wrong with respect to wastewater treatment?

(Pg. 183, E)

A) The BOD test measures the rate of uptake of oxygen by micro-organisms in the sample of water.

B) BOD is a direct measure of the organic matter present in the water.

C) The greater the BOD of waste water, more is its polluting potential.

- D) Once the BOD of sewage or waste water is reduced significantly, the effluent is then passed into a settling tank where the bacterial 'flocs' are allowed to sediment.
30. The gases which evolve from the anaerobic sludge digester constituting biogas are- **(Pg. 184, E)**
- Methane, sulphur dioxide, carbon sulphide
 - Carbon dioxide, hydrogen chloride, methane
 - Methane, hydrogen chloride and carbon dioxide
 - Methane, carbon dioxide, hydrogen sulphide
31. Which of the following statement is wrong? **(Pg. 184, E)**
- In settling tank, the sedimented bacterial flocs are called activated sludge.
 - A small part of the activated sludge is pumped back into the anaerobic sludge digester to serve as the inoculum.
 - In anaerobic sludge digesters, other kinds of bacteria which grow anaerobically, digest the bacteria and the fungi in the sludge.
 - The biogas can be used as source of energy as it is inflammable.
32. Which of the following statements is incorrect? **(Pg. 184, E)**
- The effluent from the secondary treatment plant is generally released into natural water bodies like rivers and streams.
 - Microbes play a major role in treating millions of gallons of waste water everyday across the globe. This methodology has been practiced for more than a decade now, in almost all parts of the world.
 - Till date, no manmade technology has been able to rival the microbial treatment of sewage.
 - The Ministry of Environment and Forests has initiated Ganga Action Plan and Yamuna Action Plan to save these major rivers of our country from pollution.
33. The primary treatment of wastewater removes **(Pg. 184, E)**
- dissolved impurities
 - stable particles
 - methane
 - pathogens
34. Which of the following in sewage treatment removes suspended solids? **(Pg. 184, E)**
- Tertiary treatment
 - Secondary treatment
 - Primary treatment
 - Sludge treatment
35. Secondary sewage treatment is mainly a **(Pg. 184, E)**
- physical process
 - mechanical process
 - chemical process
 - biological process
36. BOD of wastewater is represented as **(Pg. 184, E)**
- total inorganic matter
 - biodegradable matter
 - carbon dioxide evolution
 - oxygen consumption
37. The high value of BOD (Biochemical Oxygen Demand) indicates that **(Pg. 184, E)**
- water is pure.
 - water is highly polluted.
 - water is less polluted.
 - consumption of organic matter in the water is higher by microbes.
38. If the activated sludge flocs do not get enough oxygen supply, **(Pg. 184, E)**
- it will increase the rate of the treatment.
 - the center of flocs will become anoxic, which would cause the death of bacteria and eventually breakage of flocs.
 - it will increase the size of flocs.
 - protozoa would grow in large numbers.
39. Methanogenic bacteria are not present in **(Pg. 184, E)**
- gobar gas plant
 - stomach of ruminants

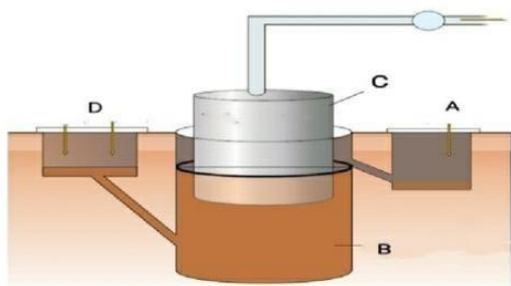
- C) bottom of water-logged paddy fields
D) activated sludge
40. Activated sludge should settle quickly so that **(Pg. 184, E)**
A) it is rapidly pumped back from sedimentation tank to aeration tank
B) absorb pathogenic bacteria present in wastewater
C) it is anaerobically digested
D) absorbs inorganic matter
41. The sludge generated by wastewater treatment is treated by **(Pg. 184, E)**
A) anaerobic digesters
B) floc
C) chemicals
D) oxidation pond
42. What gases are produced in anaerobic sludge digesters? **(Pg. 184, E)**
A) Methane and CO₂ only.
B) Methane, Hydrogen sulfide and CO₂.
C) Hydrogen Sulfide and CO₂.
D) Methane and CO₂.
43. During sewage treatment, biogases are produced which include **(Pg. 184, E)**
A) hydrogen sulfide, nitrogen, methane
B) methane, hydrogen sulfide, carbon dioxide
C) methane, oxygen and hydrogen sulfide
D) hydrogen sulfide, methane and sulfur dioxide

Microbes in Production of Biogas

44. The predominant gas in biogas is- **(Pg. 185, E)**
A) Methane
B) Carbon dioxide
C) Hydrogen sulphide
D) ethane
45. Which of the following is incorrect with respect to production of biogas? **(Pg. 185, E)**
A) The type of the gas produced depends upon the microbes and the organic substrates they utilise.
B) Certain bacteria, which grow anaerobically on cellulosic material, produce large amount of methane along with CO₂ and N₂.

- C) Methanogens are commonly found in the anaerobic sludge during sewage treatment, the common example is Methanobacterium.
D) Methanogens are also present in the rumen of cattle where they help in the breakdown of cellulose and play an important role in the nutrition of cattle.
46. The depth of concrete tank of biogas plant in which bio-wastes are collected and a slurry of dung is fed is **(Pg. 185, E)**
A) 10-12 meters B) 10-12 feet
C) 10-15 meters D) 10-15 feet
47. How many of the following statements are incorrect? **(Pg. 185, E)**
I. The gobar gas is a special type of biogas generated from the dung of cattle.
II. A floating cover is placed over the slurry, which keeps on rising as the gas is produced in the tank due to the microbial activity.
III. A typical biogas plant has two main outlets, one for biogas which is used by nearby houses and the other for spent which may be used as fertiliser
IV. The technology of biogas production was developed in India mainly due to the efforts of IARI and KVIC.
V. Biogas plants are more often built in rural areas due to availability of large quantities of cattle dung and thus the biogas produced is used for cooking and lighting.
- A) 5 B) 4
C) 3 D) none
48. IARI stands for – **(Pg. 186, E)**
A) Indian Academy of Research and Intelligence
B) International Agricultural Research Institute
C) Indian Agricultural Research Institute
D) International Academy of Research and Intelligence
49. KVIC stands for – **(Pg. 186, E)**
A) Khadi and Village Industries Company
B) Kisan and Village Industries Company
C) Khadi and Village Industries Commission

- D) Khadi and Village Interest Commission
50. Select the correct option among the following **(Pg. 186, E)**



- A) A – slurry, B – Digester, C – Gas Holder, D – Sludge
- B) A – sludge, C – Gas mixture, B – Slurry, D – Water + Dung
- C) A – sludge, B – Digester, C – Gas Holder, D – Slurry
- D) A – slurry, C – Gas mixture, B – Sludge, D – Water + Dung
51. Which of the following is mainly produced by the activity of anaerobic bacteria on sewage? **(Pg. 186, E)**
- A) Propane B) Mustard gas
- C) Marsh gas D) Laughing gas
52. Which of the following statements about methanogens is not correct? **(Pg. 186, E)**
- A) They produce methane gas.
- B) They can be used to produce biogas.
- C) They are found in the rumen of cattle and their excreta.
- D) They grow aerobically and breakdown cellulose-rich food.
53. Select the correct statement from the following: **(Pg. 186, E)**
- A) Activated sludge-sediment in settlement tanks of the sewage treatment plant is a rich source of aerobic bacteria.
- B) Methanobacterium is an aerobic bacterium found in the rumen of cattle.
- C) Biogas is produced by the activity of aerobic bacteria on animal waste.
- D) Biogas, commonly called gobar gas, is pure methane.

Microbes as Biocontrol Agent

54. The use of biological methods for controlling plant disease and pest is known as – **(Pg. 186, E)**
- A) Bioinvestment B) Bioremediation
- C) Biofortification D) Biocontrol
55. How many of the following statements are incorrect? **(Pg. 186, E)**
- I. In agriculture, there is a method of controlling pests that relies on natural predation rather than introduced chemicals.
- II. A key belief of the organic farmer is that biodiversity furthers health.
- III. The conventional farming practices rarely used chemical methods to kill both useful and harmful life forms indiscriminately.
- IV. The organic farmer holds the view that the eradication of the creatures that are often described as pests is not only possible, but also undesirable.
- A) 4 B) 3
- C) 2 D) 1
56. In a system of checks and balances- **(Pg. 187, E)**
- A) The insects that are sometimes called pests are completely eradicated.
- B) All insects are eradicated.
- C) When pests are beyond manageable levels, they are completely eradicated.
- D) Pests are not eradicated but they are kept at manageable levels.
57. The biopesticide used to get rid of aphids is – **(Pg. 187, E)**
- A) Dragonflies
- B) Baculoviruses
- C) Ladybird
- D) Bacillus thuringiensis
58. Microbial biocontrol agent that can be introduced in order to control butterfly caterpillar is- **(Pg. 187, E)**
- A) Fungus Trichoderma
- B) Bacillus tracin
- C) Baculoviruses
- D) Bacillus thuringiensis
59. The bacteria bacillus thuringiensis is available in the market in the form of – **(Pg. 187, E)**

- A) Tablets B) Powder
C) Spores D) Gel form
60. Which of the following statements is incorrect? **(Pg. 187, E)**
- A) Eradication of the pests is undesirable as without them the beneficial predatory and parasitic insects which depend upon them as food or hosts would not be able to survive.
- B) An important part of the biological farming approach is to become familiar with the various life forms that inhabit the field, predators as well as pests, and also their life cycles, patterns of feeding and the habitats that they prefer.
- C) The very familiar beetle with red and black markings is the Ladybird
- D) Bt spores are mixed with water and sprayed onto valuable plants such as brassicas and fruit trees, where these are eaten by the insect adults.
61. How many of the following are correct with respect to Trichoderma? **(Pg. 187, E)**
- I. Developed for use in the treatment of plant diseases
- II. It's species are free living fungi that are very common in root ecosystems.
- III. It belongs to the division Ascomycetes
- IV. They are very effective biocontrol agents for several plant pathogens.
- A) 4 B) 3
C) 2 D) 1
62. How many of the following are correct with respect to baculoviruses? **(Pg. 187, E)**
- I. They are pathogens that attack insects and other arthropods.
- II. The majority of baculoviruses used as biological control agents are in the family nucleopolyhedrovirus.
- III. These viruses are excellent candidates for species-specific, narrow spectrum insecticidal applications.
- IV. They have been shown to have no negative impacts on plants, mammals, birds, fish or even on non-target insects.

V. This is especially desirable when beneficial insects are being conserved to aid in an overall integrated pest management programme, or when an ecologically sensitive area is being treated.

- A) 5 B) 4
C) 3 D) 2
63. Which one of the following is not an example of carrying out biological control of pests/diseases using microbes? **(Pg. 187, E)**
- A) Ladybird beetle against aphids in mustard.
- B) Bt-cotton to increase cotton yield.
- C) Nucleopolyhedrovirus against white rust in Brassica.
- D) Trichoderma sp. against certain plant pathogens.
64. Match the items in Column-I and Column-II and choose the correct answer.

(Pg. 187, E)

	Column-I		Column-II
(a)	Ladybird	(1)	Methanobacterium
(b)	Mycorrhiza	(2)	Trichoderma
(c)	Biological control	(3)	Aphids
(d)	Biogas	(4)	Glomus

Which of the following is the correct option?

	a	b	c	d
A)	1	4	3	2
B)	3	4	2	1
C)	4	1	2	3
D)	3	2	1	4

Microbes as Biofertilizer

65. Which of the following is incorrect? **(Pg. 188, E)**
- A) Biofertilizers are organisms that enrich the nutrient quality of the soil.
- B) Realising the problems associated with the overuse of chemical fertilisers, there is a large pressure to switch to organic farming – the use of biofertilisers.

