CBSE Term 1 Mock Test

SECTION A

This section consists of 25 multiple choice questions with overall choice to attempt any 20 questions. In case more than desirable number of questions are attempted, ONLY first 20 will be considered for evaluation.

Q1. A battery is connected to the conductor of non-uniform cross section area. The quantities or quantity which remains constant is

a. Electric field Only
b. Drift Speed and electric field
c. Electric Field and current
d. Current only

Q2. The current sensitivity of a galvanometer increase by 20%. If its resistance also increases by 25%, the voltage sensitivity will

a. Increases by 5%
b. Decreases by 5%
c. Decreases by 1%
d. Decreases by 4%

Q3. An air-cored solenoid with length 30 cm, area of cross-section $25cm^2$ and number of turns 800, carries a current of 2.5 A. The current is suddenly switched off in a brief time of 10^{-3}. How much is the average back emf induced across the ends of the open switch in the circuit?

a. Zero
b. 3.125 V
c. 6.54 V
d. 16.74 V

Q4. Which statement is true for Gauss law-

a. All the charges whether inside or outside the gaussian surface contribute to the electric flux.

b. Electric flux depends upon the geometry of the gaussian surface.

c. Gauss theorem can be applied to non-uniform electric field.

d. The electric field over the gaussian surface remains continuous and uniform at every point.

Q5. By increasing the temperature, the specific resistance of a conductor and a semiconductor

a. Increases for both
b. Decreases for both
c. Increases for conductor and decreases for semiconductor
d. Decreases for conductor and increases for semiconductor

Q6. V/m and V-m are units of

a. Electric field intensity and current density
b. Electric field intensity and electric flux
c. Voltage Sensitivity and electric field intensity
d. Electric field intensity and work done

Q7. The coil of a moving coil galvanometer is wound over a metal frame in order to

(i) reduce hysteresis
(ii) increase sensitivity
(iii) increase moment of inertia
(iv) provide electromagnetic damping

Q8. The horizontal component of earth's magnetic field at a certain place is 3.0×10−5 T and having a direction from the geographic south to geographic north. The force per unit length on a very long straight conductor carrying a steady current of 1.2 A in east to west direction is then

a. 3.0 x 10^-5 Nm^-1
b. 3.2 x 10^-5 Nm^-1
c. 3.6 x10^-5 Nm^-1
d. 3.8 x10^-5 Nm^-1

Q9. Which among the following, is not a cause for power loss in a

transformer-

(i) Eddy currents are produced in the soft iron core of a transformer.
(ii) Electric Flux sharing is not properly done in primary and secondary coils.
(iii) Humming sound produced in the transformers due to magnetostriction.
(iv) Primary coil is made up of a very thick copper wire.

Q10. SI Unit of Electric Polarization vector is

a. C/m^2
b. C/m^-2
c. V/m^2
d. V/m-s

Q11. In a permanent magnet at room temperature
(a)magnetic moment of each molecule is zero.
(b)the individual molecules have non-zero magnetic moment
which are all perfectly aligned.
(c)domains are partially aligned.
(d)domains are all perfectly aligned.

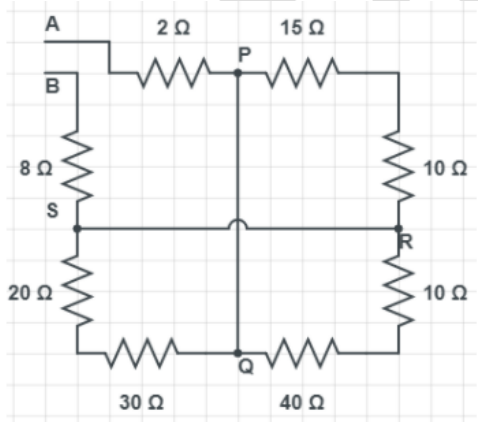
Q12. A slab of material of dielectric constant 10 has the same area as the plates of a parallel plate capacitor but has thickness 3d/4, where d is the distance between plates. The capacitance increases by a factor of

(a) 40/14
(b) 40/13
(c) 27/13
(d) 14/40

Q13. Virus peddles a stationary bicycle, the pedals of which are attached to a 100-turn coil of area $0.1m^2$. The coil rotates at half a revolution per second and it is placed in a uniform magnetic field of 0.01T perpendicular to the axis of rotation of the coil. The maximum voltage generated in the coil

