



## COMMON FIRST MID TERM TEST - 2023

Standard - XII  
PHYSICS

Reg. No.

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Marks:50

Time: 1.30 hrs.

### PART - I

#### I. Choose the correct answer:

10×1=10

1. An electric dipole is placed at an alignment angle of  $30^\circ$  with an electric field of  $2 \times 10^5 \text{ NC}^{-1}$ . It experiences a torque equal to 8 Nm. The change on the dipole if the dipole length is 1cm is  
 a) 4mc                      b) 8mc                      c) 5mc                      d) 7mc
2. Two points A and B are maintained at a potential of 7V and -4V respectively. The work done in moving 50 electrons from A to B is  
 a)  $8.8 \times 10^{-17} \text{ J}$       b)  $-8.80 \times 10^{-17} \text{ J}$       c)  $4.40 \times 10^{-17} \text{ J}$       d)  $5.80 \times 10^{-17} \text{ J}$
3. Two metallic spheres of radii 1cm and 3cm are given charges of  $-1 \times 10^{-2} \text{ C}$  and  $5 \times 10^{-2} \text{ C}$  respectively. If there are connected by a conducting wire, the final charge on the bigger sphere is  
 a)  $3 \times 10^{-2} \text{ C}$               b)  $4 \times 10^{-2} \text{ C}$               c)  $1 \times 10^{-2} \text{ C}$               d)  $2 \times 10^{-2} \text{ C}$
4. A toaster operating at 240V has a resistance of  $120 \Omega$ . Its power is  
 a) 400W                      b) 2W                      c) 480W                      d) 240W
5. Two wires of A and B with circular cross section are made up of the same material with equal lengths. Suppose  $R_A = 3 R_B$ , then what is the ratio of radius of wire A to that of B?  
 a) 3                      b)  $\sqrt{3}$                       c)  $\frac{1}{\sqrt{3}}$                       d)  $\frac{1}{3}$
6. The internal resistance of a 2.1 V cell which gives a current of 0.2A through a resistance of  $10 \Omega$  is  
 a) 0.2 $\Omega$                       b) 0.5 $\Omega$                       c) 0.8  $\Omega$                       d) 1.0 $\Omega$
7. A circular coil of radius 5cm and 50 turns carries a current of 3 ampere. The magnetic dipole moment of the coil is nearly  
 a)  $1.0 \text{ Am}^2$                       b)  $1.2 \text{ Am}^2$                       c)  $0.5 \text{ Am}^2$                       d)  $0.8 \text{ Am}^2$
8. 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)  $30^\circ$                       b)  $45^\circ$                       c)  $60^\circ$                       d)  $90^\circ$
9. If a current of 7.5A is maintained in a wire for 45 seconds then the charge flowing through the wire is  
 a) 6c                      b) 365.5 c                      c) 3c                      d) 337.5c
10. A carbon resistor of  $(47 \pm 4.7) \text{ k}\Omega$  is to be marked with rings of different colours for its identification. The colour code sequence will be  
 a) Violet - Yellow - Orange - Silver      b) Yellow - Green - Violet - Gold  
 c) Green - Orange - Violet - Gold      d) Yellow - Violet - Orange - Silver

## PART - II

Answer any 5 questions. (Q.No.18 is compulsory)

5×2=10

11. Define electric dipole. Give examples.
12. What is an equipotential surface?
13. What is corona discharge?
14. Distinguish between drift velocity and mobility.
15. Define electrical resistivity.
16. State Ampere's circuital law.
17. State Fleming's left hand rule.
18. If the resistance of the coil is  $3\Omega$  at  $20^\circ\text{C}$  and  $\alpha = 0.004/^\circ\text{C}$  then determine its resistance at  $100^\circ\text{C}$ .

## PART - III

Answer any 5 questions. (Q.No.26 is compulsory):

5×3=15

19. Distinguish between coulomb force and gravitational force.
20. Obtain Gauss law from Coulomb's law.
21. State and explain Kirchhoff's rules.
22. What is seebeck effect? List out its applications.
23. Explain the equivalent resistance of a parallel resistor network.
24. Give an account of magnetic Lorentz's force.
25. Compare the properties of soft and hard ferromagnetic materials.
26. A coil of a tangent galvanometer of diameter  $0.24\text{m}$  has 100 turns. If the horizontal components of Earth's magnetic field is  $25 \times 10^{-6} \text{ T}$  then calculate the current which gives a deflection of  $60^\circ$ .

## PART - IV

Answer all the questions:

3×5=15

27. Calculate the electric field due to a dipole on its axial line. (OR)  
Describe the microscopic form of current and hence obtain the macroscopic form of Ohm's law.
28. Obtain the condition for bridge balance in wheatstone's bridge. (OR)  
Using Biot - Savart's law, deduce the relation for the magnetic field at a point due to an infinitely long straight conductor carrying current.
29. Derive an expression for electrostatic potential due to an electric dipole. (OR)  
Obtain a relation for the magnetic field at a point along the axis of circular coil carrying current using Biot - Savart's law.