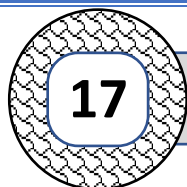
- C) The main sources of biofertilisers are bacteria, fungi, protozoans and cyanobacteria.
- D) In the root nodules of leguminous plants, symbiotic association is formed by Rhizobium.
66. The fungal symbiont in mycorrhiza association absorbs _____ from soil and passes it to the plant. **(Pg. 188, E)**
 A) N B) N and K
 C) P D) Ca
67. How many of the following are correct with respect to mycorrhiza? **(Pg. 188, E)**
 I. Fungi are also known to form symbiotic associations with plants (mycorrhiza).
 II. Many members of the genus Glomus form mycorrhiza.
 III. It provide resistance to root-borne pathogens.
 IV. It provide tolerance to salinity and drought.
 V. It helps in overall increase in plant growth and development.
 A) 5 B) 4
 C) 3 D) 1
68. Which of the following is incorrect? **(Pg. 188, E)**
 A) Rhizobium fixes atmospheric nitrogen into inorganic forms which are used by plants as nutrients.
- B) Cyanobacteria are autotrophic microbes widely distributed in aquatic and terrestrial environments many of which can fix atmospheric nitrogen.
- C) Blue green algae add organic matter to the soil and increase its fertility.
- D) In paddy fields, cyanobacteria serve as an important biofertiliser.
69. The bacteria which can fix atmospheric nitrogen in it's free-living form in the soil are – **(Pg. 188, E)**
 A) Azospirillum and Azorhizobium
 B) Azospirillum and Azotobacter
 C) Azotobacter and Rhizobium
 D) Frankia and Azospirillum
70. Which one of the following microbes form a symbiotic association with plants and helps them in their nutrition? **(Pg. 188, E)**
 A) Azotobacter B) Aspergillus
 C) Glomus D) Trichoderma
71. Which one of the following helps in the absorption of phosphorus from the soil by plants? **(Pg. 188, E)**
 A) Anabaena B) Glomus
 C) Rhizobium D) Frankia
72. Which of the following is not a biofertilizer? **(Pg. 188, E)**
 A) Rhizobium B) Nostoc
 C) Mycorrhiza D) Agrobacterium

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ANSWER KEY

MICROBES IN HUMAN WELFARE

Q	1	2	3	4	5	6	7	8	9	10
Ans	D	D	A	D	D	C	D	A	B	C
Q	11	12	13	14	15	16	17	18	19	20
Ans	C	C	D	A	B	C	C	D	C	B
Q	21	22	23	24	25	26	27	28	29	30
Ans	D	D	D	A	D	B	A	C	B	D
Q	31	32	33	34	35	36	37	38	39	40
Ans	B	B	B	C	D	D	B	C	D	A
Q	41	42	43	44	45	46	47	48	49	50
Ans	A	B	B	A	B	D	D	C	C	C
Q	51	52	53	54	55	56	57	58	59	60
Ans	C	D	D	D	D	D	C	D	C	D
Q	61	62	63	64	65	66	67	68	69	70
Ans	B	A	B	B	C	C	A	A	B	C
Q	71	72								
Ans	B	A								



1. Who is the Indian father of Ecology?

(Pg. 218, E)

- A) E. Hackel B) Ramdeo Mishra
C) P. Odum D) Tansley

13.1 Organism and its Environment

2. For what is the interaction among organisms is necessary (Pg. 220, E)

- A) Recreation B) Reproduction
C) Survival D) Both B and C

3. Basic unit of ecological hierarchy is-

(Pg. 220, E)

- A) Population B) Community
C) Ecosystem D) Organism

4. Identify the following which is not correctly matched - (Pg. 220, E)

	Biome	Mean annual temp.(°C)	Mean annual precipitation (mm)
1	Tropical forest	20-25	130-430
2	Arctic and alpine	-12-2	10-125
3	Coniferous forest	-5-5	100-200
4	Temperate forest	8-22	5-225

- A) 3 B) 1
C) 2 D) 4

5. Different biomes are formed due to annual variations in _____ over the earth's surface. - (Pg. 220, E)

- A) Temperature
B) Precipitation
C) Incident of solar radiation
D) All of these

6. Deserts, rainforests, tundra, etc. are example of - (Pg. 221, E)

- A) Community B) Niche
C) Biomes D) Ecosystem

7. The key element that determines difference in environment conditions of different habitats include. - (Pg. 221, E)

- A) Temperature B) Light

- C) Soil

- D) All of these

13.1.1 Major Abiotic Factors

8. Study the following statement and select the correct ones. - (Pg. 221, E)

- i) Organisms capable to tolerate a wide range of temperature are called stenothermal organisms.
ii) Thermal tolerance of different species determines their geographical distribution to a large extent.
iii) Average temperature in tropical desert in summer is <50°C.
iv) Thermal spring cannot sustain life due to very high avg. temperature i.e. >100°C.

- A) ii B) i, iii, iv
C) i, ii, iv D) iv

9. Organism which tolerate narrow range of temperature-- (Pg. 222, E)

- A) Stenothermal B) Eurythermal
C) Euryhaline D) None of these

10. Mango tree do not grow in (Pg. 222, E)

- A) Temperate country
B) Tropical country
C) Sub-tropical country
D) None of these

11. Mango do not and cannot grow in the above region. The most important environmental factor responsible for it is-

(Pg. 222, E)

- A) Soil B) Temperature
C) Water D) Light

12. Snow leopard are not found in _____ and tuna fish rarely caught beyond _____ latitudes in the ocean.

(Pg. 222, E)

- A) Tropical, Kerala
B) Kerala, tropical
C) Kerala, temperate
D) Kerala, sub-tropical

13. Organism which tolerate wide range of temperature?

- A) Eurythermal B) Stenothermal
C) Stenohaline D) None of these

14. Match the following salinity. (Pg. 222, E)

1	Sea	a	5
2	Hypersaline Lagoons	b	30-35
3	Inland water	c	>100

1 2 3

- A) a c b
 B) b c a
 C) c a b
 D) b a c

15. A fresh water organisms cannot survive in a water body that has greater _____ than its original habitat- **(Pg. 222, E)**

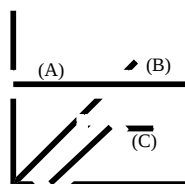
- A) Nutrients B) Depth
 C) Salt concentration D) Water clarity

13.1.2 Responses to Abiotic factor

16. The organism try to maintain the constancy of its internal environment and the process is called **(Pg. 223, E)**

- A) Hibernation B) Aestivation
 C) Homeostasis D) None of these

17. **(Pg. 223, E)**



- A) A-Regulators, B-Conformers, C-Partial Regulator
 B) A-Conformers, B-Regulators, C-Partial Regulator
 C) A-Partial Regulator, B-Regulators, C-Conformers
 D) A-Conformers, B-Partial Regulators, C-Regulator

18. Regulators maintain homeostatic by which means- **(Pg. 224, E)**

- A) Chemical B) Physiological
 C) Behavioural D) Both B and C

19. We maintain constant body temperature of- **(Pg. 224, E)**

- A) 39° C B) 37° C
 C) 33° C D) 34° C

20. The organism in which body temperature changes according to the ambient temperature is known as **(Pg. 224, E)**

- A) Conformers B) Regulator
 C) Partial Regulators D) Endothermal

21. Thermoregulation is energetically expensive process for **(Pg. 224, E)**

- A) Shrews B) Mammals
 C) Humming bird D) Both A and C

22. Thermoregulation is energetically expensive process for small animals due to their- **(Pg. 224, E)**

- A) Small surface area relative to their size
 B) Large size relative to surface area
 C) Both B and A
 D) Large surface area relative to size

23. The organism which moves away temporarily from stressful situation is known as- **(Pg. 225, E)**

- A) Migrators B) Conformers
 C) Regulators D) Endothermals

24. Keolado National Park is situated in **(Pg. 225, E)**

- A) Rajasthan B) Raipur
 C) Gujarat D) Madhya Pradesh

25. Match the following **(Pg. 223-225, M)**

A		B	
1	Regulators	i	Humming birds
2	Conformers	ii	Shrenes
3	Migrators	iii	Mammals
4	Suspendors	iv	Siberian birds
		v	Bacteria, fungi and lower plants

1 2 3 4

- A) i, ii iii iv v
 B) iii i, ii v iv
 C) iii i, ii iv v
 D) iv iii i, ii v

26. A stage of suspended development is called **(Pg. 225, E)**

- A) Diapause B) Aestivation
 C) Hibernation D) Migration

27. Winter sleep is known as _____ and summer sleep is known as _____.

(Pg. 225, E)

- A) Hibernation, Aestivation
 B) Migration, Aestivation
 C) Aestivation, Hibernation
 D) Aestivation, Migration

28. Match the following **(Pg. 225, M)**

A		B	
1	Bear	i	Aestivation

2	Zooplankton	ii	Migration
3	Snail	iii	Hibernation
4	Siberian crane	iv	Diapause

- | | 1 | 2 | 3 | 4 |
|----|-----|-----|-----|----|
| A) | ii | iv | iii | i |
| B) | iii | iv | i | ii |
| C) | iii | i | iv | ii |
| D) | iv | iii | ii | i |

13.1.3 Adaptation

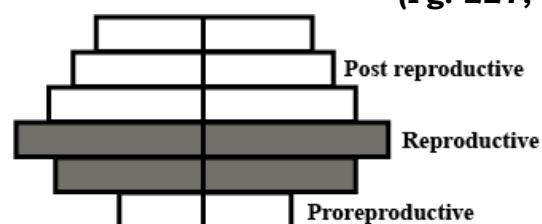
29. Any attributes of the organism that enable them to survive and reproduce in its habitat is known as **(Pg. 225, E)**
 A) Migration B) Diapause
 C) Adaptation D) Dormancy
30. Kangaroo rat in _____ American deserts is capable to meet all its water requirement through _____. **(Pg. 225, E)**
 A) East, internal fat oxidation
 B) North, internal fat oxidation
 C) North, internal protein oxidation
 D) West, internal fat oxidation
31. Desert plants have special photosynthetic pathway which is known as- **(Pg. 225, E)**
 A) C3 cycle B) C4 cycle
 C) CAM pathway D) None of these
32. Desert plants do not have following one characteristic-
 A) Bread leaf B) Flattened stem
 C) Sunken stomata D) Thick cuticle
33. Mammals from colder climates generally have shorter ears and limbs to minimize the heat loss. This rule was given by- **(Pg. 226, E)**
 A) Charles Darwin B) Jansely
 C) P. Odum D) Allen
34. Desert lizards manage to keep their body temperature constant by _____ means. **(Pg. 226, E)**
 A) Physiological B) Behavioural
 C) Chemical D) Both A and B
35. Many marine organisms live in very high pressure. Which type of adaptation is shown by them? **(Pg. 226, E)**
 A) Biochemical B) Behavioural
 C) Physical D) None of these
36. Altitude sickness in high altitude is due to-

(Pg. 226, E)

- A) Low atmospheric pressure
 B) Low oxygen
 C) High atmospheric pressure
 D) Both A and B

13.2 Population Attributes

37. What is a group of individuals belonging to the same species called- **(Pg. 227, E)**
 A) Population B) Biomes
 C) Community D) Family
38. _____ links ecology to population genetics and evolution **(Pg. 227, E)**
 A) Ecosystem
 B) Biomes
 C) Population ecology
 D) Population attributes
39. Population has certain attributes which are- **(Pg. 227, E)**
 A) birth rates B) death rates
 C) sex ratio D) All of these
40. If the age distribution is plotted for the population, the resulting structure is called- **(Pg. 227, E)**
 A) Population attributes
 B) Population ecology
 C) Age pyramids
 D) None of these
41. What type of human population is represented by the following pyramid? **(Pg. 227, E)**



- A) Stable population
 B) Declining population
 C) Expanding population
 D) Vanishing population
42. The tiger census in our national parks and tiger reserves is after based on- **(Pg. 227, E)**

- A) Pug marks
 B) Fecal pellets
 C) Counting no. of tigers
 D) Both A and B

43. _____ is more meaningful measures of the population size of parthenium

(Pg. 228, E)

- A) Total no. B) Biomass
C) Age D) None of these

44. The age distribution of a population is determined by:

(Pg. 228, E)

- A) Timing of birth
B) Timing of death
C) The rate at which the population is growing
D) All are correct

13.2.2 Population Growth

45. What four factors define population growth?

(Pg. 228, E)

- A) Birth, deaths, immigration, emigration
B) Survivorship, age-specific mortality, fecundity, death rate
C) Mark-capture, census, sampling, transects
D) Age-specific birth rates, Metapopulation structure, quad rate, ectone

46. _____ contribute to an increase in population density

(Pg. 228, E)

- A) Natality and emigration
B) Mortality and emigration
C) Mortality and Immigration
D) Natality and Immigration

47. _____ refers to the no. of deaths in the population during a period.

(Pg. 228, E)

- A) Natality B) Immigration
C) Mortality D) Birth rate

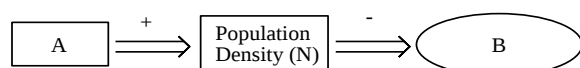
48. If N is the population density at time t, then its density at time t + 1 is

(Pg. 228, E)

- A) $N_{t+1} = N_t + (B + E) - (D + I)$
B) $N_{t+1} = N_t + (B + D) - (E + I)$
C) $N_{t+1} = N_t - (B + I) - (D + E)$
D) $N_{t+1} = N_t + (B + I) - (D + E)$

49. Fill up A and B Boxes in the given diagram with correct options:

(Pg. 229, E)



- A) $A = \text{Natality} + \text{Immigration}$, $B = \text{Mortality} + \text{Emigration}$

B) $A = \text{Natality} + \text{Mortality}$, $B = \text{Immigration} + \text{Emigration}$

C) $A = \text{Birth rate} + \text{Death rate}$, $B = \text{Migration} + \text{Emigration}$

D) $A = \text{Natality} + \text{Emigration}$, $B = \text{Mortality} + \text{Immigration}$

50. A biologist studied the population of rates in a born. He found that average Natality was 260, average Mortality 250, Immigration 30 and emmigration 40. The net increase in population is-

(Pg. 229, E)

- A) 10 B) 0
C) 15 D) 20

51. The formula for exponential population growth is

(Pg. 229, E)

- A) $dt/dN = rN$ B) $dN/rN = dt$
C) $rN/dN = dt$ D) $dN/dt = rN$

52. Which of the following is not a factor that would limit the growth of population?

(Pg. 229, E)

- A) Food shortage B) Immigration
C) Disease D) Famine

53. Birth rate = B, Death rate = D, Emigration = E and Immigration = I

(Pg. 229, E)

Column I		Column II	
a	Population is increasing	i	$B + I = D + E$
b	Population is decreasing	ii	$B + I < D + E$
c	Population is stable	iii	$B + I > D + E$

- a b c
A) iii ii i
B) ii iii i
C) i ii iii
D) ii i iii

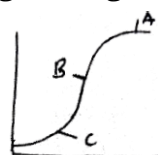
54. Darwinian fitness is represented by

(Pg. 230, E)

- A) Low r value B) High r value
C) High k value D) Low k value

55. What are Labelled phase A, B and C in given sigmoid growth curve?

(Pg. 230, E)



