Assignment 2 ANSWERS

1. A
2. b
3. C
4. c
5. c
6. A
7. A
8. A
9. D
10. D
11. I (a) II (d) III (a) IV (c)
12. I (c) II (a) III (c) IV diffusion and drift

2 MARKS

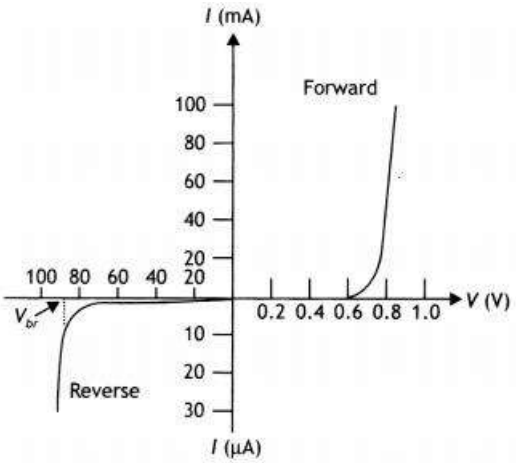
13. The difference in resistivity between conductors and semiconductors is due to their difference in charge carrier density.

The resistivity of semiconductors decreases with temperature because the number ofcharge carriers increases rapidly with increase in temperature, making the fractional change i.e. the temperature coefficient negative.

14. Any two differences

15. The technique of adding impurities to a pure semiconductor is known as **doping** and the added impurity is called **doping agent.**

16. The characteristics are as shown.



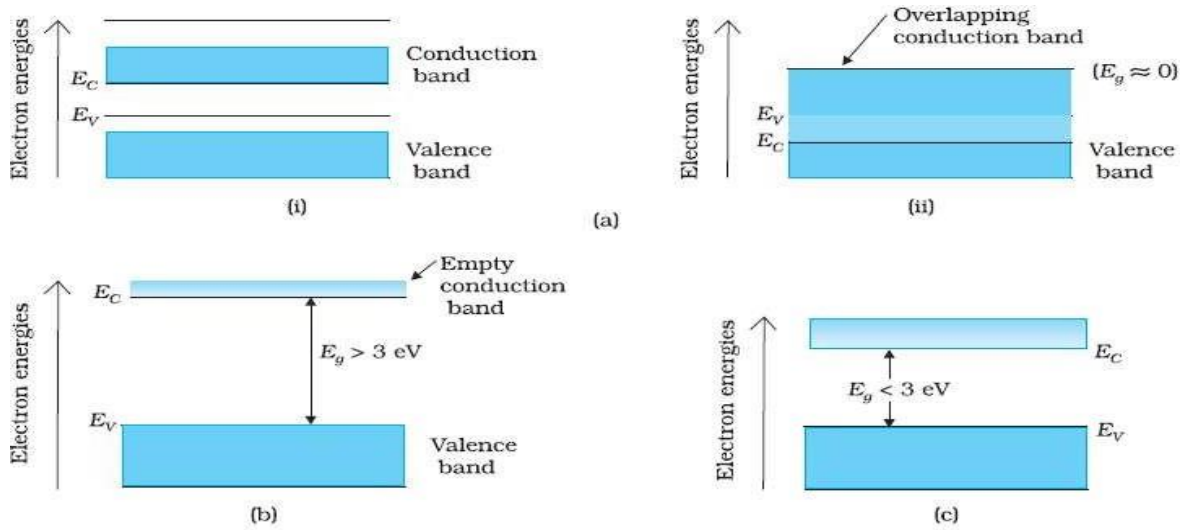
17. Full Wave rectifier

18.The conditions of the problem suggest that diode D1 is forward biased and diode D2 is reverse biased. We can, therefore, consider the branch containing diode D2 as open as shown in the figure Further, diode D1 can be replaced by its simplified equivalent circuit.

$$I = \frac{E_1 - E_2 - V_0}{R} = \frac{24 - 4 - 0.7}{2\ \text{k}\Omega} = \frac{19.3\ \text{V}}{2\ \text{k}\Omega} = \mathbf{9.65\ mA}$$

3 MARKS

19. (on the basis of diagram any two distinguish features)



20. (i)Two important processes that occur during the formation of p-n junction are diffusion and drift.

(ii) solution given in previous questions

5 MARKS

21.

i) When a trivalent impurity like aluminum, indium, boron, gallium etc. is doped with a pure germanium (or silicon), then the conductivity of the silicon increases due to deficiency of electrons i.e., and such a crystal is said to be p-type semiconductor while the impurity atoms are called acceptors.

ii) This means if energy 1.1 eV is given to an electron in the valence band, it will jump to the conduction band.

iii) An ideal diode is one which behaves as a perfect conductor when forward biased Under this situation, the forward resistance of diode is assumed to be zero and potential barrier

is neglected.

iv) Diode D_1 is reverse biased so on current flows through it due to majority carriers. And diode D_2 is forward biased. So a current flows through D_2 and the resistance R as shown in the figure.