(a) 0.75 V
(b) 0.314 V
(c) 0.475 V
(d) 0 V

Q14. The equivalent resistance between point A and B is:



(a)32.5 V

(b)22.5V

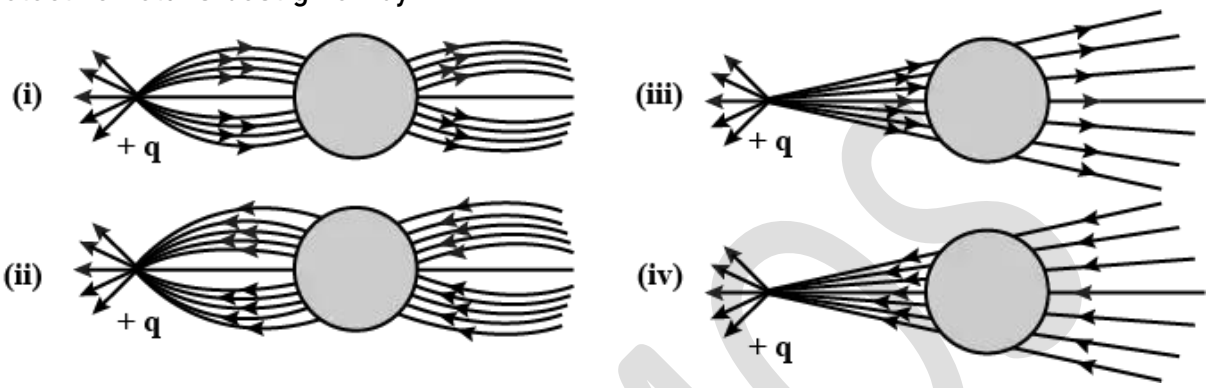
(c)12.5V

(d)2.5V

Q15. A square of side L meters lies in the x-y plane in a region, where the magnetic field is given by $B=B_o(2i+3j+4k)T$, where B_0 is constant. The magnitude of flux

passing through the square is
(a)2 B_0L^2 Wb
(b)3 B_0L^2 Wb
(c)4 B_0L^2 Wb
(d)$\sqrt{29}$ B_0L^2 Wb

Q16. A point positive charge is brought near an isolated conducting sphere. The electric field is best given by:



(a) Figure (i)
(b) Fig. (ii)
(c) Fig (iii)
(d) Fig (iv)

Q17. The small angle between magnetic axis and geographic axis at a

place is-

(i) Magnetic meridian
(ii) Geographic meridian
(iii) Magnetic inclination
(iv) Magnetic Declination

Q18. To reduce the resonant frequency in an LCR series circuit with a generator
(a)the generator frequency should be reduced.
(b)another capacitor should be added in parallel to the first.
(c)the iron core of the inductor should be removed.
(d)dielectric in the capacitor should be removed.

Q19. The self-inductance L of a solenoid of length l and area of cross-section A, with a fixed number of turns N increases as
(a)l and A increase.
(b)l decreases and A increases.
(c)l increases and A decreases.
(d)both l and A decrease.

Q20. In a cyclotron, a charged particle
(a)undergoes acceleration all the time.
(b)speeds up between the dees because of the magnetic field.