- A) A-Lag, B-Log, C-Stationary

- B) A-Stationary, B-Log, C-Lag
C) A-Lag, B-Stationary, C-Log
D) A-Stationary, B-Lag, C-Log
56. Carrying capacity is denoted as **(Pg. 230, E)**
A) r B) N
C) K D) I
57. Figure For calculation of the r value, which of the following is required? **(Pg. 230, E)**
A) Birth rates B) Death rates
C) Both a and b D) None
58. Which of the following equation is correct for Logistic growth? **(Pg. 231, E)**
A) $N_t = N_0 e^{rt}$
B) $dN/dt = rN$
C) $dt/dN = rN (K-N/K)$
D) $dN/dt = rN (K-N/K)$
59. _____ refers to the no. of births during a given period in the population that are added to the initial density. **(Pg. 231, E)**
A) Natalivity B) Mortality
C) Immigration D) Survival
60. Logistic curve is _____. **(Pg. 231, E)**
A) L-shaped B) J-shaped
C) Sigmoid curve D) None of these
61. A plot of N in relation to time (t) results in sigmoid curve. This type of population growth is called- **(Pg. 231, E)**
A) J shaped Curve
B) U shaped Curve
C) Verhulst-Pearl Logistic Growth
D) Constant Growth
62. $N_t = N_0 e^{rt}$ is the integral form of the exponential- growth equation
Which of the following statement related to equation is not correct: **(Pg. 231, E)**
A) N_t = Population density after time t
B) N_0 = Population density at time zero
C) r = Intrinsic rate of Natural decrease
D) e = The base of Natural logarithmics (2.71828)
63. Which growth model is considered as more realistic one? **(Pg. 230, E)**
A) Exponential growth
B) Constant growth
C) Logistic growth
D) None of these
64. A population growing in a habitat with limited resources show initially a ____(A)____ followed by phase of ____(B)____ and finally ____(C)____. **(Pg. 230, E)**
A) A-Lag phase, B-Acceleration and deceleration, C-an asymptote
B) A-Log phase, B-Acceleration and deceleration, C-an asymptote
C) A-Log phase, B-Acceleration and deceleration, C-a symptote
D) A-Log phase, B-Acceleration and deceleration, C-a symptote
65. To calculate the current r value for human population we need to know about **(Pg. 230, E)**
A) Birth rate B) Death rate
C) Carrying capacity D) Both A and B
66. Human population follows the _____ as the carrying capacity increase or we do not meet yet our population carrying capacity. **(Pg. 231, E)**
A) J-shaped growth curve
B) Z-shaped growth curve
C) S-shaped growth curve
D) All of the above

13.2.3 Life History Variation

67. Which of the following organism breeds only once on their life time? **(Pg. 232, E)**
A) Pacific salmon fish
B) Oyester
C) Bamboo
D) Both A and C
68. Which of the following organism produces a large no. of small sized offspring? **(Pg. 232, E)**
A) Pacific salmon fish
B) Oyester and pelagic fishes
C) Oyester and pacific salmon fish
D) Birds and mammals

13.2.4 Population Interaction

69. Match the following **(Pg. 232-238, H)**

1	Both the species benefited	a	Amensalism
2	Both the species get harmed	b	Mutualism

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3	One species get benefits	c	Pairasitism
4	One is harmed other species unaffected	d	Predation
		e	Competition

- A) 1-c, 2-b, 3-a, 4-d
 B) 1-b, 2-e, 3-c, d, 4-a
 C) 1-a, 2-e, 3-c, d, 4-b
 D) 1-b, 2-a, 3-c, d, 4-c
70. Prickly pear cactus caused havoc in the early 1920's in- **(Pg. 233, E)**
 A) Canada B) Austria
 C) India D) Australia
71. Which predator brought the control over the inversive growth of prickly pear cactus **(Pg. 233, E)**
 A) Moth B) Bollworm
 C) Caterpillar D) Grasshopper
72. (A) Chemical control methods are adopted in agricultural pest control, based on ability of predator to regulate prey population.
 (B) Penicilium and stryptomyees show Amensalism. **(Pg. 233, M)**
 A) A) Statement A is correct
 B) Statement B is correct
 C) Statement A and B both are correct
 D) Statement A and B are wrong
73. (A) Predators helps in maintaining species diversity in community.
 (B) It reduces the intensity of competition among competing prey species. **(Pg. 233, M)**
 A) Statement A is correct
 B) Statement B is correct
 C) Both statement is wrong
 D) Option A and B
74. Starfish Pisaster is **(Pg. 233, E)**
 A) Parasite
 B) Hemi-parasite
 C) Predator
 D) Prey of invertebrate
75. More than 10 species of vertebrates disappeared a year after removing the starfish from habitat is due to- **(Pg. 233, E)**

- A) interspecific competition
 B) Brood parasitism
 C) Intra specific competition
 D) None of these
76. Prey species defenses themselves through there behaviour- **(Pg. 233, E)**
 A) Camouflaged B) Highly distasteful
 C) Poisonous D) All of these
77. Which Butterfly is highly distasteful? **(Pg. 234, E)**
 A) Monarch Butterfly B) Viceroy Butterfly
 C) Queen Butterfly D) All of these
78. Butterfly is highly distasteful which is acquire by them by tending on poisonous weed during **(Pg. 234, E)**
 A) Caterpillar Stage B) Adult Butterfly
 C) Pupa State D) All of these
79. "Camouflage" means **(Pg. 234, E)**
 A) Cryptically coloured
 B) Feeding on young ones of other species
 C) Poisonous
 D) Feeding on own species
80. Darwin has given the statement of **(Pg. 234, E)**
 A) Survival of fittest
 B) Struggle for existence
 C) Both A and B
 D) None of these
81. Who has convinced that interspecific competition is a patent force in organic evolution? **(Pg. 234, E)**
 A) Darwin B) P. odum
 C) Jansely D) None of these
82. (A) It is generally believed that competition occurs when closely related species complete for same resources that are limiting.
 (B) Totally unrelated species could also complete for the same resource. **(Pg. 234, E)**
 A) A is true B is false
 B) Both A and B is false
 C) A and B both are true
 D) A is false and B is true
83. The feeding efficiency of one species might be reduced due to the interfering and inhibitory presence of the other species

- even if resource are abundant in known as- **(Pg. 234, E)**
- A) Interspecific predation
 - B) Interfering competition
 - C) Both A and B
 - D) commensalism
84. When certain exotic species are introduced in to a geographical area they become invasive mainly because: **(Pg. 235, E)**
- A) The invaded land has unlimited resources for the introduced species.
 - B) The population of the introduced species in the invaded land is very low.
 - C) Introduced species do not face any competition in the introduced land.
 - D) The invaded land does not have its natural predator.
85. What was the result, when all pisaster starfish were removed from an enclosed intertidal area, in a field experiment? **(Pg. 234, E)**
- A) Extinction of many invertebrate species
 - B) Increase in diversity of invertebrates
 - C) Inability of the pisaster to enter the area again
 - D) Replacement of pisaster by other starfish
86. A species whose distribution is restricted to a small geographical area because of the presence of a competitively superior species is found to expand its distributional range dramatically when the competing species is experimentally removed. This is called- **(Pg. 235, E)**
- A) Competitive Exclusion
 - B) Competitive Supremacy
 - C) Competitive Inclusion
 - D) Competitive Release
87. Which of the following is not a function of predators? **(Pg. 235, E)**
- A) They decrease the species competition in a community
 - B) They act as conduits for energy transfer access trophic levels
 - C) They help in stabilization of the ecosystem
 - D) They decrease the species diversity in a community
88. Connell's field experiment on the rocky sea coast of scotland the larger and competitively superior barnacle Balanus dominates the intertidal area and excludes the smaller barnacle Chthamalus from that zone. This happened due to: **(Pg. 235, E)**
- A) Mutualism
 - B) Predation
 - C) Competition
 - D) Parasitism
89. The principle of competitive exclusion was stated by: **(Pg. 235, E)**
- A) Gause
 - B) C. Darwin
 - C) Mac Arther
 - D) Connelli
90. Gause's principle of competitive exclusion states that: **(Pg. 235, E)**
- A) More abundant species will exclude the less abundant through competition
 - B) Larger organism will exclude smaller one
 - C) No two closely related species can occupy same niche indefinitely for the same limiting resources
 - D) Both A and B
91. In resource partitioning mechanism- **(Pg. 235, E)**
- A) Species divide a niche to avoid competition for resources
 - B) Two different species eat the same thing at the same time of a day
 - C) Individuals of the same species that compete with each other
 - D) Two species that share the same niche
92. In accordance with their lifestyles, parasites evolved special adaptations such as _____. **(Pg. 235, E)**
- A) the loss of unnecessary sense organs
 - B) presence of adhesive organs or suckers to cling on to the host
 - C) loss of digestive system and high reproductive capacity
 - D) All of the above
93. The human liver fluke (a nematode parasite) depends on two intermediate host to complete its life cycle that is- **(Pg. 235, E)**
- A) insect and cow
 - B) insect and human
 - C) a snail and fish

- D) None of these
94. Mosquito is- **(Pg. 235, E)**
 A) Not a parasite B) Parasite
 C) Endoparasite D) Holoparasite
95. Parasites that feed on the external surface of the host organism are called- **(Pg. 235, E)**
 A) endoparasite B) ectoparasite
 C) Holoparasite D) Hemiparasite
96. Which one is/are the example of ectoparasite? **(Pg. 235, E)**
 A) Lice on human
 B) tick one dogs
 C) sea anemone and clown fish
 D) both A and B
97. Match the following: **(Pg. 235, M)**
- | | | | |
|---|--------------|-----|------------------|
| a | Marine fish | i | Brood parasitism |
| b | Cuscutta | ii | Copepods |
| c | Cattle egret | iii | Grazing cattle |
| d | Koel | iv | Parasite |
- a b c d
 A) ii iv iii i
 B) iii iv i ii
 C) iv ii iii i
 D) i iii iv ii
98. _____ are those that live inside the host body at different sites (Liver, kidney, lungs, red blood cells, etc) **(Pg. 235, E)**
 A) endoparasite B) ectoparasite
 C) Hemiparasite D) Both B and C
99. The life cycle of endoparasite are more complex why? **(Pg. 235, E)**
 A) Because of their complex morphology
 B) Because of their food habit
 C) Because of their extreme specialization
 D) All of these
100. Which of the following group do not comes under commensalism? **(Pg. 236, E)**
 A) Orchid growing on Mango branch
 B) Lichens and fungi
 C) Cattle egret and grazing cattle
 D) Sea Anemone and clown fish
101. Orchid grows as a _____ on a mango branch. **(Pg. 236, E)**
 A) Acrophyte B) Parasite

- C) Epiphyte D) Both A and B
102. Lichens represent an intimate mutualistic relationship between _____. **(Pg. 237, E)**
 A) Fungus and algae
 B) Cyanobacteria and fungus
 C) Archaeobacteria and fungus
 D) Both A and B
103. Mycorrhiza are associations between **(Pg. 237, E)**
 A) fungi and higher root plants
 B) fungi and algae
 C) Algae and lichen
 D) Both B and C
104. Who showed that 5 closely related species of Warblers living on same tree were able to avoid competition and co-exist by behaioural difference? **(Pg. 237, E)**
 A) C. Darwins B) Connell
 C) Mac Arther D) Gause
105. (A) The female wasp uses the fig fruit only for oviposition.
 (B) Female wasp shows commensalism. **(Pg. 237, E)**
 A) A and B both are correct
 B) A and B both are wrong
 C) A is correct B is wrong
 D) A is wrong and B is correct
106. The Mediterranean orchid employs _____ to get pollination done by a species of bee. **(Pg. 238, E)**
 A) Shelter B) Food
 C) Sexual deceit D) Egg-laying sites
107. Pseudocopulation is an example of- **(Pg. 238, E)**
 A) Wasp and fig B) Ophrys and bees
 C) Ophrys and warp D) None of these
108. If the female bee's colour pattern changes, the orchid flower co-evolves to maintain the resemblance of its petals for the successful pollination is known as **(Pg. 238, E)**
 A) Commensalism B) Protocooperation
 C) Co-evolution D) None of these

ANSWER KEY

ORGANISMS AND POPULATIONS

Q	1	2	3	4	5	6	7	8	9	10
Ans	B	D	D	A	D	C	D	A	A	A
Q	11	12	13	14	15	16	17	18	19	20
Ans	B	B	A	B	C	C	A	D	B	A
Q	21	22	23	24	25	26	27	28	29	30
Ans	D	D	A	A	C	A	A	B	C	B
Q	31	32	33	34	35	36	37	38	39	40
Ans	C	A	D	B	A	D	A	C	D	C
Q	41	42	43	44	45	46	47	48	49	50
Ans	B	D	B	D	A	D	C	D	A	B
Q	51	52	53	54	55	56	57	58	59	60
Ans	D	B	A	B	B	C	C	D	A	C
Q	61	62	63	64	65	66	67	68	69	70
Ans	C	C	C	A	D	A	D	B	B	D
Q	71	72	73	74	75	76	77	78	79	80
Ans	A	B	D	C	A	D	A	A	A	C
Q	81	82	83	84	85	86	87	88	89	90
Ans	A	C	B	D	A	D	D	C	A	C
Q	91	92	93	94	95	96	97	98	99	100
Ans	A	D	C	A	B	D	A	A	C	B
Q	101	102	103	104	105	106	107	108		
Ans	C	D	A	C	D	C	B	C		

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18

Ecosystem

14.1 Ecosystem: Structure and Function

1. Vertical distribution of different species occupying different levels is called as
 A) Standing crop B) Standing state
 C) Stratification D) Decomposition

Page-242, Easy

2. Identification and enumeration of plant and animal species of an ecosystem gives its

- A) Productivity
 B) Species composition
 C) Physical structure
 D) Vertical distribution

Page-242, Easy

3. Which one of the following is odd one out from others

- A) Decomposition
 B) Energy flow
 C) Nutrient cycling
 D) None

Page-242, Easy

4. The autotrophic components include

- A) Phytoplankton B) Some algae
 C) Marginal plants D) All of these

Page-242, Easy

5. The decomposers is/are the

- A) Fungi B) Bacteria
 C) Flagellates D) All of these

Page-242, Easy

6. The consumers is/are

- A) Zooplankton B) Phytoplanktons
 C) Marginal plants D) All of these

Page-242, Easy

14.2 Productivity

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7. What is the basic requirement for any ecosystem to function and sustain.

