



Assignment 02
Basic Electronics /Physics
BC (CS) & BS (SE)
Fall Semester 2018

Q.1 Give answers to each of the following:

1. What is a crystal? Explain silicon crystal.
2. Discuss the recombination and life time.
3. Discuss the flow of free electron and hole in intrinsic semiconductor.
4. Discuss doping of a semiconductor using examples.
5. What is depletion layer and barrier potential?
6. Why there is a continuous flow of current in a forward biased diode?
7. Why ordinary diode shouldn't be operated in breakdown region?
8. Discuss different currents in the reverse biased diode.
9. What is the effect of temperature on barrier potential?
10. Why the reverse current in germanium diode is greater than silicon diode?

Q.2 Differentiate between each of the following:

1. Conductors and Semiconductors
2. Silicon and Germanium
3. Extrinsic and Intrinsic semiconductors
4. Minority and Majority carriers in a semiconductor
5. n-type and p-type semiconductors
6. Forward biased and Reverse biased diode
7. p-type energy bands and n-type energy bands

Q.3 Draw and explain each of the following diagrams/circuits:

1. Silicon crystal
2. pn-junction
3. Energy bands diagrams for intrinsic semiconductor
4. Energy bands diagrams for p-type and n-type semiconductors

Q.4 Solve each of the following:

1. Suppose an outside force removes the valence electron from a copper atom. What is the net charge of the copper atom? What is the net charge if an outside electron moves into the valence orbit?
2. Assuming a barrier potential of 0.7 V at an ambient temperature of 25°C, what is the barrier potential of a silicon diode when the junction temperature is -40°C?
3. A silicon diode has a saturation current of 10nA at 25°C. Find saturation current at 93°C.
4. A diode has a surface-leakage current of 02nA at reverse voltage is 20V. What is the surface-leakage current if the reverse voltage is increased to 50V?