

FIRST MID TERM TEST - 2024

Standard XII

 Reg No.

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PHYSICS

Time : 1.30 hrs

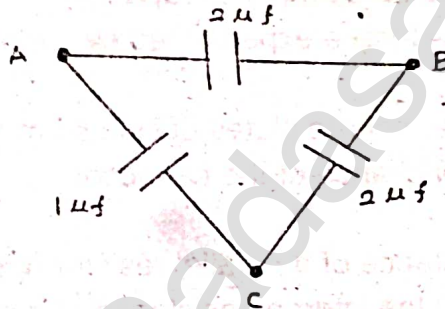
Part - I

Marks : 50

10 x 1 = 10

1. Choose the correct answer:

1. Which charge configuration produces a uniform electric field?
 - a) point charge
 - b) uniformly charged infinite line
 - c) uniformly charged infinite plane
 - d) uniformly charged spherical shell
2. Two identical conducting balls having positive charges q_1 and q_2 are separated by a centre to centre distance r . If they are made to touch each other and then separated to the same distance, the force between them will be,
 - a) less than before
 - b) same as before
 - c) more than before
 - d) zero
3. An electric field $\vec{E} = 10x\hat{i}$ exists in a certain region of space. Then the potential difference $V = V_0 - V_A$. Where V_0 is the potential at the origin and V_A is the potential at $x = 2\text{m}$ is
 - a) 10 V
 - b) -20 V
 - c) +20 V
 - d) -10 V
4. Three capacitors are connected in triangle as shown in the figure. The equivalent capacitance between the points A and C is



- a) 1 μf
 - b) 2 μf
 - c) 3 μf
 - d) $\frac{1}{4}\mu\text{f}$
5. A toaster operating at 240 V has a resistance of 120 Ω . Its power is
 - a) 400 ω
 - b) 2 ω
 - c) 480 ω
 - d) 240 ω
 6. The temperature coefficient of resistance of a wire is 0.00125 per $^\circ\text{C}$. At 20°C its resistance is 1 Ω . The resistance of the wire will be 2 Ω at
 - a) 800°C
 - b) 700°C
 - c) 850°C
 - d) 820°C
 7. 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
 - a) straight line
 - b) parabola
 - c) circle
 - d) ellipse
 8. A circular coil of radius 5 cm and 50 turns carries a current of 3 ampere. The magnetic dipole moment of the coil is nearly
 - a) 1.0Am^2
 - b) 1.2Am^2
 - c) 0.5Am^2
 - d) 0.8Am^2
 9. A non-conducting charged ring carrying a charge of ' q ' mass ' m ' and radius ' r ' is rotated about its axis with constant angular speed ω . Find the ratio of its magnetic moment with angular momentum is
 - a) $\frac{q}{m}$
 - b) $\frac{2q}{m}$
 - c) $\frac{q}{2m}$
 - d) $\frac{q}{4m}$

10. The vertical component of Earth's magnetic field at a place is equal to the horizontal component. What is the value of angle of dip at this place?
- a) 30° b) 45° c) 60° d) 90°

Part - II

II. Answer any 5 questions. (Q.No.16 is compulsory) 5 x 2 = 10

11. Define electric dipole moment. Give its unit.
12. Distinguish between polar molecule and non-polar molecule.
13. During lightning, it is safer to sit inside a car than in an open ground or under tree. Why?
14. State Kirchoff's current rule.
15. Give two applications of Seebeck effect.
16. In a Wheatstone's bridge $p = 100 \Omega$, $Q = 1000 \Omega$ and $R = 40 \Omega$. If the galvanometer shows zero deflection, determine the value of 'S'.
17. What is Hysteresis?
18. State Maxwell's right hand cork screw rule.

Part - III

III. Answer any 5 questions. (Q.No.21 is compulsory) 5 x 3 = 15

19. Give the applications and disadvantages of capacitor.
20. Derive an expression for the torque experienced by a dipole due to a uniform electric field.
21. A parallel plate capacitor has square plates of side 5 cm and separated by a distance of 1 mm. Calculate the capacitance of the capacitor.
22. Explain Thomson effect.
23. Explain the equivalent resistance of a parallel resistor network.
24. Explain the determination of the internal resistance of a cell using voltmeter.
25. State and explain Biot-Savart law.
26. Give the properties of Dia-magnetic material.

Part - IV

IV. Answer all the questions. 3 x 5 = 15

27. a) Derive an expression for electrostatic potential due to an electric dipole.
(OR)
- b) How the emf of two cells are compared using potentiometer?
28. a) Obtain the condition for bridge balance in Wheatstone's bridge.
(OR)
- b) Deduce the relation for the magnetic field at a point due to an infinitely long straight conductor carrying current using Biot-Savart law.
29. a) Calculate the magnetic field at a point on the axial line of a bar-magnet.
(OR)
- b) Obtain the expression for electric field due to an infinitely long charged wire.