- A) Primary production
 B) Decomposers

- C) Constant input of solar energy
 D) Nutrient cycling

Page-242, Easy

8. _____ is defined as the amount of biomass or organic matter produced per unit area over a time period by plants during photosynthesis

- A) Gross primary productivity
 B) Primary production
 C) Secondary production
 D) None of these

Page-242, Easy

9. Primary production is expressed as-

- A) $K \text{ Calm}^2$ B) $K \text{ Cal/m}^2$
 C) g/m^2 D) both B & C

Page-243, Easy

10. _____ of an ecosystem is the rate of production of organic matter during photosynthesis

- A) Net primary productivity
 B) Secondary production
 C) Gross primary productivity
 D) None of these

Page-243, Easy

11. Net primary productivity (NPP) equals to

- A) $NPP = R - GPP$ B) $GPP - R = NPP$
 C) $NPP = GPP + R$ D) $GPP = R - NPP$

Page-243, Easy

12. The rate of formation of new organic matter by consumers is called as

- A) primary productivity
 B) Gross primary productivity
 C) Secondary productivity
 D) Respiratory loss

Page-243, Easy

13. Primary productivity depends on

- A) Variety of environmental factors
 B) Availability of nutrients
 C) Photosynthetic capacity of plant
 D) All of these

Page-243, Easy

14. The annual net primary productivity of the whole biosphere is approximately
 A) 190 million tons B) 170 million tons
 C) 170 billion tons D) None of these

Page-243, Easy

14.3 Decomposition

15. Which one of the following is called as "farmer's friend"?

A) Cow B) Bacteria
 C) Earthworm D) Crops

Page-243, Easy

16. Who breaks down complex organic matter into inorganic substances like CO_2 , water etc.

A) Crop roots B) Decomposers
 C) Grazing Cattle D) None of these

Page-243, Easy

17. The process of breaks down complex organic matter into inorganic substances is called as

A) Fragmentation B) Humification
 C) Decomposition D) Leaching

Page-243, Easy

18. Detritus is/are

A) Dead plant B) Dead animals
 C) Fecal matter D) All of these

Page-243, Easy

19. The correct way of decomposition

- A) Fragmentation → leaching → humification → catabolism → mineralization
 B) Fragmentation → leaching → catabolism → humification → mineralization
 C) Fragmentation → catabolism → leaching → mineralization → humification
 D) Fragmentation → mineralization → catabolism → leaching → humification

Page-243-244, Medium

20. _____ break down detritus into smaller particles

A) Earthworm

- B) Detritivores
 C) Phytoplanktons
 D) Both A & B are correct

Page-243, Easy

21. Bacteria and fungal enzymes degrade detritus into simpler inorganic substances. This process is called as

A) Leaching B) Fragmentation
 C) Catabolism D) Humification

Page-243, Easy

22. Humification leads to accumulation of a dark coloured amorphous substance called _____

A) Pectin B) Humus
 C) Lignin D) None of these

Page-244, Easy

23. Decomposition rate is slower if

A) Detritus rich in lignin & chitin
 B) Rich in nitrogen & sugars
 C) Low in nitrogen & chitin
 D) Low in lignin

Page-244, Easy

24. _____ favours decompositions

A) Warm & dry environment
 B) Warm & moist environment
 C) cold & dry environment
 D) cold & moist environment

Page-244, Easy

14.4 Energy flow

25. PAR stands for

A) Percent active radiation
 B) Photosynthetically active radiation
 C) Power angel regulation
 D) None of these

Page-245, Easy

26. Plant capture only _____ of the PAR and this amount of energy sustains the entire living world

A) 50 – 60 % B) 40 – 80 %
 C) 2 – 10 % D) 20 – 40 %

Page-245, Easy

27. The green plant in the ecosystem are called

A) Primary consumer

- B) Producer
C) Secondary consumer
D) None of these

Page-245, Easy

28. Producers in an aquatic ecosystem
A) Phytoplankton B) Algae
C) Zooplanktons D) Both A & B

Page-245, Easy

29. Generally, primary consumers will be
A) Carnivores B) Producers
C) Herbivores D) All of these

Page-245, Easy

30. In ecosystem, GFC stands for
A) Generic flow control
B) Global fund for children

C) Grazing food chain

D) None of these

Page-245, Easy

31. Decomposers are also known as
A) Autotrophs B) Standing crops
C) Saprotrophs D) None of these

Page-245, Easy

32. Based on the source of their nutrition or food, organisms occupy a specific place in the food chain that is known as their

A) Food web B) Trophic level
C) Niche D) Eco level

Page-245, Easy

33. Match the following

	Column I		Column II
i	Plants	a	Lion
ii	Carnivores	b	Phytoplanktons
iii	Herbivores	c	Wolf
iv	Top Carnivores	d	Cow

- A) i-b, ii-c, iii-d, iv-a B) i-c, ii-d, iii-b, iv-a
C) i-b, ii-d, iii-a, iv-c D) i-d, ii-b, iii-a, iv-c

Page-245, Easy

34. Each trophic level has a certain mass of living material at a particular time called as the

A) Biomass B) Standing crop
C) Standing state D) None of these

Page-247, Easy

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35. The standing crop is measured as the

A) Mass of living organisms
B) Biomass
C) The no. in a unit area
D) All of these

Page-247, Easy

36. Choose the correct sequence –

A) Producer → herbivore → primary carnivore → secondary carnivore
B) Producer → primary carnivore → herbivore → secondary carnivore
C) Primary carnivore → secondary carnivore → herbivore → Producer
D) None of these

Page-247, Easy

14.5 Ecological Pyramids

37. Ecological pyramids are

A) Pyramid of number
B) Pyramid of energy
C) Pyramid of biomass
D) All of these

Page-247-249, Easy

38. The pyramid of biomass in sea is

A) Always upright
B) Generally inverted
C) Both A & B
D) None of these

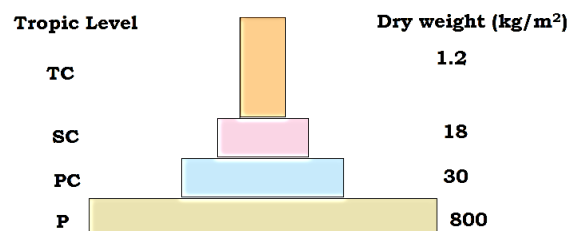
Page-249, Easy

39. Pyramid of energy is

A) Always inverted
B) Sometime upright
C) Always upright
D) Sometimes inverted

Page-249, Easy

40. Identify the pyramid

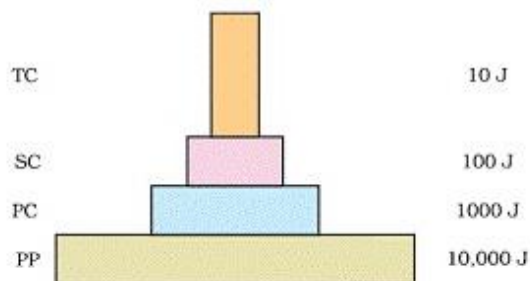


- A) Pyramid of number
B) Pyramid of biomass

- C) Pyramid of energy
D) None of these

Page-248, Easy

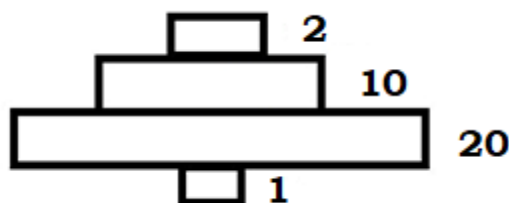
41. Identify the pyramid



- A) Pyramid of number
B) Pyramid of biomass
C) Pyramid of energy
D) None of these

Page-249, Easy

42. Identify the pyramid



- A) Pyramid of number
B) Pyramid of biomass
C) Pyramid of energy
D) None of these

Page-248, Easy

14.6 Ecological succession

43. A community that is in near equilibrium with the environment is called as

- A) Pioneer community
B) Middle community
C) Climax community
D) Sere

Page-250, Easy

44. The gradual and fairly predictable change in the species composition of a given area is called

- A) Hydrarch succession
B) Ecological succession
C) Pioneer succession
D) None of these

Page-250, Easy

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45. The entire sequence of communities that successively change in a given area are called

- A) Ecosystem
B) Pioneer
C) Sere
D) All of these

Page-250, Easy

46. Areas where primary succession occurs

- A) Bare rock
B) Newly cold lava
C) Newly created pond
D) All of these

Page-250, Easy

47. Secondary succession begins in areas where

- A) No living organism are there
B) Lost all the living organism
C) Natural biotic communities have been destroyed
D) Both B & C

Page-251, Easy

48. Areas where secondary succession occurs

- A) Burned and cut forests areas
B) Land that have been flooded
C) Abandoned farm lands
D) All are correct

Page-251, Easy

49. Select the correct statement

- A) secondary succession is faster than primary succession
B) primary succession is faster
C) Both are a equal speed
D) None of these

Page-251, Easy

50. The individual transitional communities are termed as

- A) Seral stages
B) Pioneer
C) Seral communities
D) Both A & C are correct

Page-250, Easy

14.6.1 Succession of plants

51. Which type of succession takes place in wet areas

- A) Hydrarch succession
B) Xerarch succession
C) Mesarch succession
D) None of these

Page-251, Easy

52. Xerarch succession occurs in
 A) Wet areas B) Cold areas
 C) Dry areas D) All of these

Page-251, Easy

53. The species that invade a bare area called
 A) Sere B) Pioneer species
 C) Climax species D) None of these

Page-251, Easy

54. In hydrarch succession the successional series progress from
 A) Mesic to hydric condition
 B) Hydric to mesic condition
 C) Hydric to xeric condition
 D) Xeric to mesic condition

Page-251, Easy

55. In xerarch succession, the succession series progress from
 A) Xeric to hydric condition
 B) Xeric to mesic condition
 C) Mesic to xeric condition
 D) None of these

Page-251, Easy

56. Which one of the following occur as a pioneer species on rocks
 A) Bryophytes
 B) Phytoplankton
 C) Lichens
 D) Blue algae

Page-251, Easy

57. Choose the correct sequence of succession in water
 A) Phytoplanktons → rooted-submerged plants → rooted floating angiosperms → free floating plants → reed swamp → marsh-meadow → scrub → the trees → forest
 B) Phytoplanktons → free floating plants → rooted-submerged plants → rooted floating angiosperms → reed swamp → scrub → marsh-meadow → the trees → forest
 C) Phytoplanktons → rooted-submerged plants → reed swamp → rooted floating angiosperms → free floating plants → marsh-meadow → scrub → the trees → forest

- D) None of these

Page-251, Easy

58. Choose the correct statement-
 A) All succession whether taking place in water or on land, proceeds to a different climax community
 B) All succession whether taking place in water or on land, proceeds to a similar climax community the mesic
 C) All succession whether taking place in water or on land, proceeds to a similar climax community the xeric
 D) All of these

Page-251, Easy

59. Which one of the following is not the part of hydrarch succession
 A) Scrub stage
 B) Tree
 C) Zooplankton
 D) Submerged plant stage

Page-251, Easy

60. During succession some species colonise an area and their population become more numerous whereas population of other species
 A) Increases
 B) Decline and even disappear
 C) Migrate
 D) None of these

Page-251, Easy

61. Why does secondary succession is faster?
 A) Because soil is already there
 B) They have special power
 C) Growth of plants is faster
 D) All of these

Page-251, Easy

62. The climax community remains _____ as long as the environment remains _____.
 A) Unstable, unchanged
 B) Stable, unchanged
 C) Stable, changed
 D) Stable, changed

Page-251, Easy

63. The word (term) use for medium water conditions
 A) Xeric B) Hydric

- C) Mesic D) None of these

Page-251, Easy

64. Choose the correct sequence

- i) lichens
- ii) Grasses
- iii) Bryophytes
- iv) Higher plants
- v) Forest

- A) i → ii → iii → iv → v
- B) i → iii → ii → iv → v
- C) i → iv → ii → iii → v
- D) v → iv → i → ii → iii

Page-251, Easy

65. in hydrarch succession, after climax with time the water body is converted into

- A) River B) Ocean
- C) Land D) None of these

Page-251, Easy

66. In hydrarch succession, the pioneer and climax community are respectively

- A) Forest, Phytoplanktons
- B) Phytoplanktons, Forest
- C) Moss, Trees
- D) Lichen, Trees

Page-251, Easy

14.7 Nutrient Cycling

67. The amount of nutrients such as carbon, nitrogen, phosphorus, calcium etc present in the soil at any given time is referred to as the

- A) Nutrients cycle B) Standing crop
- C) Standing state D) None of these

Page-253, Easy

68. Standing state varies in

- A) Different kinds of ecosystem
- B) On a season basis
- C) Different kinds of nutrients
- D) Both A & B

Page-253, Easy

69. The movement of nutrients elements through the various components of an ecosystem can be called

- A) Gaseous cycle
- B) Nutrient cycling
- C) Sedimentary cycle
- D) All of these

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Page-253, Easy

70. Another name of nutrient cycling is

- A) Gaseous cycle
- B) Biological cycle
- C) Biogeochemical cycle
- D) Biophysical

