APPLIED PHYSICS

UNIT-II
DIELECTRICS AND MAGNETICS

DIELCTRICS:

SHORT ANSWER QUESTIONS:

1. Define (i) Electric Polarization (ii) Electric polarizability (ii) Electric susceptibility (iii) Electric Flux Density (Displacement vector) and (iv) Dielectric Constant.
2. Show that P= $\varepsilon_0 E(\varepsilon_r - 1)$
3. Show that $\chi = \varepsilon_r - 1$
4. explain the polarization mechanism in dielectrics.
5. Mention various types of polarization.
6. Define Electronic Polarization and write the equation for it.
7. Define ionic Polarization and write the equation for it.
8. Define Orientation Polarization.
9. Draw the curve for the frequency dependence of the polarizability.
10. What is Lorentz (or) Internal field?
11. Define Clausius-Mosotti equation.
12. Mention the applications of dielectrics.

LONG ANSWER QUESTIONS:

1. Explain the electronic polarizability in atoms and obtain an expression for electronic polarizability in terms of radius of the atom.
2. Explain the Ionic polarization and derive an expression for ionic polarizability.
3. Explain the orientation polarization.
4. Obtain an expression for the internal field seen by an atom in an infinite array of atoms subjected to an external field.
5. Explain Clausius –Mosotti relation in dielectrics subjected to static fields.
6. Discuss the frequency dependence of various polarization processes in dielectric materials.

MAGNETICS:

SHORT ANSWER QUESTIONS:

1. Define terms permeability, susceptibility, magnetic induction, magnetic field and magnetization with reference to magnetism. Obtain a relation between magnetic susceptibility, magnetization and magnetic field.
2. Define magnetic moment
3. What is Bohr magneton? (OR) Find value of spin magnetic moment of an electron if it has one Bohr magneton?
4. What are Dia & paramagnetic materials? Based on any two properties compare para and dia magnetic materials.
5. Define magnetization and show that $B=\mu_0(H+M)$
6. What are ferro, ferri and anti ferro magnetic materials?
7. Explain important properties of Ferrites.
8. What is Hysteresis?
9. What are soft and hard magnetic materials?
10. What are Ferro magnetic materials? Why do they exhibit spontaneous magnetization?

ESSAY QUESTIONS:

1. Define magnetic moment. Explain the origin of magnetic moment at atomic level. (or) What are sources of permanent dipole moment in magnetic materials?
2. Explain the distinguishing features of Ferro, antiferro and ferromagnetic materials ?
3. a)What are Dia & paramagnetic materials? Explain.
   b) Mention the various properties of Dia & paramagnetic materials?
4. What is ferromagnetism? What are distinguishing features of ferro magnetism.
5. Give the important features of ferromagnetic materials. Explain the Weiss theory of ferromagnetism.
6. State Hysteresis. Explain the hysteresis loop observed in ferro magnetic materials.
7. Explain the salient features of anti-ferromagnetic materials.
8. Explain ferri-magnetism & anti –ferromagnetism.
9. Explain difference between hard and soft magnetic materials.
10. Write the importance of hard magnetic materials in engineering applications
11. Mention the applications of magnetic materials.