Practice paper term 1

Class xii

Subject: Physics (042)

Time : 90 minutes
Max. Marks 35

General Instructions:

1. The Question Paper contains three sections.

2. Section A has 25 questions. Attempt any 20 questions.

3. Section B has 24 questions. Attempt any 20 questions.

4. Section C has 6 questions. Attempt any 5 questions.

5. All questions carry equal marks.

6. There is no negative marking.

Section A

Q1.When air is replaced by a dielectric medium of dielectric constant K the force of attraction between two charges Q1 and Q2 Separated by a finite distance d

a. Decreases K times
b. Increases K times
c. Remains unchanged
d. Decreases 2K times

Q2.If a unit positive charge is taken from one point to another over an equipotential surface

a. work is done on the charge
b. work is done by the charge
c. work done is constant
d. no work is done

Q3.A capacitor of capacitance 50μF is charged to 100 volts. Its energy is equal to

a. 25×10^{-2} J
b. 225×10^{-3} J
c. 25×10^{2} J
d. 25×10^{3} J

Q4.Circular coil A of radius R and current flowing through it is I. Another circular coil B of radius 2R and if 2I is the current flowing through it, then the magnetic field at the centre of the circular coil are in the ratio (B_A:B_B) of

a. 4:1
b. 2:1
c. 1:1
d. 1:3

Q5.Constantan or manganin is widely used in wire wound standard resistors because of their

a. Moderate temperature dependent resistivity
b. Very weak temperature dependent resistivity
c. Strong dependence of resistivity on temperature
d. High Mechanical strength

Q6. A circular coil of wire consisting of 100 turns each of radius 8.0 cm carries a current of 0.40 A. The magnitude of magnetic field B at the centre of the coil will be

a. 3.1×10^{-4} T
b. 3.1×10^{-5} T
c. 9.1×10^{-4} T
d. 9.1×10^{-5} T

Q7.The horizontal and vertical components of earth's field at a place are 0.22 Gauss and 0.38 Gauss respectively. The angle of dip will be

a. $\tan^{-1}$ 1.7272
b. $\tan^{-1}$ 2.7272
c. $\tan^{-1}$ 0.7272
d. $\tan^{-1}$ 0.07272

Q8.Electric flux is a

a. Scalar Quantity
b. Vector Quantity
c. Fundamental Quantity
d. None of the above

Q9.

$$\oint \vec{E}.\vec{ds} = \frac{1}{\epsilon_0} q$$ Shows

a. Gauss's law
b. Coulomb's law
c. Kirchhoff's law
d. Faraday's law

Q10. Least possible value of charge is

a. 1.6×10^{-10} C
b. 1.75×10^{-11} C
c. 1.6×10^{-19} C
d. 1.6×10^{-21} C

Q11.Electric field at an axial point at distance r from the centre of the dipole for short dipole is

a. $E_{axial} = 1/4\pi\varepsilon_0 (2p^2/r^3)$
b. $E_{axial} = 1/4\pi\varepsilon_0 (2p/r^2)$
c. $E_{axial} = 1/4\pi\varepsilon_0 (2p^2/r^2)$
d. $E_{axial} = 1/4\pi\varepsilon_0 (2p/r^3)$

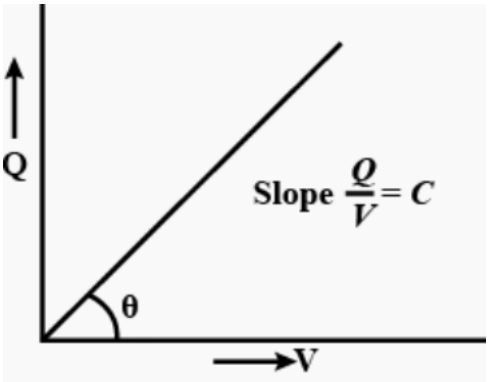
Q12.Expression for energy stored in capacitor

a. $(Q^2/2C)$
b. ½ (CV^2)
c. ½ (Q V)
d. All of the above

Q13.The shape of the equipotential surfaces for a uniform electric field is

a. Parallel planes perpendicular to the direction of electric field.
b. Parallel planes parallel to the direction of electric field.
c. Parallel planes which are inclined at 45^0 with the electric field.
d. None of these.