Page-253, Easy

71. Reservoir for gaseous type of nutrient cycle

- A) Earth's crust B) Rock
- C) The atmosphere D) Water bodies

Page-253, Easy

72. Reservoir for sedimentary type of Nutrient cycle

- A) Ocean B) Earth's crust
- C) Rock D) Atmosphere

Page-253, Easy

73. Environmental factor to regulate the rate of release of nutrients into the atmosphere.

- A) Soil
- B) Moisture
- C) Temperature & pH
- D) All of the above

Page-253, Easy

74. Reason behind nutrients never lost from ecosystem.

- A) Because nutrients present in large amount
- B) Because they are recycled
- C) Because they have no use
- D) All of the above

Page-253, Easy

14.7.1 Ecosystem-Carbon Cycle

75. Percent of carbon constitutes in dry weight of organism

- A) 60% B) 39%
- C) 49% D) 71%

Page-254, Easy

76. Which is the first & second most abundant constituent of an organism?

- A) Water, phosphorus
- B) Water, carbon
- C) Carbon, water
- D) Carbon, phosphorus

Page-254, Easy

77. How much of total quantity of global carbon is dissolved in the oceans?

- A) 88% B) 75%
C) 81% D) 71%

Page-254, Easy

78. Carbon cycling occurs through

- A) Atmosphere
B) Living & dead organism
C) Ocean
D) All of the above

Page-254, Easy

79. How much at carbon in fixed annually in the biosphere through photosynthesis?

- A) 8×10^{12} kg B) 4×10^{12} kg
C) 4×10^{13} kg D) 4.9×10 kg

Page-254, Easy

80. Additional sources for releasing CO_2 in the atmosphere is/are-

- A) Burning of wood B) Forest fire
C) Fossil fuel D) All of the above

Page-254, Easy

81. Human activities have significantly increased the rate of released of CO_2 into the atmosphere by

- A) Rapid deforestation
B) Massive burning of fossil
C) Both A and B
D) None of the above

Page-254, Easy

14.7.2 Ecosystem-Phosphorus Cycle

82. Phosphorus is a major constituent of

- A) Biological membranes
B) Nucleic acids
C) Cellular energy transfer unit
D) All of the above

Page-254, Easy

83. Rock is the natural reservoir of

- A) Carbon
B) Nitrogen
C) Phosphorus
D) None at these

Page-254, Easy

84. Herbivores & other animals obtain Phosphorus from

- A) Rock B) Plants
C) Ocean D) Lake

Page-254, Easy

85. The waste products and the dead organism are decomposed by _____ releasing phosphorus.

- A) Fungi
B) Phosphate-solubilising bacteria
C) Phosphate-unsolubilising bacteria
D) None of the above

Page-254, Easy

86. Choose the correct statement.

- A) Atmospheric inputs of phosphorus through rainfall are much smaller than carbon inputs.
B) Atmospheric inputs of phosphorus through rainfall are larger than carbon inputs.
C) Atmospheric inputs of phosphorus through rainfall are equal to the carbon inputs.
D) None of the above

Page-254, Easy

87. Choose the more correct statement.

- A) Gaseous exchange at phosphorus b/w organism & environment are very high.
B) Gaseous exchange of phosphorus b/w organism & environment are low.
C) Gaseous exchange at phosphorus b/w organism & environment are negligible.
D) None at these

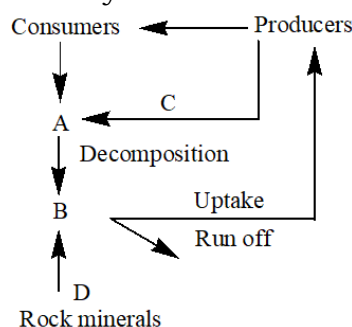
Page-254, Easy

88. In natural resevoirs, phosphorus present in the form of

- A) Phosphite B) Pyrophosphate
C) Phosphates D) None of the above

Page-254, Easy

89. Identify the blanks



	A	B	C	D
A)	Detritus	Weathering	Soil solution	Litter fall

B)	Litter fall	Weatheri ng	Detritu s	Soil solution
C)	Weatheri ng	Litter fall	Soil solutio n	Detritus
D)	Detritus	Soil solution	Litter fall	Weatheri ng

Page-254, Medium

90. Which one of the following is not a Gaseous nutrient cycle?

- A) Oxygen cycle B) Nitrogen cycle
C) Sulphur cycle D) None of the above

Page-254, Easy

91. Animals need large quantities of phosphorus to make

- A) Shells B) Teeth
C) Bones D) All of the above

Page-254, Easy**14.8 Ecosystem Services**

92. The products of ecosystem processes are named as

- A) Environmental services
B) Ecosystem goods
C) Ecosystem services
D) All of the above

Page-255, Easy

93. Healthy ecosystems are the base for a

- A) Wide range of economic
B) Environmental
C) Aesthetic goods & services
D) All of the above

Page-255, Easy

94. Examples of Ecosystem services

- A) Healthy forest ecosystem purify air & water
B) Generate fertile soil
C) Provide storage site for carbon
D) All of the above

Page-255, Easy

95. _____ & his colleagues have very recently tried to put price tags on nature's life-support services.

- A) Robert frost
B) Robert Constanza

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C) Robert hook

D) Robert Clive

Page-255, Easy

96. Researchers have put an average price tag of _____ a year on fundamental ecosystem services.

- A) US \$ 33 billion B) US \$ 44 billion
C) US \$ 44 trillion D) US \$ 33 trillion

Page-255, Easy

97. GNP stands for

- A) Grand national product
B) Gross national product
C) Gross national produce
D) None of these

Page-255, Easy

98. Out of the total cost at various ecosystem services the soil formation accounts for about.

- A) 40% B) 60%
C) 50% D) 30%

Page-255, Easy

99. The cost of climate regulation & habitat for wildlife are

- A) 8% each B) 6% at overall
C) 6% each D) None at the above

Page-255, Easy

100. The value of the global GNP

- A) US \$ 28 trillion B) US \$ 18 Billion
C) US \$ 33 trillion D) US \$ 18 trillion

Page-255, Easy

101. Choose the correct statement.

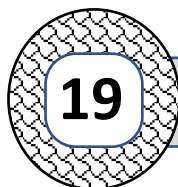
- A) Value of Ecosystem services at biodiversity is difficult to determine.
B) Value of Ecosystem services of biodiversity is very easy to determine.
C) No need to determine the value of Ecosystem services.
D) None of these

Page-255, Easy

ANSWER KEY ECOSYSTEM

Q	1	2	3	4	5	6	7	8	9	10
Ans	C	B	D	D	B	A	C	B	D	C
Q	11	12	13	14	15	16	17	18	19	20
Ans	B	C	D	C	C	B	C	D	B	D
Q	21	22	23	24	25	26	27	28	29	30
Ans	B	B	A	B	B	C	B	D	C	C
Q	31	32	33	34	35	36	37	38	39	40
Ans	C	C	A	B	D	A	D	B	C	B
Q	41	42	43	44	45	46	47	48	49	50
Ans	C	A	C	B	C	D	D	D	A	D
Q	51	52	53	54	55	56	57	58	59	60
Ans	A	C	B	B	B	A	A	B	C	B
Q	61	62	63	64	65	66	67	68	69	70
Ans	A	B	B	B	C	B	C	D	D	C
Q	71	72	73	74	75	76	77	78	79	80
Ans	C	B	D	B	C	B	D	D	C	D
Q	81	82	83	84	85	86	87	88	89	90
Ans	C	D	C	B	B	A	C	C	D	C
Q	91	92	93	94	95	96	97	98	99	100
Ans	D	C	D	D	B	D	B	C	C	D
Q	101									
Ans	A									

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19

Biodiversity and conservation**15.1 Biodiversity**

1. Term 'Biodiversity' popularized by (Pg. 258, E)
A) Robert hook B) Ernst Haeckel
C) Edward Wilson D) G. Tansley
 2. Edward Wilson was a - (Pg. 258, E)
A) Mathematician B) Sociobiologist
C) Psychologist D) None of the above
 3. 'Biodiversity' was popularized (Pg. 259, E)
A) To describe the combined diversity
B) to describe individual diversity
C) To describe plant diversity
D) None of the above
 4. Types of Biodiversity is/are- (Pg. 259, E)
A) Genetic diversity
B) Species diversity
C) Ecological diversity
D) All of these
 5. The genetic variation shown in (Pg. 259, E)
A) *Rauwolfia vomitoria*
B) Rice
C) Mango
D) All of the above
 6. Active chemical in *Rauwolfia vomitoria* (Pg. 259, E)
A) Terpine
B) Reserpine
C) Asprine
D) None of the above
 7. Which one is correct about Genetic diversity (Pg. 259, E)
A) Genetic variation shown by *Rauwolfia vomitoria*
B) Genetic variation shown in western ghats.
C) India has less than 5000 genetically different strain of rice
D) India has 1,000 varieties of rice
 8. India has more than..... genetically different strains of rice, andvarieties of Mango. (Pg. 259, E)
A) 50,000, 1,000
B) 1,000 & 50,000
C) 5,000, 1,000
D) 1,000 & 5,000
 9. The diversity at the species level is c/a (Pg. 259, E)
A) Ecological diversity
B) Genetic diversity
C) Species diversity
D) None of these
 10. TheGhats have a greater amphibian species diversity than the Ghats. (Pg. 259, E)
A) Eastern, Western
B) Western, Eastern
C) Western, Southern,
D) Eastern, Southern
 11. Ecological diversity is in (Pg. 259, E)
A) Deserts
B) Rain forests, Mangroves
C) Coral reefs, Wetlands
D) All of the above
 12. Biodiversity and its conservation is of (Pg. 259, E)
A) national concern
B) concern in some states of india
C) international concern
D) all of these
- 15.1.1 How many species are there on Earth How many in India.**
13. IUCN stands for- (Pg. 259, E)
A) International unity for conservation of Nature
B) Indian union for conservation of Nature
C) Italian union for conservation at Nature
D) International Union for conservation of Nature and Natural Resources
 14. Robert may estimates the global species diversity at about (Pg. 259, E)
A) 7 billion B) 70 million
C) 7 million D) 70 billion
 15. Most species rich taxonomic group are (Pg. 260, E)
A) Crustaceans B) Insects
C) Molluscs D) None of the above

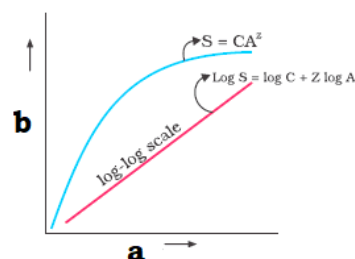
16. In all available species more than 70% of all the species recorded are _____ which _____ comprise no more than 22% of the total **(Pg. 260, E)**
 A) Invertebrates, Plants
 B) Plants, Animal
 C) Animal, Plants
 D) Plant, Invertebrates
17. Highest variation of species in plants is in **(Pg. 260, E)**
 A) Fungi B) Mosses
 C) Algae D) Lichens
18. In vertebrates maximum No. of species found in **(Pg. 260, E)**
 A) Birds B) Mammals
 C) Fishes D) Reptiles
19. Problem behind no given figures about prokaryotes is **(Pg. 260, E)**
 A) Conventional taxonomic methods are not suitable for identifying microbial species
 B) Many species are simply not culturable under laboratory conditions
 C) Because prokaryotes are non-living
 D) A & B both are correct
20. India has only percent at the world's land area. Its share of the global species diversity in an impressive....percent. **(Pg. 261, E)**
 A) 2.4, 8.1 B) 8.1, 2.4
 C) 4.1, 8.2 D) 8.4, 2.1
21. India is one of themega diversity countries of the world. **(Pg. 261, E)**
 A) 13 B) 14
 C) 12 D) 11
22. How many plant species found in India roughly **(Pg. 261, E)**
 A) 1,00,000 B) 45,000
 C) 3,00,00 D) None of the above
23. According to May's global estimate there are probably.....plant species & more thananimal species. **(Pg. 261, E)**
 A) 3,00,000 & 1,00,000
 B) 30,000 & 10,000
 C) 1,00,000 & 3,00,000
 D) 10,000 & 30,000
24. Species diversity decreases as **(Pg. 261, E)**
 A) We move away from the equator towards the poles
 B) We move away from the poles towards equator
 C) We move hill to plane area
 D) None of the above
25. How many species of birds found in India? **(Pg. 261, E)**
 A) 1500 B) 1400
 C) 1200 D) 1700
26. Greatest biodiversity on earth is found in **(Pg. 261, E)**
 A) Sundarbans
 B) Amazon rain forest
 C) Congo rain forest
 D) None of the above
27. Amazon Rainforest situated in **(Pg. 261, E)**
 A) North America B) North India
 C) South America D) West America
28. Choose the correct option **(Pg. 261, E)**
- | | | | |
|---|----------|-----|--------|
| 1 | Plant | i | 378 |
| 2 | Fishes | ii | 40,000 |
| 3 | Birds | iii | 427 |
| 4 | Mammals | iv | 3,000 |
| 5 | Reptiles | v | 1,300 |
- 1 2 3 4 5
 A) ii iv v iii i
 B) iii ii v I iv
 C) ii iv v I iii
 D) None of the above
29. How many insect species waiting to be discovered & named. **(Pg. 261, E)**
 A) 2 million B) 20,000
 C) 2,000 D) 2,00,000
30. Which one is wrong about species found in Amazon rainforest. **(Pg. 261, E)**
 A) Reptiles-378 B) Fishes-3,000
 C) Birds-1300
 D) All of the above are correct
31. More.....Energy available in tropics, which contributes to higher productivity **(Pg. 262, E)**
 A) Solar
 B) Thermal
 C) Nuclear
 D) None of the above

