Nirmal Vidya
I I T   A C A D E M Y

ADMISSION TEST

Class IX to X Moving
for
IIT-JEE

Time: 1:30 Hr.   **Maximum Marks: 145**

INSTRUCTIONS

Please read the instructions carefully. You are allotted 5 minutes specifically for this purpose.

1. *There are 55 questions in this paper.*
2. *Each question has only ONE, correct answer. In case you wish to change an answer, erase the old answer and mark your fresh choice.*
3. *For each correct answer in IQ 2 marks and PCBM 3 marks will be awarded. For each wrong answer 1 mark will be deducted.*
4. *Question No. 1 to 20 of IQ, 21 to 28 of Physics, 29 to 36 of Chemistry, 37 to 44 of Biology and 45 to 55 of Mathematics.*
5. *Use of calculator is not permitted.*
6. *Use of Logarithmic table is not permitted.*
7. *Darken the bubble by pencil only.*
8. *Write your Roll number, Name at the specified space on the OMR Sheet.*
9. *All the notations used in this paper are standard.*

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TO BE FILL IN CAPITAL LETTERS

NAME OF THE STUDENT: _____

FATHER NAME : _____

ROLL NO : _____   TEST DATE: _____

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IQ

SECTION – A

Direction (Question No. 1 – 3):

In each of the following questions, there is a certain relationship between two given words on one side of : : and one word is given on another side of : : while another word is to be found from the given alternatives, having the same relation with this word as the words of the given pair bear. Choose the correct alternative.

1.   Shark : Fish : : Lavender : ?
      (A) Shrub   (B) Tree
      (C) Herb   (D) Climber

2.   Winter : Hibernation : : Summer : ?
      (A) Survival   (B) Activation
      (C) Aestivation   (D) Cache

3.   Circle : Circumference : : Square : ?
      (A) Volume   (B) Area
      (C) Diagonal   (D) Perimeter

Direction (Question No. 4 – 5):

Each of the following questions consists of a pair of numbers that have a certain relationship to each other, followed by four other pairs of numbers given as alternatives. Select the pair in which the numbers are similarly related as in the given pair.

4.   7 : 24
      (A) 30 : 100   (B) 23 : 72
      (C) 19 : 58   (D) 11 : 43

5.   6 : 108
      (A) 4 : 30   (B) 5 : 125
      (C) 8 : 192   (D) 9 : 81

Direction : (Question No. 6):

In each of the following questions, choose one number which is similar to the numbers in the given set

6.   Given set : 134, 246, 358
      (A) 372   (B) 470
      (C) 572   (D) 684

Space for rough work

Direction (Question No. 7 – 8):

In each of the following questions, four words have been given, out of which three are alike in some manner and the fourth one is different. Choose out the odd one.

7.   (A) Deuce   (B) Pitch
     (C) Crease   (D) Stump

8.   (A) Kiwi   (B) Ostrich
     (C) Eagle   (D) Penguin

Direction (Question No. 9 – 10):

In each of the following questions, four pairs of words are given out of which the words in three pairs bear a certain common relationship. Choose the pair in which the words are differently related.

9.   (A) Petrol : Car   (B) Ink : Pen
     (C) Garbage : Dustbin   (D) Lead : Pencil

10. (A) Sahara : Africa   (B) Thar : India
     (C) Kalahari : America (D) Gobi : Mongolia

Direction (Question No. 11 – 13):

In each of the following questions, one term in the number series is wrong. Find out the wrong terms.

11. 11, 2, 21, 3, 32, 4, 44, 5, 57, 6,
     (A) 61   (B) 31
     (C) 71   (D) 51

12. 1, 5, 10, 16, 23, 31,
     (A) 50   (B) 40
     (C) 60   (D) 45

13. 10, 26, 74, 218, 650,
     (A) 1266   (B) 1746
     (C) 1218   (D) 1946

Direction (Question No. 14 – 17):

In each of the following questions, various terms of a letter series are given with one term missing as shown by (?). Choose the missing term out of the given alternatives.