(c)speeds up in a dee.
(d)slows down within a dee and speeds up between dees

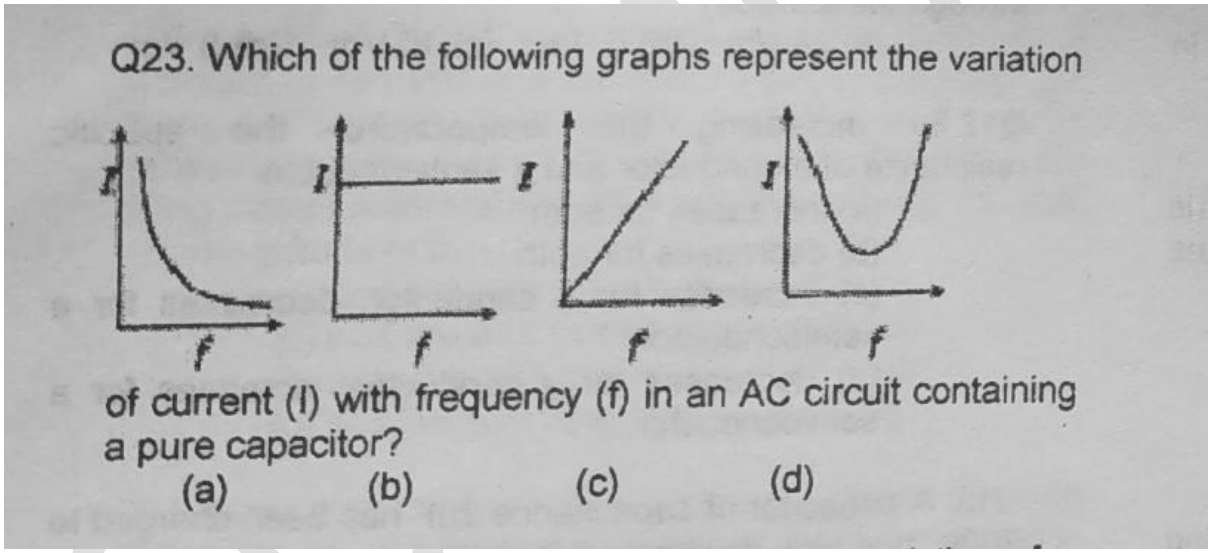
Q21. Kirchoff's 2nd law is related to

(a) Charge conservation
(b) Energy Conservation
(c) Voltage Conservation
(d) Power Conservation

Q22. Consider a tightly wound 100 turn coil of radius 10 cm, carrying a current of 1 A. What is the magnitude of the magnetic field at the centre of the coil?

(a) 6.28×10^{-4} T
(b) 5.32×10^{-4} T
(c) 12.35×10^{-4} T
(d) 4.0×10^{-5} T

Q23.



Q24. A hemisphere is uniformly charged positively. The electric field at a point on a diameter away from the centre is directed
(a)perpendicular to the diameter
(b)parallel to the diameter
(c)at an angle tilted towards the diameter
(d)at an angle tilted away from the diameter

Q25. The line that draws power supply to your house from street has
(a)zero average current.
(b)220 V average voltage.
(c)voltage and current out of phase by 90°.
(d)voltage and current possibly differing in phase ϕ such that $|\phi| < \frac{\pi}{2}$

SECTION – B

This section consists of 24 multiple choice questions with overall choice to attempt any 20 questions. In case more than desirable number of questions are attempted, ONLY first 20 will be considered for evaluation.

Q26. A cylinder of radius r and length l is placed in a uniform electric field parallel to the axis of the cylinder. The total flux for the surface of the cylinder is given by-

(i) zero

(ii) πr^2

(iii) E πr^2

(iv)E.$2\pi r^2$

Q27. On moving a charge of 20C by 2 cm, 2J of work is done. Then the potential difference between the points is:

(i) 0.1 V
(ii) 8V
(iii) 2V
(iv) 0.5V

Q28. Two capacitors of capacitance 3μF and 6μF are charged to a potential of 12V each. They are now connected to each other with the positive plate of joined to the negative plate of the other. The potential difference across each will be:

(i) 3V
(ii) Zero
(iii) 6V
(iv) 4V

Q29. An electron is accelerated under a potential difference of 200 V. Energy gained by it in electron volt is

(i) 50 eV
(ii) 100 eV
(iii) 200 eV
(iv) 400 eV

Q30. When a charged particle, moving with a velocity v, is subjected to a magnetic field, the force on it is non-zero. This implies that