15.1.2 Patterns of Biodiversity

32. The relation b/w species richness & area for a wide variety of taxa turns out to be a
(Pg. 262, E)
A) Linear B) Sigmoid
C) Rectangular Hyperbola
D) None of the above
33. Correct equation of species-Area relationship
(Pg. 262, E)
A) $\log A = \log S + Z \log C$
B) $\log S = \log C + Z \log A$
C) $\log S = \log Z + C \log A$
D) $\log S = \log C - Z \log A$
34. In species area relationship equation, Z stands for-
(Pg. 262, E)
A) Slope of the line
B) Regression coefficient
C) species richness
D) Both a & B are correct
35. Value of Z is
(Pg. 262, E)
A) 20-30 B) 1 - 2
C) 0.1 - 0.2 D) None of the above
36. The value of Z in the entire continents
(Pg. 262, E)
A) 0.8 - 1.8 B) 0.6 - 1.2
C) 0.1 - 0.2 D) None of the above
37. The value of Z for frugivorous birds & mammals in the tropical forests of different continents
(Pg. 262, E)
A) 2.15 B) 0.5
C) 1.15 D) 0.8
38. Concept of species-Area relationship given by
(Pg. 262, E)
A) Robert Frost
B) Paul Ehrlich
C) Alexander hook
D) Alexander Von Humboldt
39. Alexander von Humboldt is a
(Pg. 262, E)
A) German naturalist
B) Philosopher
C) Geographer
D) Both A & C are correct
40. According to Alexander species richness
(Pg. 262, E)
A) Increased with increasing explored area, but only up to a limit
B) Decreased with increasing explored area, but only up to a limit

- C) Increased with decreasing explored area, but there are no limitations
D) None of the above

41. Find out A and B and also select the correct answer
(Pg. 262, E)



- A) a = species richness
b = Area
B) a = area
b = species richness
C) a = Area
b = Regression coefficient
D) none of these
42. In species-area relationship equation
(Pg. 262, E)
A) S = species richness
B) A = area
C) C = Y - intercept
D) All of these
43. Which one is correct about a stable community?
(Pg. 262, E)
A) Should not show too much variation in productivity from year to year
B) It must be either resistant or resilient on surface disturbance
C) It must also be resistant to invasions by alien species
D) All of these are correct
44. Find out correct option about David Tilman's long term ecosystem experiments
(Pg. 263, E)
A) Plots with more species showed less year-to-year variation in total biomass
B) Plots with more species show too much variation in productivity
C) Increased diversity contributed to higher productivity
D) Both A & C are correct
45. 'Rivet popper hypothesis' is given by
(Pg. 263, E)
A) Alexander von Humboldt
B) Paul Ehrlich

- C) Tilman
D) Robert hook
46. Paul Ehrlich is a **(Pg. 263, E)**
A) Stanford ecologist
B) Stanford psychologist
C) Stanford micrologist
D) Stanford geologist
47. In Rivet popper hypothesis, rivets depict as **(Pg. 263, E)**
A) Ecosystem B) Extinct species
C) Species D) Plants
48. According to Ehrlich's rivet popper hypothesis loss of rivets on the wings affects in ecosystem as- **(Pg. 263, E)**
A) Loss of key species that drive major ecosystem function
B) Proper functioning of ecosystem
C) Species to become extinct
D) None of these
49. According to rivet popper hypothesis, which one is not correct **(Pg. 263, E)**
A) Rivet – species
B) Airplane – Ecosystem
C) Rivets to take home – species to become extinct
D) All of these are correct

15.1.4 Loss of Biodiversity

50. The colonization of tropical pacific islands by humans is said to have led to the extinction of more than _____ of native birds **(Pg. 263, E)**
A) 2000 species B) 1200 species
C) 20000 species D) 200 species
51. According to red list (2004) No. of total extinct species in last 500 years **(Pg. 263, E)**
A) 504 species B) 387 species
C) 478 species D) 784 species
52. How many species of invertebrates become extinct in last 500 years **(Pg. 263, E)**
A) 87 species B) 784 species
C) 359 species D) None of these
53. According to recent extinction which one is incorrect option – **(Pg. 263, E)**
A) Dodo – Mauritius
B) Steller's sea cow – USA
C) Quagga – Africa

- D) Thylacine – Australia
54. Subspecies of tiger which become recently extinct **(Pg. 263, E)**
A) Bali B) Caspian
C) Javan D) All of these
55. The last 20 years alone have witnessed the disappearance of _____ **(Pg. 263, E)**
A) 300 species B) 10 species
C) 27 species D) 1000 species
56. Match the following- **(Pg. 264, E)**

	Species		% of threat of extinction
a	Birds	1	23%
b	Mammals	2	32%
c	Amphibians	3	12%
d	Gymnosperms	4	31%

- A) a-1, b-3, c-2, d-4
B) a-3, b-1, c-2, d-4
C) a-3, b-1, c-4, d-2
D) a-3, b-4, c-1, d-2
57. Select the correct statement about 'Sixth Extinction' **(Pg. 264, E)**
A) The extinction rates are estimated to be 100 - 1000 times faster than in the pre-human times.
B) Human activities are responsible for the faster rates.
C) Half of all the species on Earth might be wiped out within the next 1000 years.
D) Both A and B option are correct.
58. Loss of biodiversity in a region may lead to **(Pg. 264, E)**
A) decline in plant production,
B) lowered resistance to environmental perturbations such as drought.
C) Increased variability in ecosystem process.
D) All of these.
59. 'The Evil Quartet' is the term used to describe **(Pg. 264, E)**
A) Causes of habitat losses
B) Causes of biodiversity losses.
C) Causes of water losses
D) All of these.
60. The accelerated rates of species extinctions are largely due to **(Pg. 264, E)**

- ## NCERT LINE BY LINE

15.2 Biodiversity Conservation

74. Reason behind conserving the biodiversity.

(Pg. 265, E)

- A) Narrowly utilitarian.
- B) Broadly utilitarian.
- C) Ethical
- D) All of these

75. More than 25% of the drugs currently sold in the market worldwide are derived from i and ii species of plants contribute to the traditional medicines used by native peoples around the world.

(Pg. 265, E)

- A) i- plants, ii- 25,000
- B) i- Animals, ii- 25,000
- C) i- Animals, ii- 25,00
- D) i- plants, ii- 25,00

76. How much oxygen is produced by Amazon Forest through Photosynthesis?

(Pg. 266, E)

- A) 20% of the total oxygen.
- B) 30% of the total oxygen.
- C) 25% of the total oxygen.
- D) None of these.

77. Select the correct option about ethical argument.

(Pg. 266, E)

- A) In ethical argument of conserving biodiversity relates to what we are to million of plant, animals and micro species with whom we share this planet.
- B) We need to realize that every species has an intrinsic value.
- C) We have a moral duty to care for their well being and pass on our biological legacy in good order to future generation.
- D) All these statements are correct.

15.2.2 How do we conserve biodiversity?

78. Species confined to that region and not found anywhere else is called as-

(Pg. 266, E)

- A) In situ
- B) Exotic
- C) Endemic
- D) None of these

79. Initially i biodiversity hotspots were identified, but after some time ii more have been added and the total number of biodiversity hotspot in the world to iii.

(Pg. 266, E)

- A) i- 25, ii- 9
- B) ii- 8, iii- 30
- C) i- 23, iii- 34
- D) none of these

80. Match the following (Pg. 266, E)

	Column I		Column II
a	Biosphere reserve	1	448
b	National parts	2	14
c	Wildlife centuries	3	90

- A) a-2, b-3, c-1
- B) a-1, b-2, c-3
- C) a-2, b-1, c-3
- D) a-1, b-3, c-2

81. Sacred groves are/is found in (Pg. 267, E)

- A) Khasi and Jaintia hills in Meghalaya
- B) Aravalli hills of Rajasthan
- C) Western ghat region of Karnataka
- D) All of these are correct

82. In which sacred growth the last refugees for a large number of rare and threatened plants are there?

(Pg. 267, E)

- A) In Rajasthan
- B) In western ghat
- C) In Meghalaya
- D) In Karnataka.

83. 'Biodiversity hotspots' is a region where-

(Pg. 267, E)

- A) Very high level of species richness and high degree of endemism
- B) Very high level of species richness and low degree of endemism
- C) Very low level of species richness and also low degree of endemism
- D) None of these

84. Which one is not a characteristic of biodiversity hotspots?

(Pg. 267, E)

- A) High level of species richness.
- B) Endemism
- C) 38 in numbers
- D) Accelerated habitat loss protection

85. Which one is not included under in situ conservation?

(Pg. 267, E)

- A) Biosphere reserves
B) National parks
C) Zoological parks
D) Sacred groves
86. Which one is not the hotspot in India? **(Pg. 267, E)**
A) Western ghats B) Indo Burma
C) Eastern Ghats D) Himalaya
87. Sacred groves are that- **(Pg. 267, E)**
A) Place which are protected for animals.
B) Place where all people are worship.
C) Place where religion and cultural traditions that emphasized protection of nature
D) None of these
88. Sacred groves, Khasi and Jaintia hills located in- **(Pg. 267, E)**
A) Meghalaya B) Manipur
C) Mizoram D) Madhya Pradesh
89. What is endangered or threatened? **(Pg. 267, E)**
A) Organisms facing a very high risk of death due to environment.
B) Organisms facing a very high risk of extinction, in the near future.
C) Organism facing a very high risk of danger from other organisms.
D) None of these.
90. Which one of the following is not an example of Ex-situ conservation? **(Pg. 267, E)**
A) Zoological parks
B) Botanical Gardens
C) Biosphere reserves
D) none
91. Gametes of threatened species can be preserved in variable and fertile condition for long period using **(Pg. 267, E)**
A) Heat B) Cryopreservation
C) Both D) None of these
92. Threatened plant species can be propagated by- **(Pg. 267, E)**
A) Tissue Culture B) Aquaculture
C) Cryopreservation D) None of these
93. The Earth's summit held in Rio de Janeiro in. **(Pg. 267, E)**
A) 2000 B) 1990
C) 1992 D) 2002
94. The world's summit on sustainable development held in 2002 in. **(Pg. 267, E)**
A) Johannesburg, South Africa.
B) Cape town South Africa.
C) Rio de Janeiro.
D) East America
95. How many countries pledged in world summit held in 2002 in Johannesburg? **(Pg. 267, E)**
A) 200 B) 180
C) 170 D) 190
96. In which type of conservation threatened animals and plants are taken out from their natural habitat and placed in special setting place where they can be protected and given a special care? **(Pg. 267, E)**
A) Cryopreservation
B) Ex-situ conservation
C) In-situ conservation
D) None of these
97. Seeds of different genetic strains of commercially important plants can be kept for long period in **(Pg. 267, E)**
A) Cryopreservation
B) Tissue culture
C) Seed bank
D) None of these
98. Which are involved in In-situ conservation? **(Pg. 267, E)**
(i) Biosphere reserve
(ii) Cryopreservation
(iii) Tissue culture
(iv) Seed bank
(v) National park
(vi) Zoological park
(vii) Sacred groves
(viii) Safari parks
A) iii, vii, v B) ii, iii, i
C) i, v, vii D) iv, vi, i
99. Pledge of Earth Summit held in Rio de Janeiro. **(Pg. 267, E)**
A) All nations to take appropriate measure for conservation of

biodiversity and sustainable utilization of its benefit.

- B) All nations are free to utilize natural resources and also harm the ecosystem.
- C) Significant reduction in the current rate of biodiversity loss at global, regional and local levels.
- D) None of these

100. What is correct about the historic convention on biological diversity?

(Pg. 267, E)

- (i) It held in Rio de Janeiro
- (ii) In 1992

(iii) Also called the earth summit

(iv) 190 states Pledged in this summit

(v) Commitment to achieve by 2020

- A) i, ii, iv B) i, ii, iii
- C) iii, iv, I D) all

101. In recent years, which type of conservation has advanced beyond keeping threatened species in enclosures? **(Pg. 267, E)**

- A) In-situ conservation
- B) Ex-situ conservation
- C) None of these
- D) Both A & B

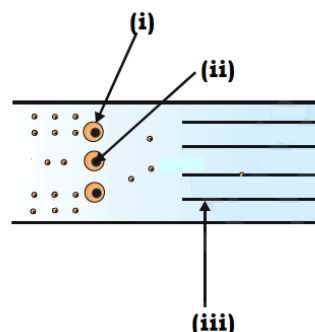
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ANSWER KEY**BIODIVERSITY AND CONSERVATION**

Q	1	2	3	4	5	6	7	8	9	10
Ans	C	B	A	D	D	B	A	A	C	B
Q	11	12	13	14	15	16	17	18	19	20
Ans	D	C	D	C	B	C	A	C	D	A
Q	21	22	23	24	25	26	27	28	29	30
Ans	C	A	C	A	C	B	C	A	A	D
Q	31	32	33	34	35	36	37	38	39	40
Ans	A	C	B	D	C	B	C	D	D	A
Q	41	42	43	44	45	46	47	48	49	50
Ans	B	D	D	D	B	A	C	A	D	A
Q	51	52	53	54	55	56	57	58	59	60
Ans	D	C	B	D	C	B	D	D	B	C
Q	61	62	63	64	65	66	67	68	69	70
Ans	D	D	B	D	B	C	D	C	D	B
Q	71	72	73	74	75	76	77	78	79	80
Ans	D	B	A	D	A	A	D	C	A	A
Q	81	82	83	84	85	86	87	88	89	90
Ans	D	C	A	C	C	A	D	A	B	C
Q	91	92	93	94	95	96	97	98	99	100
Ans	B	A	C	C	D	B	C	C	A	D
Q	101									
Ans	B									