Q14.



Above graph shows
a. $Q \propto 1/V$
b. $Q \propto 1/V^2$
c. $Q \propto V$
d. $Q \propto V^2$

Q15. The property which is not shown by magnetic field lines is

a. The tangent to the field lines at a given point represents the direction of the net magnetic field at that point.
b. The magnetic field lines of a magnet do not form continuous closed loops.
c. The magnetic field lines do not intersect.
d. The larger number of the field lines crossing per unit area, stronger is The magnitude of the magnetic field.

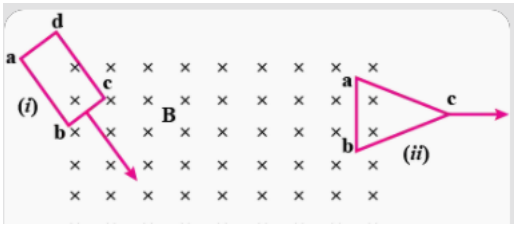
Q16. Dipole moment (m) associated with current loop

a. $m = NIA$
b. $m = N I^2A$
c. $m= N^2 IA$
d. $m= N^2 I^2A$

Q17.Induced emf-

a. $e = - d^2ø/dt$
b. $e = - d^2ø/dt^2$
c. $e = d^2ø/dt$
d. $e = - dø/dt$

Q18.



Above figure shows planar loops of different shapes moving out or into a region of magnetic field which is directed normal to the plane of the loop away from the reader. The direction of induced current in each loop using Lenz's law will be

(a) (i) b a d c b ; (ii) b c a b

(b) (i) b c d a b ; (ii) b a c b

(c) (i) b c d a b ; (ii) b c a b

(d) (i) b a d c b ; (ii) b a c b

Q19. 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 horizontal component of earth's magnetic field H_E at a place.If H_E = 0.4G at the place, the induced emf between the axle and the rim of the wheel is

a. 62.8×10^{-5} V
b. 628×10^{-6} V
c. 1.29×10^{-6} V
d. 6.28×10^{-5} V

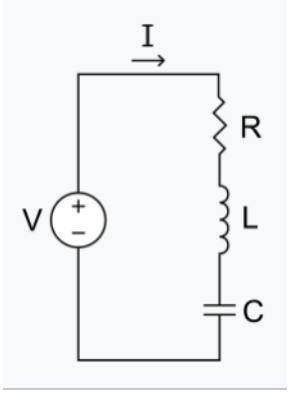
Q20. The electric mains supply in our homes and offices is a voltage that varies like a sine function with time. Such a voltage is called

a. Alternating voltage
b. Direct voltage
c. Induced voltage
d. None of these

Q21.When inductor is connected to an a.c source

a. Current I lags behind the voltage by π/2
b. Current I is π/2 ahead of voltage V.
c. Current I and voltage V are in same phase.
d. None of these

Q22. In the adjacent LCR circuit, according to Kirchhoff's law



a. $L\, d^2I/dt^2 + IR + q/C = V$
b. $L\, dI/dt + I^2R + q/C = V$
c. $L\, dI/dt + IR + q/C = V$
d. $L\, dI/dt - I\, R - q/C = V$

Q23. $Z = \{ R^2 + (Xc - X_L)^2 \}^{1/2}$

a. Circuit in which a. c voltage is applied only on resistor.
b. Circuit in which a. c voltage applied only on Inductor only.
c. Circuit in which a. c voltage is applied only on Capacitor only.
d. Relates with L-C-R circuit.