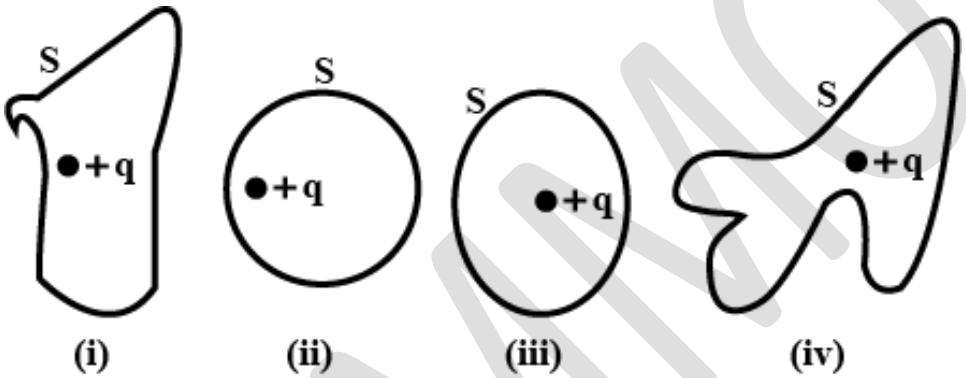
(i) Angle between is either zero or π
(ii) Angle between is necessarily 90°
(iii) Angle between can have any value other than 90°
(iv) Angle between can have any value other than zero and 180°

Q31. Two charges 3×10^{-8} C and -2×10^{-8} C are located 15 cm apart. At what point on the line joining the two charges is the electric potential zero? Take the potential at infinity to be zero.

(i) 9cm from -2×10^{-8}C charge
(ii) 9 cm from 3×10^{-8} charge
(iii) 10cm from -2×10^{-8}C charge
(iv) 10 cm from 3×10^{-8} C charge

Q32. The primary origin(s) of magnetism lies in
(a)atomic currents and intrinsic spin of electrons
(b)Pauli exclusion principle.
(c)polar & non polar nature of molecules.
(d)intrinsic spin of electron

Q33. The electric flux through the surface

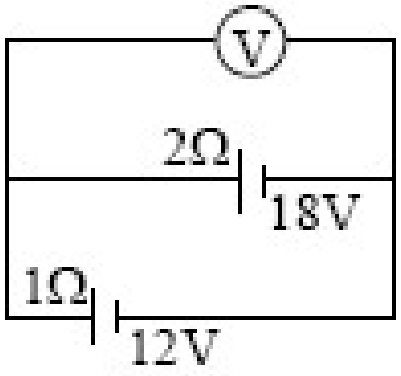


(i) In fig. (iv) is the largest
(ii) In fig. (ii) is the least
(iii) In fig (ii) is same as in figure (iii) but is smaller than figure (iv)
(iv) Is same for all figures

Q34. A wheel with 10 metallic spokes each 0.5 m long is rotated with a speed of 120 rev/min in a plane normal to the earth's magnetic field at the place. If the magnetic of the field is 0.4G, what is the induced emf between the axle and the rim of the wheel?

(i) 6.28×10^{-5} V
(ii) 12.27×10^{-5} V
(iii) 4×10^{-5} V
(iv) 0.9×10^{-5} V

Q35. Two batteries, one of emf 18 volts and internal resistance 2Ω and the other of emf 12 volt and internal resistance 1Ω, are connected as shown. The voltmeter V will record a reading of:



a. 18V
b. 14V
c. 13V
d. 15V

Q36. A micro-ammeter has a resistance of 100 ohms and a full-scale range of 50 micro-amperes. It can be used as a voltmeter or as a higher range ammeter provided resistance is added to it. Pick the current range and the resistance combinations.
a. 50 V range with 10$k\Omega$ resistance in series
b. 10 Volts range with 200$k\Omega$ resistance in series
c. 5mA range with 1Ω resistance in parallel.
d. Both (b) and (c)

Q37. A circular coil of 50 turns and radius 7 cm is placed in a uniform magnetic field of 4T normal to the plane of the coil. If the current in the coil is 6A then total torque acting on the coil is

(i)14.78Nm

(ii) 0

(iii)7.39 Nm

(iv)3.69 Nm

Q38. The force between two identical charges placed at a distance of r in vacuum is F. Now, a slab of dielectric of constant 4 is inserted between these two charges. If the thickness of the slab is 2r, then the force between the charges will become:

(i) F
(ii) $\frac{3}{5}$F

(iii) $\frac{4}{9}$F

(iv) $\frac{F}{2}$

Q39. A voltmeter of range 2 V and resistance 300Ω cannot be converted into ammeter of range:

