ASSIGNMENT 1

ELECTRONIC MATERIALS

1. Give assumptions of classical free electron theory
2. Explain the dependence of Fermi level on temperature.
3. Fermi energy of a given substance is 7.9 eV. What is the average energy and speed of electron in this substance at 0 K?
4. Give the difference between Direct and Indirect band gap.
5. Write a note on energy band diagram and formation of energy bands.
6. Explain fermi levels.
7. Explain classification of materials as conductors, insulators and semiconductors.
8. Explain Kronig Penney model in detail.
9. Explain direct and indirect band gap with E-k diagrams.
10. Give success and drawback of classical free electron theory.
11. The thermal and electrical conductivity of Cu at 20˚C are $390 Wm^{-1}K^{-1}$ and $5.87 \times 10^{7} (\Omega m)^{-1}$ respectively. Calculate the Lorentz number.
12. Write short notes on E-K diagram.
13. Derive the mathematical expression for density of states.
14. What is meant by effective mass of an electron? Derive an expression for the effective mass of an electron.