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1. _____ are the agents that bring undesirable changes in physical, chemical or biological characteristics of air, land, water or soil. (Pg. 270, E)
 - A) Pollution
 - B) Pollutants
 - C) Contagion
 - D) Particulate matter
2. Environment (protection) Act was passed in _____. (Pg. 270, E)
 - A) 1990
 - B) 1996
 - C) 1986
 - D) 1948
3. Environment (protection) Act was passed by _____. (Pg. 270, E)
 - A) WHO
 - B) Forest and environment minister of USA
 - C) Water conservation committee of world
 - D) Government of india
8. Catalytic converters, having expensive metals namely _____ and _____ as the catalysts are fitted into auto mobiles for reducing emission of poisonous gases. (Pg. 272, E)
 - A) platinum – palladium and rhodium
 - B) osmium – platinum and rhodium
 - C) silver – platinum and indium
 - D) ruthenium – palladium and rhodium
9. In India, the air (prevention and control of pollution) Act come into force in _____. (Pg. 272, E)
 - A) 1980
 - B) 1982
 - C) 1988
 - D) 1981
10. Label the figure correctly using given correct option – (Pg. 271, E)



	(i)	(ii)	(iii)
A	Discharge corona	Negatively charged wire	Collection plate grounded
B	Electron	Nucleus	Collection plate
C	Negatively charged wire	Discharge corona	Collection plate
D	Dust particles	Negatively charged wire	Collection plate grounded

16.1 Air Pollution and Its Control

4. _____ is the most widely used method of removing particulate matter from air (Pg. 271, E)
 - A) Wet scrubbers
 - B) Venturi scrubbers
 - C) Fume scrubber
 - D) Electrostatic precipitator
5. In electrostatic precipitator, _____ attach to dust particle giving them a net negative charge (Pg. 271, E)
 - A) Proton
 - B) Negatively charged wire
 - C) Electron
 - D) Another dust particles
6. CPCB stands for (Pg. 271, E)
 - A) Control pollution central board
 - B) Central population control board
 - C) Central pollution control board
 - D) Control population central board
7. According to CPCB, particulate size _____ are responsible for causing the greatest harm to human health (Pg. 271, E)
 - A) 2.0 micrometers or more in diameter
 - B) 2.0 micrometers or less in diameter
 - C) 2.5 micrometers or less in diameter
 - D) 2.5 micrometers or more in diameter
11. Which among the following is used in scrubber to clean the exhaust air?
 - A) Water or lime
 - B) Chlorine
 - C) Platinum
 - D) Molybdenum

16.1 Air Pollution and Its Control

12. What does PIL stands for (Pg. 272, E)
 A) People Interest Limitation
 B) Public Interest Litigation
 C) Population Interest Litigation
 D) Personal Interest Litigation
13. Which among the following is best to use as a fuel for public transport? (Pg. 272, E)
 A) Petrol
 B) Diesel
 C) Compressed Natural Gas (CNG)
 D) Gasoline
14. Statement P : CNG is better than petrol and diesel
 Statement Q : CNG burns most efficiently and left with very little of unburnt residue (Pg. 273, E)
 A) P is correct and Q is wrong
 B) Both statements are correct
 C) P is wrong and Q is correct
 D) Both statements are wrong
15. Use of _____ and _____ reduces the vehicular pollution. (Pg. 273, E)
 A) Lead petrol and low sulphur petrol
 B) Unleaded petrol and high sulphur petrol
 C) Unleaded petrol and low sulphur petrol and diesel.
 D) Lead petrol and high sulphur petrol
16. Which among the following is correct option –
 ACC. to Euro III norms – (Pg. 273, E)
 A) Sulphur be controlled at 350 ppm in diesel
 B) Sulphur be controlled at 150 ppm in diesel
 C) Sulphur be controlled at 370 ppm in diesel
 D) Sulphur be controlled at 360 ppm in diesel
17. Bharat stage II is equivalent to which among the following – (Pg. 273, E)
 A) Euro – III norms B) Euro – I norms
 C) Euro – II norms D) Euro – IV norms
18. (i) Bharat stage III – norms is applicable to 4 wheelers, 3 wheelers, 2 wheelers
 (ii) Bharat stage III norm is implemented throughout the country since May 2017

(Pg. 273, E)

- A) Both (i) and (ii) are correct
 B) (i) is correct and (ii) is wrong
 C) (i) is wrong and (ii) is correct
 D) Both (i) and (ii) are wrong

16.2 Water Pollution and It's Control

19. Water (Prevention and Control of pollution) Act was passed in which year?

(Pg. 273, E)

- A) 1981 B) 1974
 C) 1989 D) 1986

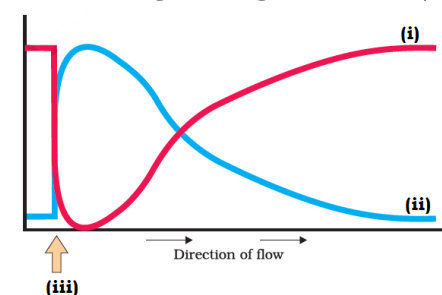
20. Choose the correct option –

Impurities in waste water (Pg. 273, E)

1	Suspended solids	i	Fecal matter, bacteria
2	Colloidal material	ii	Nitrate, Calcium
3	Dissolved material	iii	Sand, Silt, Clay

- A) 1-i, 2-ii, 3-iii B) 1-ii, 2-i, 3-iii
 C) 1-iii, 2-i, 3-ii D) 1-ii, 2-iii, 3-i

21. Label the given figure (Pg. 274, E)



	(i)	(ii)	(iii)
A	BOD	Dissolved O ₂	Clean water
B	BOD	Dissolved O ₂	Sewage discharge
C	Dissolved O ₂	BOD	Sewage water
D	Dissolved O ₂	BOD	Clean water

22. BOD stands for – (Pg. 275, E)

- A) Biological Oxygen Demand
 B) Biochemical Oxygen Demand
 C) Biodegradable Oxygen Demand
 D) Biological Oxygen Dissolved

23. (i) Dissolved salts like nitrates, phosphates, toxic metal ions and organic compounds are most easy to remove from sewage water
(ii) A mere 0.1 % impurities make domestic sewage unfit for human use
(iii) Most of domestic sewage are not readily decomposed
How many among the above statements are correct — **(Pg. 275, E)**
A) 0 B) 1
C) 2 D) 3
24. Assertion : It is possible to estimate the amount of non – biodegradable organic matter in sewage water by measuring BOD.
Reason : Bacteria and other micro-organism multiply using the organic substances as substrate and utilizes some of the components of sewage **-(Pg. 275, E)**
A) Assertion is wrong Reason is correct
B) Both are wrong
C) Assertion is correct but Reason is wrong
D) Both are correct
25. Free-Floating algae are also called _____
A) Euglenoids
B) Planktonic-algae
C) Hydro algae
D) Dinoflagellates algae
26. What is the cause of algal bloom?
A) Excessive growth of planktonic algae due to presence of large amount of nutrient in water
B) Excess of fish mortality in water
C) Discharge of harmful elements like lead, mercury, etc in water bodies through industries
D) Nitrogen – fixing bacteria present in water bodies fixes nitrogen and results in the spread of vegetation
27. Which among the following are not consequences of algal bloom **-(Pg. 275, E)**
A) Imparting distinct colors to the water bodies
B) Deterioration of water quality
C) Fish natality
D) Toxicity to human being and animals
28. Scientific name of water hyacinth – **(Pg. 275, E)**
A) *Eichhornia crassipes*
B) *Elodeo canadensis*
C) *Epomoea quamoclit*
D) *Etiopis surotensis*
29. Which among the following is called ‘ Terror of Bengal ’ ? – **(Pg. 276, E)**
A) *Nelumbo nucifera*
B) *Ceratophyllum submersum*
C) *Eichhornia crassipes*
D) *Lemna minor*
30. Which among the following is not true about water hyacinth? – **(Pg. 276, E)**
A) There are the world’s most problematic aquatic weed.
B) These are introduced in the India for their rapid growing ability
C) They have very beautiful flowers
D) They cause imbalance in the ecosystem dynamics of the water bodies
31. Match the following – **(Pg. 276, E)**
- | | | | |
|---|---------------------|-----|---------------|
| 1 | Water | i | DDT 0.5 ppm |
| 2 | Zooplankton | ii | DDT 2 ppm |
| 3 | Small fish | iii | DDT 0.003 ppm |
| 4 | Large fish | iv | DDT 25 ppm |
| 5 | Fish – Eating birds | v | DDT 0.04 ppm |
- A) 1-iii, 2-v, 3-i, 4-ii, 5-iv
B) 1-i, 2-ii, 3-v, 4-iv, 5-iii
C) 1-ii, 2-v, 3-iv, 4-i, 5-iii
D) 1-iii, 2-iv, 3-i, 4-v, 5-ii
32. Heavy metals like mercury, lead, etc have density greater than _____? **-(Pg. 276, E)**
A) 5 g/cm³
B) 5 mg/cm³
C) 25 g/cm³
D) 25 mg/cm³
33. Which among the following refers to the increase in concentration of the toxicant at successive trophic level – **(Pg. 276, E)**
A) BOD
B) Biomagnification
C) Biofortification
D) Eutrophication
34. Assertion : Toxic substances get passed on to the next higher trophic level

Reason : Toxic substances get accumulated by an organism cannot be metabolised or excreted – **(Pg. 276, E)**

- A) Both are correct
 B) Assertion is correct but Reason is wrong
 C) Assertion is wrong but Reason is correct
 D) Both are wrong
35. High concentration of DDT disturb calcium metabolism in bird which causes – **(Pg. 276, E)**
 A) Thinning of eggshell
 B) Premature breaking of eggshell
 C) Decline in bird population
 D) All of these
36. Which among the following is a term used for natural aging of lake – **(Pg. 276, E)**
 A) Biomagnification
 B) Eutrophication
 C) Euphorbism
 D) Eumagnification
37. What causes eutrophication? – **(Pg. 277, E)**
 A) Introduction of nutrients like nitrogen and phosphorus
 B) Introduction of harmful elements like lead
 C) Introduction of plastic waste
 D) None of these
38. Which among the following statements are correct? – **(Pg. 277, E)**
 i) Eutrophication is long process which may even take thousands of years
 ii) Eutrophication encourages growth of aquatic organisms
 iii) Eutrophication leads to the conversion of fresh lake into polluted and deteriorate lake
 A) (ii) and (iii) B) Only (i)
 C) (i) and (ii) D) All
39. Eutrophication finally leads to the conversion of lake into which among the following? – **(Pg. 277, E)**
 A) Deep swampy pond
 B) Land
 C) Polluted pond
 D) Lake with silt and organic content at base

40. Which among the following can accelerate the process of eutrophication – **(Pg. 277, E)**
 A) Organic waste from household
 B) Plastic waste
 C) Sewage and agricultural waste
 D) Both A & C
41. Accelerated aging process of natural lake by pollutants from mans activities are called _____ – **(Pg. 277, E)**
 A) Cultural eutrophication
 B) Man-made eutrophication
 C) Accelerated eutrophication
 D) More than one option is correct
42. Prime contaminants, that causes severe eutrophication and also act as plant nutrients are _____ – **(Pg. 277, E)**
 A) Calcium B) Nitrate
 C) Phosphate D) Both B & C
43. Which of below option is correct? Pollutants from thermal power plants results in — **(Pg. 277, E)**
 i) Elimination of organism sensitive to high temperature
 ii) Elimination of organisms sensitive to low temperature
 iii) Enhance the growth of organisms in extremely cold areas
 iv) Certainly has no effect on the organisms
 A) Only I B) ii and iii
 C) i and iii D) only iv

16.2.2 A case study of Integrated waste water Treatment

44. Arcata is situated along the – **(Pg. 277, E)**
 A) North coast of California
 B) Eastern part of Europe
 C) Southern part of Germany
 D) Middle zone of France
45. The series of six connected marshes spread over how much area in the integrated waste water treatment? –
 A) 600 hectares B) 60 hectares
 C) 600 Acre D) 60 Acre
46. Which among the following is true about the second stage of the Arcata integrated waste water treatment? – **(Pg. 277, E)**

- A) It comprises of marshes which contain algae, fungi and bacteria, which neutralises absorb and assimilate the pollutants
 B) Marshes go with conventional sedimentation filtering and chlorine treatment
 C) Marshes constitute of a sanctuary with a high level of biodiversity
 D) Both (i) and (iii)
47. Who are responsible for the safeguarding of integrated waste water treatment in Arcata? – **(Pg. 277, E)**
 A) FOAM B) POAM
 C) COAM D) DOAM
48. What does FOAM stands for? – **(Pg. 277, E)**
 A) Family of Arcata Marsh
 B) Friends of Arcata Marsh
 C) Family of Arcata Mission
 D) Friends of Arcata Mission
49. Which among the following is a sustainable system for handling human excreta using dry composting toilets? – **(Pg. 277, E)**
 A) Recycle sanitation
 B) Biological sanitation
 C) Ecological sanitation
 D) None of these
50. Name of dry composting toilets used in many areas of Kerala and Sri Lanka – **(Pg. 278, E)**
 A) Bio san B) Com san
 C) Chem san D) Eco san
- A) large amount of garbage results in rapidly filling of landfills
 B) seepage of chemicals causing soil contamination
 C) Contamination of groundwater
 D) all of these
54. Waste that is generated is categorized into the following type-- **(Pg. 278, E)**
 i) bio-degradable
 ii) nonbiodegradable
 iii) contaminated waste
 iv) recyclable waste
 A) only i and ii B) i, ii and iii
 C) i, ii and iv D) All of these
55. What is incinerators? – **(Pg. 279, E)**
 A) Chemicals used for degradation of waste
 B) Micro-organisms that degrade waste
 C) Area where waste products are dumped
 D) Furnace wear waste are burned
56. Crucial step for safe disposing hospital waste is – **(Pg. 279, E)**
 A) disinfecting the waste products
 B) using of incinerators
 C) disposal in water bodies
 D) none of these
57. What are irreparable computers and electronic wastes are called? – **(Pg. 279, E)**
 A) E – waste B) C – waste
 C) A – waste D) B – waste
58. How E – waste are treated without damage to environment and human life? – **(Pg. 279, E)**
 A) Recycling
 B) Buried in pit / landfills
 C) Incinerated
 D) All of these