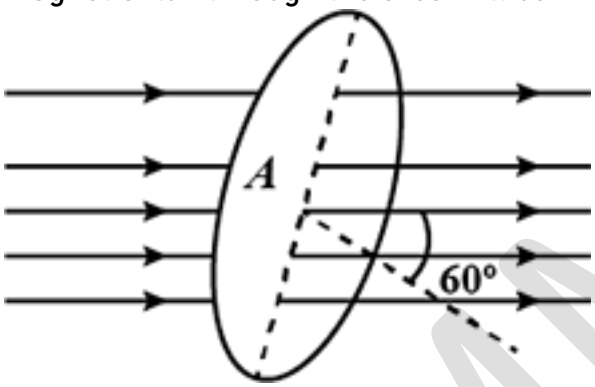
(i) 5mA

(ii) 8mA

(iii) 1A

(iv) 10A

Q40. Figure represents an area A=0.5m2 situated in a uniform magnetic field B=2Wb/m2 and making an angle of 60° with respect to magnetic field. The value of magnetic flux through the area will be:



a. 2 Wb

b. $\frac{\sqrt{3}}{2}$ Wb

c. 0.5 Wb

d. $\sqrt{3}$ Wb

Q41. An electric current pass through a long straight copper wire. At a distance 5cm from the straight wire, the magnetic field is B. The magnetic field at 20cm from the straight wire would be

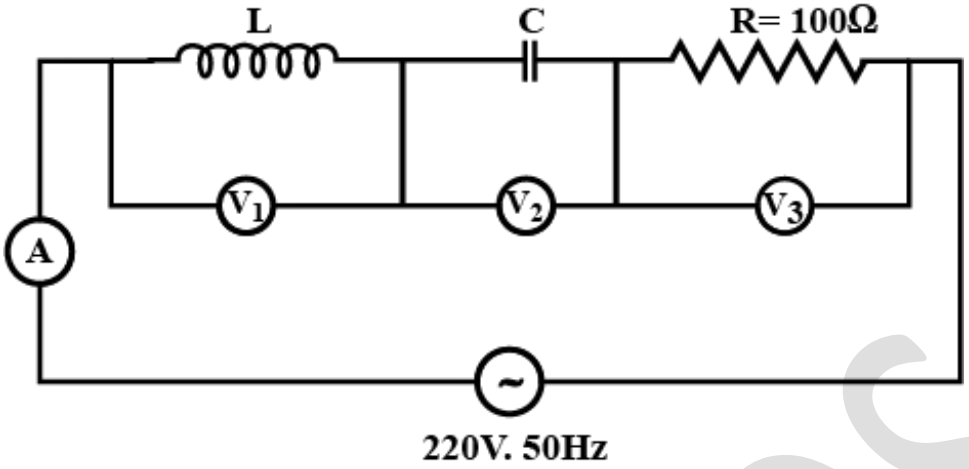
(i) B/2

(ii) B/6

(iii) B/4

(iv) B/3

Q42. In the given circuit the reading of voltmeter V1 and V2 are 300 volts each. The reading of the voltmeter V3 and ammeter A are respectively



a. 100V, 2A
b. 150V,2.2 A
c. 220V,2.2 A
d. 220V,2.0A

Q43. The voltage measured across the ac mains terminals is 210 V. Then the peak-to-peak variation of voltage between the terminals will be

(i) 420V
(ii) $420/\sqrt{2}$ V
(iii) $420\sqrt{2}$ V
(iv) $210\sqrt{2}$ V

Q44. A square current carrying loop is suspended in a uniform magnetic field acting in the plane of the loop. If the force on one arm of the loop is F, the net force on the remaining three arms of the loop is

(i) -F
(ii) -3F
(iii) F
(iv) 3F

Q45. Given below are two statements labelled as Assertion (A) and Reason(R)

Of the following statements, mark the correct Answers as-

A - if both Assertion and Reason -- are true and Reason -- is correct explanation of the Assertion.

B - if both Assertion and Reason -- are true but Reason -- is not correct explanation of Assertion.

C - if Assertion is true but Reason -- is false.

D - if both Assertion and Reason -- are false.

E - if Assertion is false but Reason -- is true

Assertion (A): To increase the range of an ammeter, we must connect

a suitable high resistance in series to it.

Reason (R): The ammeter with increased range should have high resistance.

Q46.Assertion(A): The total amount of charge on a body equal to $4X10^{-19}$ C is not possible.

