INDIAN SCHOOL NIZWA - WORKSHEET

PHYSICS

CH: 14 SEMICONDUCTOR AND ELECTRONIC DEVICES

Name: _____ Date:_____ Class: XII Sec: A___

I Answer in detail

1. Draw energy band diagram of n type and p type semiconductors at temp, T > 0K. Mark the donor and acceptor energy levels with their energies.

2. Explain the roles played by the energy levels (donor and acceptor) in conduction and valence bands.
Ans. N type : the electrons from the donor impurity atoms, can move into the conduction band with very small supply of energy. The conduction band , therefore has electrons as the majority charge carriers.
P type : in this a very small supply of energy can cause an electron form its valence band to jump to the acceptor energy level. The valence band has more holes. This implies that the majority charge carriers in p type are holes.

3. How biasing in diode , used in rectification?(HOTS)
Ans. From the V I characteristics of a junction diode, it is clear that it allows current to pass only if it is forward biased. So when an alternate voltage is applied across a diode, current flows only during that part of the cycle when it is forward biased.

4. Why is a photo diode used in reverse bias?

5. What happened to the width of the depletion layer when a pn junction diode is (i) forward biased (ii) reverse biased?

6. Mention the important consideration required while fabricating a pn junction diode to be used as aLED. What should be the order of band gap of an LED if it is required to emit light in visible range?

7. Assuming that the diodes are used in an electric circuit, find out the value of current flowing through 2.5Ω resistor

8. The current in the forward bias is more than current in reverse bias. What is the reason? Why photo diode is used to operate in reverse bias?

9. Name the semiconductor device that can be used to regulate an unregulated dc power supply. With the help of I V characteristics of this device, explain its working principle.

10. With what consideration in view, a photodiode is fabricated? State its working with the help of a suitable diagram.

11. Give reason for the following.
    (i) The zener diode is heavily doped
    (ii) A photodiode is reverse biased
    (iii) The band gap semiconductors used for fabricating visible LEDs must be atleast 1.8eV.