Chapter- 5

Magnetism And Matter

Very Short Answer Type Questions

01. What are the units of magnetic permeability?

02. Write the relation between relative permeability and susceptibility. ***[CBSE-2008]***

03. What are SI units of magnetic susceptibility? ***[CBSE-2009]***

04. The permeability of a magnetic material is 0.9983. Name the type of magnetic material it represents.

05. Why electromagnets are made of soft iron? ***[Kerala Board 2012]***

06. Magnetisation and demagnetisation of soft iron is easier/more difficult as compared to steel. Why?

07. Which materials have a negative value of magnetic susceptibility?

08. The magnetic moment of atoms of certain materials is zero. Name such materials.

09. Which materials have relative magnetic permeability > 1?

10. Can there be a material, which is non-magnetic?

Short Answer Type Questions (2 marks)

11. State two methods to destroy the magnetism of a magnet.

12. Define the term: magnetic dipole moment of a current loop. Write the expression for the magnetic moment when an electron revolves at a speed around an orbit of radius r in a hydrogen atom. ***[CBSE 2008]***

13. Three identical specimens of magnetic materials nickel, antimony and aluminium are kept in a non-uniform magnetic field. Draw the modifications in the field lines in each case. Justify your answer. ***[CBSE 2010]***

14. What is the susceptibility and permeability of a perfectly diamagnetic substance?

15. Comment on the state of magnetisation of a substance whose atoms contain an odd number of electrons.

16. Which material is used to make electromagnets and why? ***[CBSE 2010]***

17. Why is soft iron preferred for making the core of a transformer? ***[Hr. Board 2011]***

18. What is the basic difference between the atom/molecule of a diamagnetic and a paramagnetic material? Why are elements with even atomic number more likely to be diamagnetic?

19. Suppose you have two bars of identical dimensions, one made of paramagnetic substance and the other of diamagnetic substance. If you place these bars along a uniform magnetic field, show diagrammatically what modification in the field pattern would take place in each case.

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

Short Answer Type Questions (3 marks)

21. Explain magnetic permeability, magnetising force and magnetic field induction. State the relation between them.

22. Explain paramagnetism based on electron theory. ***(AP Board 2011)***

23. State and explain Curie law in magnetism.

24. What is meant by hysteresis loss? Where is the study of hysteresis used?

25. Permanent magnets are made of steel while the core of the transformer is made of soft iron. Why?

26. Write any two differences between the electromagnet and permanent magnet. ***[Bihar Board 2012]***

27. A magnetising field of 1500 A/m produces a flux of 2.4×10^{-5} weber in a bar of iron of cross-selectional area 0.5 cm^2. Calculate the permeability and susceptibility of the iron bar used. ***[CBSE 2008]***

28. A toroid has 2000 turns. The inner & outer radii of its core are 11 cm and 12 cm respectively. The magnetic field in the core for a current of 0.7 A is 2.5 T. What is the relative permeability of core?

29. For a magnetising field of intensity 2×10^3 Am^{-1}, aluminium at 280 K acquires intensity of magnetisation of 4.8×10^{-2} Am^{-1}. Find the susceptibility of aluminium at 280 K. If the temperature of the metal is raised to 320 K, what will be its susceptibility and intensity of magnetisation?

30. An iron rod of volume 10^{-4} m^3 and relative permeability 1000 is placed inside a long solenoid wound with 5 turns/cm. If a current of 0.5 A is passes through the solenoid, find the magnetic moment of the rod.

Long Answer Type Questions (5 marks)

31. Define magnetising field, magnetic induction, permeability, the intensity of magnetisation and susceptibility. Establish the relation between permeability and susceptibility.

32. Distinguish between the magnetic properties of dia, para and ferromagnetic substances in terms of

(i) Susceptibility

(ii) magnetic permeability and (iii) Coercivity. Give one example of each of these materials.

Draw the field lines due to an external magnetic field near a

(i) diamagnetic (ii) paramagnetic substance. ***[CBSE 2007]***