14. JE, LH, OL, SQ, ?
    (A) WV (B) WX
    (C) VW (D) XW

15. CAT, FDW, IGZ, ?
    (A) LJC (B) KTC
    (C) LHD (D) KJA

16. FLP, INS, LPV, ?
    (A) ORY (B) UXZ
    (C) VXY (D) SVW

17. LXF, MTJ, NPN, OLR, ?
    (A) PIU (B) PBV
    (C) PJW (D) PKX

18. If L denotes ÷, M denotes ×, P denotes + and Q denotes −, then which of the following statements is true ?

    (A) 32 P 8 L 16 Q 4 = $-\dfrac{3}{2}$ (B) 6 M 18 Q 26 L 13 P 7 = $\dfrac{173}{13}$

    (C) 11 M 34 L 17 Q 8 L 3 = $\dfrac{38}{3}$ (D) 9 P 9 L 9 Q 9 M 9 = -71

19. If + means ÷, − means ×, ÷ means −, × means +, what will be the value of $8 + 6 \div 4 - 7 \times 3$?

    (A) $-\dfrac{71}{3}$ (B) $-\dfrac{23}{2}$

    (C) 12   (D) 14

20. It being given that : > denotes +, < denotes −, + denotes ÷, − denotes =, = denotes 'less than' and × denotes 'greater than', find which of the following is a correct statement.
    (A) 3 + 2 > 4 = 9 + 3 < 2   (B) 3 > 2 > 4 = 18 + 3 < 1
    (C) 3 > 2 < 4 × 8 + 4 < 2   (D) 3 + 2 < 4 × 9 + 3 < 3

PCBM

SECTION – B

PHYSICS

21. A single horizontal force F is applied to a block of mass m_1, which is in contact with another block of mass m_2. If the surfaces are frictionless, then force between the blocks is

(A) $\dfrac{m_1 F}{m_2}$

(B) $\dfrac{m_1 m_2 g}{m_1 + m_2}$

(C) $\dfrac{m_2 F}{m_1 + m_2}$

(D) $\dfrac{m_2 (m_1 + m_2)}{F}$.

22. The displacement–time graph of two objects moving in a straight line makes angles 30º and 60º with the time axis. The ratio of their velocities is:

(A) 1 : 3

(B) 1 : 2

(C) 1 : $\sqrt{3}$

(D) $\sqrt{3}$: 1.

23. A body is initially at rest when we apply a constant force of 50 N it moves a distance 20 m in 2 seconds. Find the mass of the body.

(A) 3 kg

(B) 4 kg

(C) 5 kg

(D) 6 kg.

24. A stone in released vertically downward from a height H (H > 125 m). Calculate the distance traveled by it in 5th second of it's journey. (take g = 10 m/s^2)

(A) 30 m

(B) 45 m

(C) 34 m

(D) 43 m.

25. A block of wood is kept on a table top. The mass of wooden block is 5 kg and its dimensions are 40 cm × 20 cm × 10 cm. Find the pressure exerted by the wooden block on the table top if it is made to lie on the table top with its sides of dimension 20 cm × 10 cm.

(A) 2450 N/m^2

(B) 2540 N/m^2

(C) 5240 N/m^2

(D) 2054 N/m^2.

26. Relative density of silver is 10.8. The density of water is 10^3 kg m^{-3}. What is the density of silver in S.I. unit ?
    (A) 10.8×10^3 kg/m^3 (B) 1.08×10^4 kg/m^3
    (C) $.108 \times 10^5$ kg/m^3 (D) all of the above.

27. An object of mass 12 kg is at a certain height above the ground. If the potential energy of the object is 480J, find the height at which the object is with respect to the ground. $g = 10$ m/s^2
    (A) 2 m   (B) 4 m
    (C) 6 m   (D) 8 m.

28. An object of mass 4 kg and density 2×10^3 kgm^{-3} is completely immersed in water, its apparent weight will be
    (A) 2 kg wt   (B) 20 kg wt
    (C) 1 kg wt   (D) 10 kg wt.

CHEMISTRY

29. The rate of evaporation does not depends upon
    (A) Temperature   (B) Humidity
    (C) Wind Speed   (D) Pressure.

30. The change from solid to gas directly is called
    (A) Condensation   (B) Vaporisation
    (C) Regulation   (D) Sublimation.

31. A solution contains 40gm of common salt in 320 gm of water. Calculate the concentration in terms of mass by mass percentage of the solution
    (A) 8%   (B) 9%
    (C) 11.1%   (D) 10.1%.