Q24. Formula between rms value of current (I_{rms}) and maximum value of current (I_m) is

a. $I_{rms} = I_m / 2$

b. $I_{rms} = I_m / \sqrt{2}$

c. $I_{rms} = I_m / 2\sqrt{2}$

d. $I_{rms} = I_m \sqrt{2}$

Q25. The device based on the principle of "Mutual induction" is

a. Transformer

b. A.C Generator

c. Moving coil galvanometer

d. None of these

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. The force between two small charged spheres having charges of 2×10^{-7}C and 3×10^{-7}C placed 30 cm apart in air will be-

a. 0.6×10^{-3} N

b. 18×10^{-3} N

c. 6×10^{-3} N

d. 1.6×10^{-3} N

Q27. When 10^{19} electrons are removed from a neutral plate, the electric charge on it will be

a. -1.6 C

b. +1.6 C

c. 10^{+19} C

d. 10^{-19} C

Q28. In bringing an electron towards another electron , the electrostatic potential energy of the system

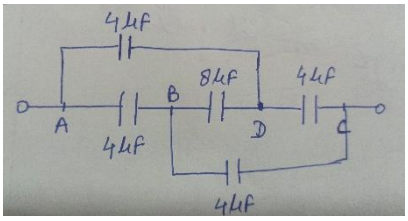
a. Increases

b. Decreases

c. Remains unchanged

d. Remains zero

Q29.



In the above figure equivalent capacitances of the given combination of five capacitors is

a. 4 μF
b. 10μF
c. 8 μF
d. 120 μF

Q 30. When a dielectric material is introduced between the plates of a charged condenser, then electric field between the plates

a. Decreases
b. Remains constant
c. Increases
d. First increses then decreases

Q 31.The electric field between two metal plates 3mm apart , connected to 12 V battery

a. 4×10^{-3} V/m
b. 8×10^{3} V/m
c. 4×10^{3} V/m
d. 8×10^{-3} V/m

Q 32. The Storage battery of a car has an EMF 12 volt. If the internal resistance of the battery is 0.4 ohm the maximum current that can be drawn from the battery will be

a. 15 A
b. 30 A
c. 12 A
d. 20 A

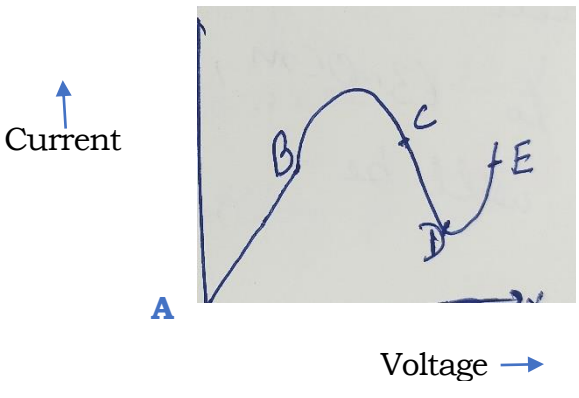
Q 33. In a potentiometer arrangement a cell of EMF 1.25 V gives a balance point at 35.0 cm length of wire. If the cell is replaced by another cell and the balance point shifts 63.0 cm, e.m.f of second cell will be

a. 1.2 V
b. 2.0 V
c. 3.0 V
d. 2.25 V

Q 34. If potential difference V applied across a conductor is increased to 2 V, The drift velocity of electron

a. Will become half
b. gets doubled
c. No change
d. None of these

Q 35



Find in graph (i) negative resistance (ii) Ohm's law is obeyed

a. (i) CD; (ii) AB
b. (i) AB; (ii) CD
c. (i) DE; (ii) BC
d. None of these

Q36. Two electric bulbs are rated at 220 V-100W and 220 V- 60 W,then

a. Resistance of 100 watt bulb is greater than that of 60 watt bulb.
b. both are having equal resistances.
c. resistance of 60 watt bulb is greater than resistance of 100 watt bulb.
d. none of these.

