UNIT - I

Quantum Mechanics

1. Define Black Body radiation? Describe plank's Law
2. Explain the Compton Theory and Experimental verification.
3. Describe the photoelectric Effect?
4. Describe the Davison Germer's Experiment?
5. Derive the Schroedingeer's wave Equation?
6. Explain De-broglie hypothesis of matter waves.
7. Describe the Particle in a Potential Box?
8. characteristics of matter waves.
9. Explain the physical significance of wave function ψ.

UNIT - II

Semiconductor Physics.

1. Distinguish b/w intrinsic and Extrinsic impurity semi-conductors with suitable examples?
2. Derive an expression for the density of holes in the valence band of an intrinsic Semiconductor.
3. Derive the expression for fermi level.
4. Derive the Continuity equation for electrons.
5. write a note on diffusion length

Scanned with CamScanner

6. Describe the drift and diffusion currents in a Semiconductor.

7. Explain Hall effect.

8. Show That for a n-type semiconductor the Hall coefficient $R_H = -\frac{1}{ne}$

9. Explain The applications of Hall effect.

10. Explain PN junction formation?

11. Draw I-V characteristics curve of a P-N junction diode. and explain

12. Write a detailed note on photo diode.

13. Explain The rectifying action of a PIN dicde.

UNIT-III

Opto electronics

1. Explain with Theory different carrier generation and recombination Processes in semiconductors?

2. Explain with theory The construction and working of a photo diode.

3. Explain The I-V characteristics of a photodiode.

4. What is a LED? write in detail The construction and working of a LED? list out its advantages and disadvantages.

Scanned with CamScanner

5. What is a photo detector? Explain its working. What are the detector Performance Parameters?

6. What are Solar cell? Explain its working. Draw I-V characteristics of a solar cell and discuss its features.

7. What are photo detectors? Name different types of detectors. Write in detail the construction and working of any one detector.

UNIT-IV

Lasers and Fibre optics.

1. Explain characterstics and Applications of Lasers.
2. Describe the Principle of laser action.
3. Describe The Pumping Process.
4. Describe The Ruby Laser?
5. Describe The He-Ne Laser
6. Describe The Co_2 Laser
7. Explain The Population inversion.
8. Define The all basic definations.
9. Explain The total internal Reflection.
10. Explain The Types of optical fibers.

Scanned with CamScanner

11. Explain The losses in optical fibers
12. Explain The Applications of optical fibers.

UNIT-V

Electromagnetic and Magnetic Properties.

1. Deduce Maxwell's first and second equations from Gauss theorem in electro- statics and Gauss theorem in mangnetostatics respectively.

2. Deduce Maxwell's third and fourth equations from faraday's law of electro-magnetic induction and Ampere's circuital law respectively.

3. write maxwell's equations in both differential from and integral form. Discuss the significance of Maxwell's equations.

4. with usual natations show that $P = \epsilon_0(\epsilon_r - 1)E$

5. a) Derive expressions for electronic and ionic polarizations
   b) Discuss about internal field in solids.

6. What is orientation polarization? Derive an expression for ~~electronic~~ the mean dipole moment when a polar material is subjected to an external field.

7. explain, in detail, the terms.
   a. Dielectric constant
   b. Electric susceptibility and
   c. Displacement vector.

Scanned with CamScanner

8. Explain clausius - Mosotti relation in dielectrics subjected to static fields.

9. What is piezo - electricity?

10.a. Explain ferroelectricity.

b. Derive clausius - Mosotti equation.

11. Explain the phenomenon of ferro electricity with particular reference to Barium titanate?

12. Define the terms permeability (μ), susceptibility (χ), magnetic induction (B), magnetic field (H), and magnetization (M) with reference to magnetism. obtain a relation between magnetic susceptibility, magnetization and magnetic field.

13. Define magnetic moment. Explain the origin of magnetic moment at the atomic level. What is a Bohr magneton?

14. Explain in detail the classification of magnetic materials on the basis of electron spin.

15. Explain in detail domain theory of ferromagnetism. List out what further this theory can explain?

16. Explain the hysteresis loop observed is ferromagnetic materials.

17. Explain ferromagnetism and B-H curve.

18. what are hard and soft magnetic materials? Give their characteristics properties and applications.

CS Scanned with CamScanner