Previous Years

Examination Questions

☑ 2 Marks Questions

1. A small compass needle of magnetic moment $\mathbf{M}$ and moment of inertia I is free to oscillate in a magnetic field B. It is slightly disturbed from its equilibrium position and then released. Show that it executes simple harmonic motion. Hence, write the expression for its time period.

   Delhi 2011C

2. A bar magnet of dipole moment 3 A-m^2 rests with its centre on a frictionless pivot. A force F is applied at right angles to the axis of the magnet, 10 cm from the pivot. It is observed that an external magnetic field of 0.25 T is required to hold the magnet in equilibrium at an angle of 30° with the field. Calculate the value of F. How will the equilibrium be effected, if F is withdrawn? **All India 2020**

☑ 3 Marks Questions

3. (i) State Gauss' law for magnetism. Explain its significance.

   (ii) Write the four important properties of the magnetic field lines due to a bar magnet. **Delhi 2019**

4. A bar magnet of magnetic moment 6 J/T is aligned at 60° with a uniform external magnetic field of 0.44 T. Calculate

    (i) the work done in turning the magnet to align its magnetic moment (a) normal to the magnetic field, (b) opposite to the magnetic field and

   (ii) the torque on the magnet in the final orientation in case (b).   **CBSE 2018**

☑ 5 Marks Question

5.   (i) Show that a current carrying solenoid behaves like a small bar magnet. Obtain the expression for the magnetic field at an external point lying on its axis.

   (ii) A steady current of 2A flows through a circular coil having 5 turns of radius 7 cm. The coil lies in *XY*-plane with its centre at the origin. Find the magnitude and direction of the magnetic dipole moment of the coil.   **All India 2020**

Previous Years
Examination Questions

☑ 1 Mark Questions

1. The magnetic susceptibility of magnesium at 300K is 1.2×10^5. At what temperature will its magnetic susceptibility become 1.44×10^5? **All India 2019**

2. The magnetic susceptibility of χ of a given material is -0.5. Identify the magnetic material. **All India 2019**

3. In what way is the behaviour of a diamagnetic material different from that of a paramagnetic, when kept in an external magnetic field? **All India 2016**

4. Relative permeability of a material $\mu_r = 0.5$. Identify the nature of the magnetic material and write its relation of magnetic susceptibility. **Delhi 2014**

5. The permeability of a magnetic material is 0.9983. Name the type of magnetic material, it represents. **Delhi 2011**

6. The susceptibility of a magnetic material is 1.9×10^{-5}. Name the type of magnetic material, it represents. **Delhi 2011**

7. The susceptibility of a magnetic material is -4.2×10^{-6}. Name the type of magnetic material, it represents. **Delhi 2011**

8. What is the characteristic property of a diamagnetic material? **Foreign 2010**

☑ 2 Marks Questions

9. (i) Define the term magnetic susceptibility and write its relation in terms of relative magnetic permeability.
(ii) Two magnetic materials A and B have relative magnetic permeabilities of 0.96 and 500. Identify the magnetic materials A and B. **CBSE 2018C**

10. Show diagrammatically the behaviour of magnetic field lines in the presence of
(i) diamagnetic and
(ii) paramagnetic substances.
How does one explain this distinguishing feature? **All India 2014**

11. Out of the two magnetic materials, A has relative permeability slightly greater than unity while B has less than unity. Identify the nature of the materials A and B. Will their susceptibilities be positive or negative? **Delhi 2014**

12. Give two points to distinguish between a paramagnetic and diamagnetic substance. **Delhi 2014C**

13. The relative magnetic permeability of a magnetic material is 800. Identify the nature of magnetic material and state its two properties. **Delhi 2012**

14. (i) How does a diamagnetic material behave when it is cooled at very low temperature?
(ii) Why does a paramagnetic sample display greater magnetisation when cooled? Explain. **Delhi 2012**

15. Explain the following.
(i) Why do magnetic lines of force form continuous closed loops?
(ii) Why are the field lines repelled (expelled) when a diamagnetic material is placed in an external uniform magnetic field? **Foreign 2011**

16. Distinguish between diamagnetic and ferromagnetic materials in terms of
(i) susceptibility and
(ii) their behaviour in a non-uniform magnetic field. **All India 2011**

17. Draw magnetic field lines when a (i) diamagnetic, (ii) paramagnetic substance is placed in an external magnetic field. Which magnetic property distinguishes this behaviour of the field lines due to the two substances? **Delhi 2010**

☑ 3 Marks Questions

18. Write three points of differences between para-, dia- and ferro- magnetic materials, give one example for each. **Delhi 2019**

19. The susceptibility of a magnetic material is 0.9853. Identify the type of magnetic material. Draw the modification of the field pattern on keeping a piece of this material in a uniform magnetic field. **CBSE 2018**

20. Three identical specimens of a magnetic materials nickel, antimony and aluminium are kept in a non-uniform magnetic field. Draw the modification in the field lines in each case. Justify your answer. **Delhi 2011**