FML

FIRST MID - TERM TEST - 2024

12- Std PHYSICS (salem)

Time : 1.30 HR MARKS: 40

I Choose the best answer. 10 X 1 = 10

1. An electric dipole is placed at an alignment angle of 30° with an electric field of 2×10^5 NC^{-1}. It experiences a torque to 8 Nm. The charge on the dipole if the dipole length is 1 cm is a) 4 mC b) 8 mC c) 5 mC d) 7 mC

2. Two identical conduction 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. A toaster operating at 240V has a resistance of 120 Ω Its power is
a) 400 W b) 2 W c) 480 W d) 240 W

4. The internal resistance of a 2.1V cell which gives a current of 0.2A through a resistance of 10 Ω is
a) 0. 2 Ω b) 0.5 Ω c) 0.8Ω d) 1.0 Ω

5. 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) $\frac{q}{4m}$

6. 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°

7. Two equipotential surfaces
a) Can interact with each other b) Cannot interact with each other
c) Interact in some cases d) none of these

8. The Value of resistance for the colour code "Brown, Black, Orange" is
a) 10 KΩ b) 1 kΩ c) 20 kΩ d) 10 kΩ ± 20%

9. The net charge of a dipole is
a) q b) +2q c) -2q d) Zero

10. The ratio of Geometrical length to magnetic length of a bar magnet is
a) 0.5 b) 0.833 c) 2 d) 1.2

II Answer any three questions. Q.NO: 15 is Compulsory. 3 X 2 = 6

11. State Coulomb's Law.
12. Define electrical resistivity. Give its unit.
13. What is meant by hysteresis?
14. A sample of HCl gas is places in a uniform electric field of magnitude 3×10^{-30} NC^{-1}. The dipole moment of each HCl molecule is 3.4×10^{-30} cm. Calculate the maximum torque experienced by a each HCl molecule.
15. The repulsive force between two magnetic poles in air is 9×10^{-3} N. If the two poles of equal strength and are separated by a distance of 10cm, calculate the pole strength of each pole.

III Answer any three questions. Q.NO: 20 is Compulsory. 3 X 3 = 9

16. Write the properties of electric field lines.
17. Discuss the conversion of galvanometer into an ammeter.
18. Derive the relation between current and drift Velocity.
19. State Kirchoff's laws.
20. The resistance of a nichrome wire at 20°C is 10Ω. If its temperature coefficient of resistivity of nichrome is 0.004/°C, find the resistance of the write at boiling point of water. Comment on the result.

IV Answer all the questions. 3 X 5 = 15

21. Explain in detail the construction and working of a Van de Graaff generator .

(OR)

Obtain the condition for bridge balance in Wheatsone's bridge.

22. Derive the expression for the force between two parallel current carrying conductors.

(OR)

Calculate the electric field due to a dipole on its axial line.

23. Explain the equivalent resistance of a series and parallel network.

(OR)

Compute the torque experienced by a magnetic needle in a uniform magnetic field.