Question Bank

5-Magnetism

Level A

1. Which of the following substances are para-magnetic? [1]

   Bi, A*l*, Cu, Ca, Pb, Ni

2. The susceptibility of a magnetic material is -0.080.What is the type of material. [1]
3. Compare the properties of an electromagnet and a permanent magnet [2]
4. Draw the hysteresis curve of soft iron [2]
5. Define the terms magnetisation and magnetic intensity. [2]
6. Define the terms magnetic meridian and geographic meridian.[2]
7. Define magnetic susceptibility [2]
8. State two properties of a ferromagnetic substance ?[2]
9. Explain the elements of earth's magnetism.[3]
10. Compare the properties of diapara and ferromagnetic substances. [3]
11. What is hysterisis? Draw the hysterisis curve for a magnetic substance and explain the terms retentivity and coercivity. How do these factors help in selecting suitable materials for (a) permanent magnet (b) Electromagnet [5]
12. Derive an expression for the potential energy of a magnetic dipole in a uniform magnetic field. What is Bohr magneton? Derive an expression for it and calculate its value. [5]

Level B

1. In which direction would a compass free to move in the vertical plane point to, if located right on the geomagnetic north or south pole? [1]

2. The earth's core is known to contain iron. Yet geologists do not regard this as a source of the earth's magnetism. Why? [1]

3.The permeability of a magnetic material is 0.9983. Name the type of magnetic materials it represents. [1]

4 Write two characteristics of a material used for making permanent magnets. [2]

5 Why is core of an electromagnet made of ferromagnetic materials? [2]

6.Why should the material used for making permanent magnets have high coercivity? [2]

7. What is Curie Temperature? [2]

8.Why do we prefer steel or alnico for making permanent magnets? [2]

9.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?[3]

10.Define magnetic susceptibility of a material. Name two elements, one having positive susceptibility and the other having negative susceptibility. What does negative susceptibility signify?[3].

11.Earth behaves as a magnet with magnetic poles approximately near the geographic poles.

(a) What do you understand by 'dynamo effect'?

(c) Classify the following materials into diamagnetic and paramagnetic.

(i) Lead

(ii) Magnesium

(iii) Tungsten

(iv) Copper. [3]

12.A short bar magnet placed with its axis at 30 degrees with a uniform magnetic field of 0.35 T. A torque of 0.055 J is experienced by the magnet. Find the magnetic moment. [3]

Level C

1.A magnetic needle orients with its axis vertical at a certain place on earth . What are the values of

i. horizontal component of earth's field.
ii. angle of dip at this place . [1]

2.In what direction could a compass needle align if taken to geographical (i) North (ii) South pole ?[1]

3.When does a magnetic dipole posses maximum P.E. inside a magnetic field ?[1]

4..Which material is used to make the core of a moving coil galvanometer ? [1]

5.Give relation for susceptibility χ_m in terms of curie constant and temp. T (in Kelvin) .[1]

6.Write down the dimensional formula for magnetic flux .[1]

7.An iron bar magnet is heated to 1000°C and then cooled in a magnetic field free space . Will it retain magnetism ?[2]

8.Establish relationship between magnetic inclination and horizontal component of Earth's magnetic field at a place with the help of a diagram .[2]

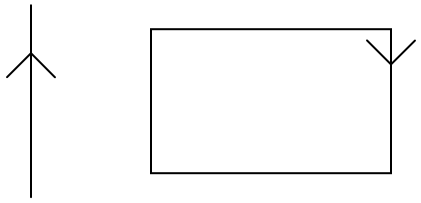
9.Suppose you have two bars of identical dimensions , one made of paramagnetic and the other diamagnetic substance . If you place the bars along a uniform magnetic field . Show diagrammatically what modification in the field would take each case ?[2]

10.A short bar magnet of magnetic moment 0.9J/T is placed with its axis at 45° to a uniform magnetic field . If it experiences a torque of 0.063J

(i) calculate the magnitude of the magnetic field

(ii) what orientation of the bar magnet corresponds to the stable equilibrium in the magnetic field . [3]

11. In the figure, the straight wire AB is fixed while loop is free to move under the influence of the electric currents flowing in them. In which direction dose it begin to move Give reason. [3]



12. What is Hysterisis? Draw the hysterisis loops for soft iron and steel. Explain Retentivity and Coercivity. Hence explain which material would you prefer for making

a. Permanent magnet
b. Core of a transformer
c. Electromagnet [5]