

Class : 12

Register
Number**FIRST MID TERM TEST - 2024**

Time Allowed : 1.30 Hours]

PHYSICS

[Max. Marks : 50

PART - I

YouTube/ Akwa Academy

Choose the correct Answer.

10x1=10

- Which charge configuration produces A uniform electric field?
 - Point charge
 - Uniformly charged infinite line
 - Uniformly charged infinite plane
 - Uniformly charged spherical shell
- Two metallic spheres of radii 1 cm and 3 cm are given charges of $-1 \times 10^{-2}\text{C}$ and $5 \times 10^{-2}\text{C}$ respectively. If these are connected by a conducting wire, the final charge on the bigger sphere is
 - $3 \times 10^{-2}\text{C}$
 - $4 \times 10^{-2}\text{C}$
 - $1 \times 10^{-2}\text{C}$
 - $2 \times 10^{-2}\text{C}$
- In India electricity is supplied for domestic use at 220 V. It is supplied at 110 V in USA. If the resistance of a 60W bulb for use in India is R, the resistance of a 60W bulb for use in USA will be
 - R
 - 2R
 - R/4
 - R/2
- In Joule's heating law, when R and t are constant, if the H is taken along the y axis and I^2 along the x axis, the graph is
 - Straight line
 - Parabola
 - Circle
 - Ellipse
- A thin insulated wire forms a plane spiral of N = 100 tight turns carrying a current I = 8 mA (milli ampere). The radii of inside and outside turns are a = 50 mm and b = 100 mm respectively. The magnetic induction at the centre of the spiral is
 - $5 \mu\text{T}$
 - $7 \mu\text{T}$
 - $8 \mu\text{T}$
 - $10 \mu\text{T}$
- The potential energy of magnetic dipole whose dipole moment is $\vec{P}_m = (-0.5\hat{i} + 0.4\hat{j}) \text{ Am}^2$ kept in uniform magnetic field $\vec{B} = 0.2\hat{i} \text{ T}$
 - 0.1 J
 - 0.8 J
 - 0.1 J
 - 0.8 J
- In a transformer, the number of turns in the primary and the secondary are 410 and 1230 respectively. If the current in primary is 6A, then that in the secondary coil is
 - 2 A
 - 18 A
 - 12 A
 - 1 A
- A step-down transformer reduces the supply voltage from 220 V to 11 V and increase the current from 6 A to 100 A. Then its efficiency is
 - 1.2
 - 0.83
 - 0.12
 - 0.9
- An inductor 20 mH, a capacitor 50 μF and a resistor 40 Ω are connected in series across a source of emf $V = 10 \sin 340 t$. The power loss in AC circuit is
 - 0.76 W
 - 0.89 W
 - 0.46 W
 - 0.67 W

V / 12 / Phy / 1

10. ----- is an instrument used to measure current in an electrical circuit.
- (a) Voltmeter (b) Galvanometer
(c) Ammeter (d) None of the above

PART - II

II. Answer any five questions in which question No.14 is compulsory. 5X2 = 10

11. Define 'electric flux'.
12. What is corona discharge?
13. Write a short note on superconductors?
14. If the resistance of coil is 3Ω at 20°C and $\alpha = 0.004/^\circ\text{C}$ then determine its resistance at 100°C .
15. Define ampere.
16. State Fleming's left hand rule.
17. State Lenz's law.

PART - III

III Answer any five questions in which question No. 21 is compulsory. 5X3 =15

18. Derive an expression for electrostatic potential due to a point charge.
19. State and explain Kirchhoff's rules.
20. Give the properties of dia / para / Ferro magnetic materials.
21. An electron moving perpendicular to a uniform magnetic field 0.500 T undergoes circular motion of radius 2.50 mm . What is the speed of electron?
22. How will you induce an emf by changing the area enclosed by the coil?
23. State the principle of potentiometer.
24. Write the properties of electric field lines

PART - IV

IV. Answer all the questions. 3X5 =15

25. a) Derive an expression for electrostatic potential due to an electric dipole.
(OR)
b) Explain the construction and working of transformer.
26. a) Obtain a relation for the magnetic field at a point along the axis of a circular coil carrying current using Biot-Savart law.
(OR)
b) Obtain the condition for bridge balance in Wheatstone's bridge.
27. a) Explain in detail the construction and Working of a Van de Graaff generator.
(OR)
b) How the emf of two cells are compared using potentiometer?

V / 12 / Phy / 2