32. Number of valence electrons in Cl$^-$ ion are
    (A) 7   (B) 16
    (c) 18   (D) 8.

33. Suspension is a …. mixture
    (A) Homogeneous   (B) Heterogeneous
    (C) Both   (D) None.

34. Calculate the formula unit mass of $CaCl_2$.
    (A) 75.5   (B) 71.5
    (C) 111   (D) 110.

35. Calculate the mass of 3.011×10^{23} number of N_2 molecules.
    (A) 7   (B) 14
    (C) 28   (D) 2.

36. An isotope of cobalt is used for
    (A) Nuclear reactor   (B) Goitre
    (C) Agriculture   (D) Cancer.

## BIOLOGY

37. Plasmamembrane is made up of
    (A) Lipoprotein   (B)   Phospholipid
    (C) Glycoprotein   (D)   None of these

38. Cell wall is made up of
    (A) Protein   (B)   Lipid
    (C) Cellulose   (D)   Chitin

39. Oxysome is the structural & functional unit of
    (A) Mitochondria   (B)   Plastids
    (C) Golgi   (D)   Ribosomes

40. Thalykoids is structural component of
    (A) Plastids   (B)   SER
    (C) RER   (D)   Ribosomes

41. Ribosomes associated with -
    (A) Smooth Endoplasmic reticulum   (B)   Rough Endoplasmic Reticulum
    (C) Lysosomes   (D)   Golgi

42. Which one is largest group of animal kingdom?
    (A) Chordata   (B)   Arthropoda
    (C) Mollusca   (D)   Porifera

43. Name of the cell organelles that helps in packaging of protein
    (A) Rough endoplasmic reticulum   (B) Smooth endoplasmic reticulum
    (C) Golgi complex   (D) Mitochondria

44. Which one is bacterial disease of lungs in human beings?
   (A) Leprosy   (B) Meningitis
    (C) Tuberculosis   (D) Pertusis

MATHEMATICS

45. In the figure given below, AB = AC, CH = CB and HK ∥ BC. If
    ∠CAX is 140°, then ∠HCK is
    (A) 40°   (B) 30°
    (C) 45°   (D) 60°
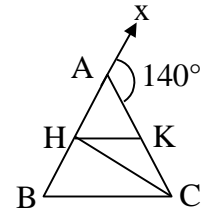
46. The length of three sides of a triangle are 12 cm, 10 cm and 8 cm, respectively. The length
    of the median drawn from the vertex opposite to the greatest side will be
    (A) $\sqrt{46}$ cm   (B) $\sqrt{47}$ cm
    (C) $50\sqrt{3}$ (D) $\sqrt{50}$ cm

47. If in a triangle ABC right angled at B, s − a = 3, s − c = 2 then the values of a and c are
    respectively
    (A) 2, 3   (B) 3, 4
    (C) 4, 3   (D) 6, 8

48. In the adjacent figure that, CP ∥ AB, then ∠ACB is
    (A) 70^0 (B) 65^0
    (C) 75^0 (D) 60^0
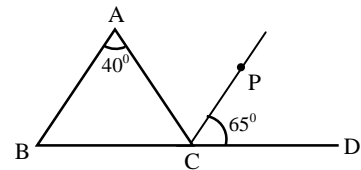
49. The number of prime numbers between 0 and 20 is
    (A) 7   (B) 8
    (C) 6   (D) 9

50. Factors of $2(a + b)^2 - 9(a + b) - 5$ are
(A) $a + b + 5$, $2a + 2b -1$ (B) $a + b - 5$, $2a + 2b + 1$
(C) $a - b + 5$, $2a - 2b + 5$ (D) none of these

51. The curved surface of a cylinder is 3140 cm^2. The diameter of its base is 20 cm. The volume of this cylinder is
(A) 6,560 cm^3 (B) 12,560 cm^3
(C) 3950 cm^3 (D) none of these

52. A room 8 m × 6 m is to be carpeted by a carpet 2 m wide the length of carpet required is
(A) 12 m   (B) 36 m
(C) 24 m   (D) 48 m

53. The length of a rectangular field is increased by 50% and its breadth is decreased by 50% to form a new rectangular field. The percentage change in the area of the field is
(A) 50%   (B) 125%
(C) 25%   (D) 75%

54. The total surface area of the cube is 216 sq. cm. The length of the longest pole that can be kept inside the cube is
(A) $6\sqrt{3}$ (B) 6
(C) 8   (D) $7\sqrt{3}$

55. The area of the curved surface of a right circular cone of diameter 14 cm is 550 cm^2. The height of the cone is
(A) 25 cm   (B) 22 cm
(C) 23 cm   (D) 24 cm

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