16.3 Solid Wastes

51. Municipal solid waste include waste from – **(Pg. 278, E)**
 A) Homes and schools
 B) Hospitals
 C) Stores and office
 D) All of these
52. _____ were adopted as the substitute for open - burning dumps – **(Pg. 278, E)**
 A) sanitary landfills
 B) decomposing pit
 C) shallow pit
 D) none of these
53. Problems with landfills to dump wastes are-- **(Pg. 278, E)**

16.3.1 Case Study of Remedy for Plastic Waste

59. Which among the following is produced by Ahmed Khan's company? – **(Pg. 279, E)**
 A) Bitumen B) Polyblend
 C) Karlit D) Qualinite
60. Polyblend is obtained by which of the following? – **(Pg. 279, E)**
 A) By making a paste of recycled modified plastic

- B) By making a powder of recycled modified plastic
 C) By making a paste of non-recycled unmodified plastic
 D) By making a powder of non-recycled unmodified plastic
61. Polyblend is mixed with which among the following to lay roads? – **(Pg. 279, E)**
 A) Karolinite B) Allinite
 C) Bitumen D) Dalinite
62. What are the factors by which Khan proved that his innovation is a better way to lay road – **(Pg. 279, E)**
 A) Enhanced water repellent properties
 B) This increases the road life by a factor of 3
 C) Accumulation of plastic waste reduced
 D) All of these
63. Ahmed Khan collaborated with –
 A) R.V. College of Engineering
 B) Jawaharlal Medical College
 C) Bangalore City Corporation
 D) Both A and C

16.4 Agro – Chemicals and their Effects

64. What are the effects of Green Revolution? – **(Pg. 279, E)**
 A) Increased crop production
 B) widely used inorganic fertilizer and pesticides
 C) increased toxicity to soils ecosystem
 D) all of these
65. Which among the following is correct? – **(Pg. 279, E)**
 i) Increase the use of chemical fertilizer can be biomagnified in terrestrial ecosystem and can be toxic
 ii) increased use of chemical fertilizer is useful for aquatic ecosystem as it undergoes Eutrophication in faster rate
 A) only (i) B) only (ii)
 C) (i) and (ii) D) None of these
66. What is the key point of integrated organic farming? – **(Pg. 280, E)**
 A) Preference of mixed farming
 B) Waste product from one process are cycled in as nutrient for other process
 C) Minimizing the use of chemical fertilizer
 D) All of these
67. What are the results of integrated organic farming? – **(Pg. 280, E)**
 A) Maximum utilization of resources
 B) Increased efficiency of production
 C) Higher profitability to farmer
 D) All of these
68. How many among the following are true for Dagar's idea of integrated organic farming – **(Pg. 280, E)**
 i) he included Bee - keeping, dairy, water harvesting, composting and agriculture in his farm
 ii) he uses cattle dung as manure to crops
 iii) he uses crop waste only to generate natural gas but not for compost formation
 iv) he uses chemical fertilizer for crops
 A) 1 B) 2
 C) 3 D) 4
69. Who was the founder of Haryana Kisan Welfare Club? – **(Pg. 280, E)**
 A) Suresh Dagariya
 B) Raju Chandra Bhushan
 C) Ahmad Khan
 D) Ramesh Chandra Dagar

16.1 Radioactive wastes

70. Three Mile Island and Chernobyl incidents are related to which among the following? – **(Pg. 280, E)**
 A) Leakage of chemical gas
 B) Leakage of radioactive gas
 C) release of contaminated wastewater
 D) none of these
71. How much radiation given off by nuclear waste is damaging to organisms? – **(Pg. 280, E)**
 A) They cause mutation at very high rate
 B) They cause disorders by altering the gene sequence
 C) they cause cancer

16.4.1 Case Study of Organic Farming

- D) all the above
72. What is the best method to dispose nuclear waste? – **(Pg. 280, E)**
- A) Bury then deep down in Atlantic Ocean
- B) after pre-treatment bury within the rock in shielded container 500-meter-deep below the earth
- C) taking these wastes to the other planet and disposing there.
- D) all of these

16.6 Greenhouse effect and Global Warming

73. From where does term 'Greenhouse effect' has been derived? – **(Pg. 280, E)**
- A) From Green Terrestrial Surface
- B) Phenomena occurring in green plants
- C) phenomena that occurs in greenhouse
- D) scientist named Greenhouse
74. Why greenhouse is actually used for plants? – **(Pg. 280, E)**
- A) It is used to maintain the soil health for growing plant
- B) It is used to grow plants especially in winter as it's warm from inside providing plants good temperature to grow
- C) It provide plants cool temperature and environment to grow
- D) all of these
75. Which among the following phenomena is responsible for natural heating of Earth's surface and atmosphere? – **(Pg. 280, E)**
- A) Absorption of heat (sun) rays
- B) Greenhouse effect
- C) Emission of radioactive raise from nuclear plant
- D) Doppler's phenomena
76. Earth receives incoming solar radiation in the form of _____. – **(Pg. 281, E)**
- A) Long wave radiation
- B) Short wave radiation
- C) Electronic wave radiation
- D) Magnetic wave radiation
77. In which form earth's surface re-emits heat, that does not escape into space? – **(Pg. 281, E)**
- A) Infrared radiation

- B) UV rays
- C) PAR
- D) All of these

78. Match the following-
Relative contribution of various greenhouse gasses to total global warming

1	CO ₂	I	20%
2	Methane	II	14%
3	CFC	III	60%
4	N ₂ O	IV	6%

- A) 1-II, 2-III, 3-IV, 4-I
- B) 1-III, 2-II, 3-IV, 4-I
- C) 1-IV, 2-I, 3-II, 4-III
- D) 1-III, 2-I, 3-II, 4-IV
79. Assertion : greenhouse gasses are responsible for greenhouse effect.
Reason : Earth receives incoming solar radiation in short wave radiation some radiation get reflected back, some get fall in Earth's surface heating it, earth again re-emits heat in form of infrared rays and get absorbed by greenhouse gases these gases again radiate them and cycle get repeated many times and keep earth surface warm – **(Pg. 281, M)**
- A) Assertion is correct and Reason is wrong
- B) Both are correct
- C) Assertion is wrong and Reason is correct
- D) Both are wrong
80. What is the result of increased level of greenhouse gasses? – **(Pg. 281, E)**
- A) Global warming
- B) melting of ice glaciers in Polar region
- C) abnormal weather phenomena (El Nino effect)
- D) all of these
81. What portion of incoming solar radiation get reflected by clouds and gases without reaching to the earth's surface? – **(Pg. 281, E)**
- A) 1/3 rd
- B) 1/4 th
- C) 2/3 rd
- D) 1/2 nd

82. What would be the average temperature of earth if there would be no greenhouse effect? – **(Pg. 281, E)**
 A) 0°C B) 15°C
 C) -18°C D) -105°C

16.7 Ozone Depletion in the Stratosphere

83. Bad ozone is found in which layer? – **(Pg. 282, E)**
 A) Upper Stratosphere
 B) Thermosphere
 C) Troposphere
 D) Ionosphere
84. Good ozone is found in which layer? **(Pg. 282, E)**
 A) Upper Stratosphere
 B) Thermosphere
 C) Troposphere
 D) Ionosphere
85. The thickness of ozone layer is measured by **(Pg. 282, E)**
 A) Fukin unit B) Delberg unit
 C) Dobson unit D) Colleit unit
86. The area where, ozone layer is thin is known as **(Pg. 282, E)**
 A) Ozone reduced area
 B) Ozone hole
 C) Spare ozone area
 D) Zero ozone
87. At which area, ozone hole is prominent? **(Pg. 282, E)**
 A) Above antarctica
 B) Above north Pacific ocean
 C) Above Atlantic ocean
 D) Above whole Asia
88. What is the time period at which ozone hole area Antarctica develops each year? **(Pg. 282, E)**
 A) Late August – early October
 B) January – February
 C) Early March – Late March
 D) Mid December – Mid January
89. How ozone gas are formed? **(Pg. 282, E)**
 A) By action of UV rays on molecular oxygen
 B) By action of infrared rays on molecular oxygen

- C) By action of PAR on molecular oxygen
 D) none of the above
90. Full Form of CFCs is **(Pg. 282, E)**
 A) Chlorofluoro cation
 B) Chlorofluroscent carbon
 C) Chlorofluoro carbon
 D) Cationicfluoroin carbon
91. Which among the following is true about CFCs? **(Pg. 282, E)**
 i) It degrades the ozone layer
 ii) By the action of UV ray CFCs releases Cl atom
 iii) Cl bind with ozone and releases molecular oxygen and act as merely catalysts
 iv) Cl atom are consumed in the reaction
 A) Only i and ii B) Only i and iii
 C) i, ii and iii D) all of these
92. what are the effects of UV – B rays? **(Pg. 282, E)**
 A) Damages DNA by causing mutation
 B) Causes inflammation of Cornea, snow-blindness,
 C) causes cataract
 D) All of these.
93. Which among the following international treaty was signed to control emission of ozone depleting substances? **(Pg. 282, E)**
 A) Kyoto Protocol
 B) Nagoya Protocol
 C) Earth summit
 D) Montreal Protocol
94. In which year Montreal Protocol was signed? **(Pg. 283, E)**
 A) 1990 B) 1985
 C) 1986 D) 1987

16.8 Degradation By Improper Resources Utilization And Maintainance

95. What cause soil erosion? **(Pg. 283, E)**
 A) Un-restricted grazing
 B) Deforestation
 C) Poor-irrigation practices
 D) All of these
96. What are the effect of water logging? **(Pg. 283, E)**

- A) It result in soil salinity as it draws salt from underground and deposit on land surface as thin crust.
- B) It results in accumulation of acid on soil surface.
- C) It results in desertification.
- D) All of these.

16.1 Air Pollution and Its Control

97. When was National Forest Policy came? **(Pg. 284, E)**
- A) 1987 B) 1985
 - C) 1988 D) 1986
98. Another name of slash and burn agriculture is _____. **(Pg. 284, E)**
- A) Sling cultivation
 - B) Donum cultivation
 - C) Jhum cultivation
 - D) Fiala cultivation
99. Assertion: Jhum cultivation also causes deforestation
Reason: It include cutting down of trees in forest and burned the remaining plant. Ashes used as fertilizer and land is used for cultivation, then same process is repeated to another area due to increased population time-gap given is limited for recovery and results in deforestation. **(Pg. 284, M)**
- A) Assertion and Reason both are correct
 - B) Assertion is correct but Reason is wrong
 - C) Both are wrong
 - D) Assertion is wrong but reason is correct
100. The process of restoration of forest that once existed, but was removed at some point of time in past is called _____. **(Pg. 284, E)**

- A) Deforestation
- B) Repeated forestation
- C) Reforestation
- D) All of these

16.9.1 Case Study of Peoples participation in conservation of Forests

101. Amrita devi was a lady from which community? **(Pg. 284, E)**
- A) Garwhal B) Bajpah
 - C) Bishnoi D) Barwal
102. Chipko movement was performed in? **(Pg. 285, E)**
- A) Diwanans Gujarat
 - B) Bishnoi Gir forest
 - C) Garhwal Himalayas
 - D) Deoni Delhi
103. When was Chipko movement observed? **(Pg. 285, E)**
- A) 1972 B) 1971
 - C) 1973 D) 1974
104. What does JFM stand for? **(Pg. 285, E)**
- A) Junior Federation of Management
 - B) Junior Forest Manager
 - C) Joint Fellowship Management
 - D) Joint Forest Management
105. Which among the following award is given to the individual community for their extraordinary courage and dedication in protecting wildlife? **(Pg. 285, E)**
- A) Chipcombent award.
 - B) Amrita Devi Bisnoe wildlife protection award.
 - C) Garval wildlife protection award
 - D) none of these.

TG: @Chalnaayaaar

Answer Key
ENVIRONMENTAL ISSUES

Q	1	2	3	4	5	6	7	8	9	10
Ans	B	C	D	D	C	C	C	A	D	A
Q	11	12	13	14	15	16	17	18	19	20
Ans	A	B	C	B	C	A	C	B	B	C
Q	21	22	23	24	25	26	27	28	29	30
Ans	C	B	B	A	B	A	C	A	C	B
Q	31	32	33	34	35	36	37	38	39	40
Ans	A	A	B	A	D	B	A	C	B	C
Q	41	42	43	44	45	46	47	48	49	50
Ans	C	D	C	A	B	D	A	B	C	D
Q	51	52	53	54	55	56	57	58	59	60
Ans	D	A	D	C	D	B	A	D	B	A
Q	61	62	63	64	65	66	67	68	69	70
Ans	C	D	A	D	A	D	D	B	D	B
Q	71	72	73	74	75	76	77	78	79	80
Ans	D	B	C	B	B	B	A	D	B	D
Q	81	82	83	84	85	86	87	88	89	90
Ans	B	C	C	A	C	B	A	A	A	C
Q	91	92	93	94	95	96	97	98	99	100
Ans	C	D	D	D	D	D	C	C	A	B
Q	101	102	103	104	105					
Ans	A	C	D	D	B					

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