1. $F(A, B, C, D) = \prod M (1, 3, 4, 6, 8, 9, 11, 13, 15) + \Sigma d (0, 2, 14)$
2. $F(A, B, C, D) = \prod M (0, 1, 2, 5, 7, 8, 9, 10, 13, 15)$
3. Differentiate Conductor, Semiconductor and Insulator based on energy band diagram.
4. Explain Intrinsic and Extrinsic semiconductors.
5. State and explain the mass action law for semiconductors.
6. What do you mean by current density? Obtain an expression of drift current density for a semiconductor in terms of conductivity and applied electric field.
7. Explain mobility and conductivity and drive the formula.
8. Explain the current components in semiconductor.
9. A specimen of germanium at $300^{\circ}K$ for which the density of carriers is 2.5×10^{13} per cm^3, is doped with impurity atoms such that there is one impurity atom for 10^6 germanium atoms. All the impurity atoms may be assumed ionized. The conductivity of doped material is 25.64 S/cm. Carrier mobility for germanium at $300^{\circ}K$ is 3600 $cm^2/V\text{-}s$. For the doped material, find the electron and hole densities. $e=1.602 \times 10^{-19}$ C.
10. The current flowing through a Germanium diode at room temperature when reversed biased is 0.25 μA. Determine the forward current flowing through the diode when the applied voltage is 0.15 V. ($V_T = 0.026$ V)
11. The forward current in a Silicon Diode is 15mA at $27^{O}C$. If reverse saturation current is 0.24nA, what is the forward bias voltage?