Q 37.What information you should have when galvanometer is converted into ammeter.

a. Resistance of galvanometer (Rg)
b. Current (Ig) required to produce full scale deflection in galvanometer.
c. Both a and b
d. None of these

Q38.If R_A , R_v & R_g are resistances of ammeter, voltmeter and galvanometer respectively then correct relation is

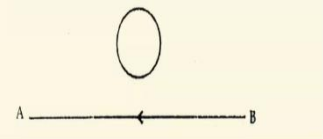
a. $R_A < R_g < R_v$
b. $R_A > R_v > R_g$
c. $R_A > R_g > R_v$
d. $R_A = R_g = R_v$

Q39.

A square coil of the side 10 cm consists of 20 turns and carries a current of 12 A, the coil is suspended vertically and normal to the plane of the coil and makes an angle of 30 degree with the direction of uniform horizontal magnetic field of magnitude 0.80 Tesla . The magnitude of torque experienced by the coil is

a. 2.96 Nm
b. 3.45 Nm
c. 5 Nm
d. 0.96 Nm

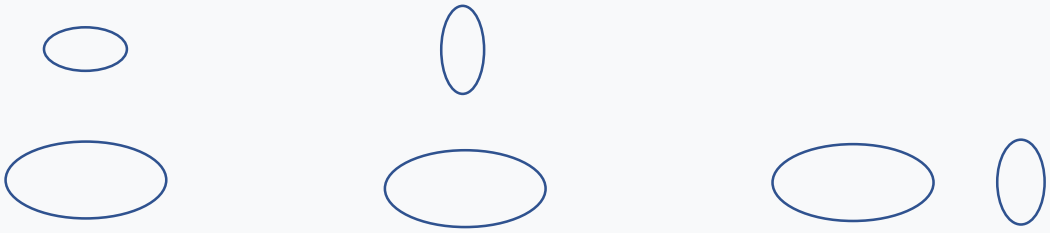
Q 40.



The electric current flowing in a wire in the direction B to A is decreasing. The induced current in the metallic loop kept above the wire as shown in the figure is

a. Anticlockwise
b. Clockwise
c. is absent
d. None of these

Q41.



(i) (ii) (iii)

Two circular coils can be arranged in any of the three situations shown in the above figures. Their mutual inductance will be

a. Maximum in situation (i)
b. Maximum in situation (ii)
c. Maximum in situation (iii)
d. Same in all situations

Q42. If number of turns per unit length of a coil of a solenoid is doubled, its self inductance will be

a. Same as before
b. Doubled

c. Four times

d. Halved

Q 43. In an a.c series circuit the instantaneous current is maximum when the instantaneous voltage is maximum. The circuit element connected to the source will be

a. Pure inductor

b. Pure capacitor

c. Inductor and capacitor

d. Pure resistor

Q44. Lenz's law is a consequence of the law of conservation of

a. Charge

b. Momentum

c. Mass

d. Energy

Assertion and Reasoning Questions

Directions : Each of these questions contain two statements, Assertion (A) and Reason(R). Each of these questions also has four alternative choices, only one of which is the correct answer. You have to select one of the codes (a), (b), (c) and (d) given below.

a. Both A and R are true and R is the correct explanation of A.

b. Both A and R are true and R is not the correct explanation of A.

c. A is true but R is false.

d. A is false and R is also false.

Q45. **Assertion (A) :** A charge whether stationary or in motion produces a magnetic field around it.

Reason (R): Moving charges produce only electric field in the surrounding space.

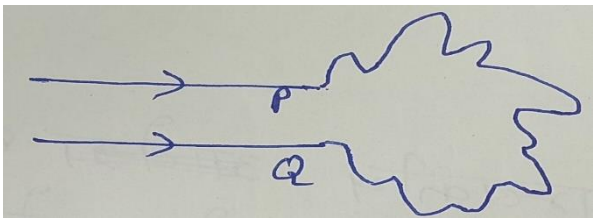
Q 46. **Assertion (A**): The resistance of an ideal voltmeter should be infinte.