Reason(R): Experimentally it is established that all free charges are integral multiples of a basic unit of charge denoted by e. Thus, charge q on a body is always given by q = ne

Q47. Assertion (A): The torque acting on square and circular current carrying coils having equal areas, placed in uniform magnetic field, will be same.

Reason (R): Torque acting on a current carrying coil placed in uniform magnetic field does not depend on the shape of the coil, if the areas of the coils are same.

Q48. Assertion(A): Eddy current is produced in any metallic conductor when magnetic flux is changed around it

Reason(R): Electric potential determine the flow of charge

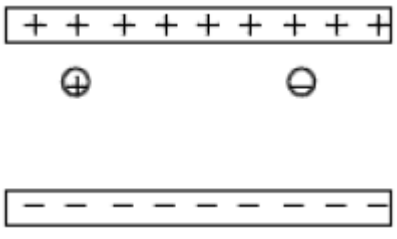
Q49. Assertion(A): The quantity L/R possesses dimensions of time

Reason(R): to reduce the rate of increase of current through a solenoid should increase the time constant L/R

SECTION C

This section consists of 6 multiple choice questions with an overall choice to attempt any 5. In case more than desirable number of questions are attempted, ONLY first 5 will be considered for evaluation.

Q50.

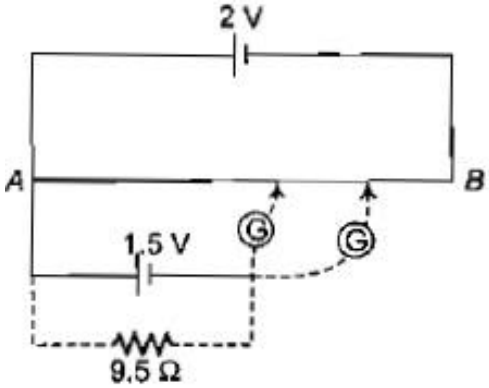


A free electron and a free proton are placed between two oppositely charged parallel plates. Both are closer to the positive plate than the negative plate. See the diagram below. Which of the following statements is true?

I. The force on the proton is greater than the force on the electron.
II. II. The potential energy of the proton is greater than that of the electron.
III. III. The potential energy of the proton and the electron is the same.

(A) I only
(B) II only
(C) I & II only
(D) I & III only

Q51. The figure shows a 2.0 V potentiometer used for the determination of internal resistance of a 1.5 V cell. The balance point of the cell in open circuit is 75 cm. When a resistor of 10Ω is used in the external circuit of the cell, the balance point shifts to 65 cm length of the potentiometer. The internal resistance of the cell is



(i) 2.5 Ω
(ii) 2Ω
(iii) 1.54Ω
(iv) 1.0Ω

Q52. **Case study:**

Read the following paragraph and answers the questions:

AURORA BOREALIS

During a solar flare, a large number of electrons and protons are ejected from the sun. Some of them get trapped in the earth's magnetic field and move in helical paths along the field lines. The field lines come closer to each other near the magnetic poles, hence the density of charges increases near the poles. The particles collide with atoms and molecules of the atmosphere. Excited oxygen atoms
emit green light and excited nitrogen atoms emit pink light. This phenomenon is called 'Aurora Borealis'.

52. When will the path of the particle be helix, when it is moving in external magnetic
field?
(a) When v has a component parallel to B
(b) When v has a component perpendicular to B
(c) When v is parallel to B
(d) None of these

53. When the charged particle travelling in a helical path enters a region where the magnetic field is non-uniform, the pitch of helix of the charge particle will be
(a) Same as in uniform magnetic field
(b) Increases as the charge moves inside the magnetic field
(c) Decreases as the charge moves inside the magnetic field
(d) First increases then decreases as the charge moves inside the magnetic field

54. The colour of Aurora Borealis is due to
(a) Excited ozone, chromium atoms
(b) Excited Oxygen and Nitrogen atoms
(c) Due to presence of water vapours in the atmosphere
(d) Excited electrons and protons in the atmosphere

55. The density of magnetic field lines is greater_____ on the earth
(a) At the poles

(b) Near the equator
(c) Uniform everywhere on the surface
(d) None of these

“The problem with the world is that the intelligent people are full of doubts, while the stupid ones are full of confidence.”
— Charles Bukowski