**I-II-R18-CSE-ENGINEERING PHYSICS- II-QB**

1. Discuss about the particle in a potential box of width ‘a’ and determine the Eigen values and Eigen functions of the particle.
2. Explain how the Davisson-Germer experiment will prove the existence of matter waves?
3. a) What is effective mass of an electron? Derive an expression for it

b) Write notes on Direct and Indirect band gap semiconductors.

4 Using Kronig-Penny model, Show that the energy spectrum of an electron contains a number of allowed Energy bands separated by forbidden bands.

1. a) Write a notes on Bragg’s law

b) What is the angle at which the fourth order reflection of X-Rays of 0.79 A0 wavelength can occur in a calcite crystal of 3.04 x 10-10 m spacing.

1. Describe with a neat diagram, Powder method of determination of crystal structure
2. Explain the Electronic Polarisability in atoms and obtain an expression for it

1. a) Explain in detail Domain theory of Ferro magnetism on basis of hysteresis curve

b) Write a short note on Superconductivity

1. a) What is matter wave? Discuss the Debroglie hypothesis of matter waves

b) Explain properties of matter waves

1. a) Explain about the Tunnelling effect and write down transmission and reflection coefficients

b) Write any three applications of Tunnelling effect

1. a) Explain about the classification of solids into conductors, semiconductors and insulators

b) What is Direct and Indirect bandgap semiconductor?

12. Discuss the Kronig-Penny model for the motion of an electron in a periodic potential

1. a) Explain about the classification of crystal defects

b) Write any three applications of X-Ray diffraction methods

1. Derive an expression for inter planar spacing of orthogonal crystal systems
2. Explain and obtain expression for Electronic and Ionic Polarisabilities
3. a) Discuss about the Dia, Para and Ferro magnetic materials on the basis of magnetic moment

b) What is Meissner effect? Explain

1. Deduce the expression for energy of an electron confined to a potential box of width ‘L’
2. Describe in detail with a neat diagram, Davisson-Germer experiment to show the particles

behave like waves

1. a) Explain about the effective mass of an electron

b) Explain about the classification of solids into Conductors, Semiconductors and Insulators

20 Using Kronig-Penny model show that the energy spectrum of an electron contains a number of allowed Energy bands separated by forbidden bands

21. a) What are Miller Indices? Sketch the following atomic planes in a simple cubic structure

(1 0 0), (3 1 2) and (-1 0 2)

b) Name the seven crystal systems

22. Derive an expression for inter planar spacing of orthogonal crystal systems

23. Discuss the origin of magnetic moment. Show that the magnetic dipole moment is due to orbital and spin motions of an electron.

24. a) Explain the Space- Charge Polarisation

b) What is Orientation Polarisation? Derive an expression for it

1. Obtain Time independent Schrodinger’s wave equation for the motion of an electron
2. a) An electron is confined to one dimensional potential box of length 4 A0. Calculate the energies corresponding to the second and fourth quantum states in eV.

b) State and Explain Heisenberg’s Uncertainity Principle

1. a) What are Brillouin zones? Explain using E-K diagram

b) Explain the concept of Direct and Indirect band gap semiconductors

28. Explain Kronig-Penny model for the motion of an electron in a periodic potential

1. Describe in detail, Powder method to determine the crystal structure
2. Describe the seven crystal systems with diagrams
3. Explain and Derive expression for Ionic Polarisability
4. a) What are the differences between Soft and Hard magnetic materials

b) What is Superconductivity? Explain about the Type-I and Type-II superconductors