PHYSICS CLASS XII
CHAPTER – 5 MAGNETISM AND MATTER

Q.1. Where on the surface of earth is the vertical component of earth's magnetic field zero?

Ans. At equator.

Q.2. The permeability of a magnetic material is 0.9983. Name the type of magnetic material it represents.

Ans. The magnetic material is diamagnetic substance for which $\mu_r < 1$.

Q.3. The susceptibility of a magnetic material is 1.9×10^5. Name the type of magnetic material it represents.

Ans. The small and positive susceptibility of like 1.9×10^{-5} represents paramagnetic substance.

Q.4. If the horizontal and vertical components of the earth's magnetic field are equal at a certain place, what would be the angle of dip at that place?

Ans. $\tan \delta = \frac{V}{H}$,

where δ = angle of dip,

H and V are horizontal and vertical components of magnetic field.

For $V = H$

$\therefore \quad \tan \delta = 1$

$\Rightarrow \quad \delta = \frac{\pi}{4}$

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Q.5. The horizontal component of earth's magnetic field at a place is B and angle of dip is 60°. What is the value of vertical component of earth's magnetic field at equator?

Ans. Here, there is no significance of the given value of B and angle of dip as the vertical component of magnetic field at equator is zero.

Q.6. What is the maximum value of angle fo dip? At what place does it occur?

Ans. The maximum value of angle of dip is 90°. It occurs at earth magnetic poles.

Q.7. What is dynamo effect?

Ans. The magnetic field of earth has arisen due to electrical currents produced by convective motion of metallic fluids in the outer core of the earth, this is known as dynamo effect.

Q.8. Define magnetic intensity and give its SI unit.

Ans. The magnetic intensity define as the number of ampere turns flowing round unit length of toroid to produce the magnetic induction. SI unit is A/m.

Q.9. Define magnetic susceptibility?

Ans. The magnetic susceptibility of a magnetic substance is defined as the ratio of the intensity of magnetisation to the magnetic intensity.

It is denoted by χ_m

$$\chi_m = \frac{I}{H}$$

Q.10. What are diamagnetism and paramagnetism.

Ans. Diamagnetic substances are those which have tendency to move from stronger to the weaker part of the external magnetic field.

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Substances that have the tendency to move from a region of weak magnetic field to strong magnetic field i.e., they get weakly attracted to a magnet.

Q.11. What are electromagnets?

Ans. Electromagnets are current carrying solenoids having soft iron core. Electromagnets are used in electric bells, loudspeaker and telephone diaphragam. The core of an electromagnet is made of ferromagnetic material, which have high permeability and low retentivity.

Q.12. What are the units of magnetic permeability?

Ans. Tesla meter/Ampere (TmA^{-1})

Q.13. Can there be a material, which is non-magnetic?

Ans. No, every substance is atleast diamagnetic.

Q.14. What are SI units of magnetic susceptibility

Ans. $$\chi_m = \frac{I}{H}$$

$$\chi_m = \frac{Am^{-1}}{Am^{-1}} = 1$$

χ_m has no units.

Q.15. Give two examples of magnetic dipole.

Ans. Every atom of para and ferromagnetic substance, a loop of current are magnetic dipoles.

Q.16. (i) Write two characteristics of a material used for making permanent magnets?

(ii) Why is core of an electromagnet made of ferromagnetic materials?

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Ans. (i) Two characteristics of material used for making permanent magnets are

(a) High coercitivity.

(b) High retentivity and high hysterisis loss.

(ii) Core of an electromagnet made of ferromagnetic material, because of its

(a) low corecitivity

(b) high permeability and low hysterisis loss

Q.17. State, briefly, an efficient way of making a permanent magnet. Write two properties to select suitable materials for making permanent magnets.

Ans. Permanent magnet can be made by putting a steel rod inside the solenoid and a strong current is allowed to pass through solenoid. The strong magnetic field inside the solenoid magnetise the rod.

For properties to select suitable materials for making permanent magnets.

Q.18. The relative magnetic permeability of a magnetic material is 800. Identify the nature of magnetic material and state its two properties.

Ans. Ferromagnetic substances as these substance have very high magnetic permeability.

Properties

(i) High retentivity

(ii) High susceptibility

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