Reason (R) : The lower resistance of voltmeter gives a reading lower than the actual potential difference across the terminals.

Q 47. **Assertion (A):** Magnetic field interacts with a moving charge and not with a stationary charge.

Reason(R): A moving charge produces magnetic field.

Q 48. **Assertion (A):** A wire bent into an irregular shape with the points P and Q fixed. If a current I is passed through the wire, then the area enclosed by the irregular portion of the wire increases.



Reason (R): Opposite currents Carrying wires repel each other**.**

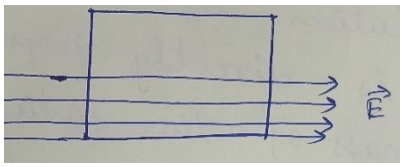
Q 49. Assertion (A): If a proton and an alpha particle enter a uniform magnetic field perpendicularly with the same speed, the time period of revolution of alpha particle is double that of proton.

Reason(R): In a magnetic field ,the period of revolution of a charged particle is directly proportional to the mass of the particle and inversely proportional to charge of particle.

Section C

This section consists of 06 multiple choice questions with overall choice to attempt any 05 questions. In case more than desirable number of questions are attempted, ONLY first 05 will be considered for evaluation.

Q 50.



A square surface of side L meters is in the plane of paper**. E** is limited only to the lower half of the square surface as shown in the figure. Electric field **E** is in V/m. The electric flux (SI units) associated with the surface is

a. EL^2

b. $EL^2/2\varepsilon_0$

c. $EL^2/2$

d. Zero

Q 51. An electric dipole is placed at an angle of 30 degree with an electric field intensity 2 x 10^5 N/C. It experience a torque equal to 4 Newton metre. The charge on the dipole length 2 cm, is

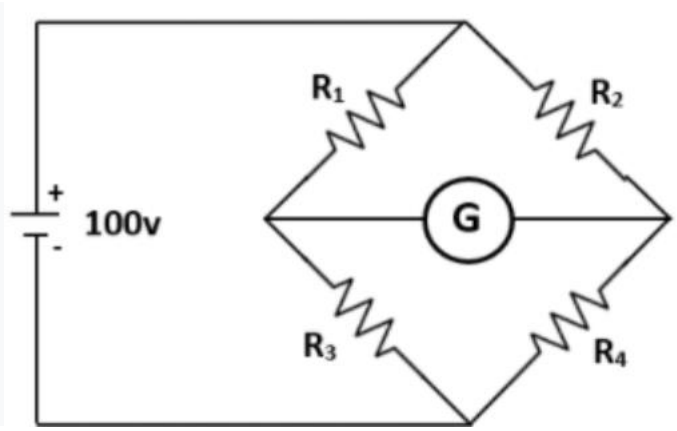
a. 5 mC

b. 7μC

c. 8mC

d. 2mC

Case Study



The Wheatstone bridge and its balance condition provide the practical method for determination of an unknown resistance. Let us suppose we do not know the value of R_4 resistance.

Keeping known resistances R_1 and R_2 in the first and second arm, we go on varying R_3 till the Galvanometer shows a null deflection then we use relation of balance condition

$$R_2/ R_1= R_4/ R_3$$

And find value $R_4= R_3 R_2/ R_1$

Q 52 When wheat stone bridge is balanced ,potential difference between point B and D is

a. Zero
b. Maximum
c. Same as potential difference between A and C
d. None of these

Q 53 Wheatstone bridge is used to measure

a. Unknown current
b. Unknown voltage
c. Unknown charge

d. Unknown resistance

Q54. A practical device using this principle is called

a. Ammeter

b. Voltmeter

c. Meter bridge

d. Potentiometer

Q55. Which instrument is used as the null detector in Wheatstone bridge?

a. Venturimeter
b. Voltmeter
c. Ammeter
d. Galvanometer