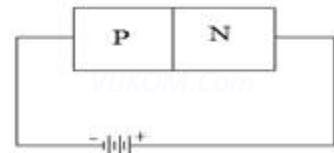


# IMPORTANT QUESTIONS CLASS – 12 D<sub>MG7</sub> G<sub>7</sub> < 5 DH9 F E%

## SEMICONDUCTOR ELECTRONIC : MATERIAL, DEVICES AND SIMPLE CIRCUITS

**1. Draw a pn junction with reverse bias? Which biasing will make the resistance of a p-n-junction high?**

**Ans.**



Reverse biasing will make the resistance high as it will not allow the current to pass.

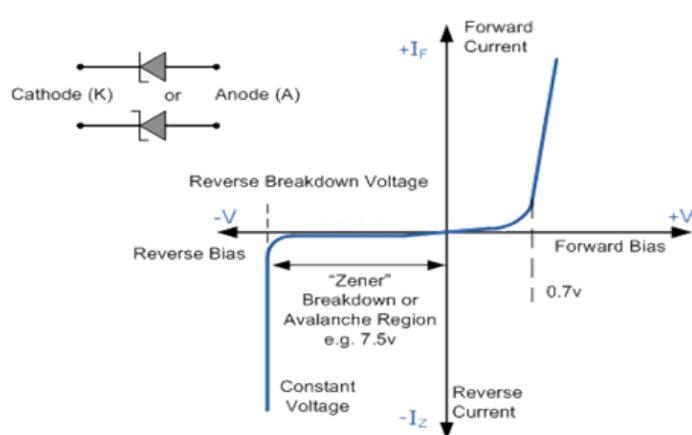
**2. Write the truth table for the following combination of gates?**

**Ans.**

A	B	Y'	Y
0			
1			
1			

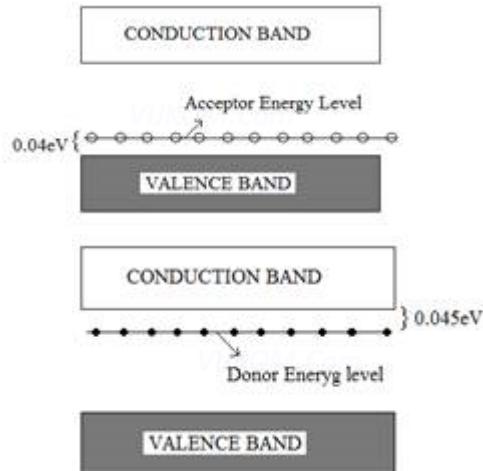
**3. Draw the voltage current characteristics of a zener diode?**

**Ans.**



**4. For a extrinsic semiconductor, indicate on the energy band diagram the donor and acceptor levels?**

**Ans.** N-type Extrinsic Semiconductor P-type Extrinsic Semiconductor



**5. What do you mean by depletion region and potential barrier in junction diode?**

**Ans.** A layer around the junction between p and n-sections of a junction diode where charge carriers electrons and holes are less in number is called depletion region. The potential difference created across the junction due to the diffusion of charge carriers across the junction is called potential barrier.

**6. A transistor has a current gain of 30. If the collector resistance is 6k, input resistance is 1k, calculate its voltage gain?**

**Ans.** Given  $R_{in} = 1k\Omega$

$R_{out} = 6k\Omega$

$\therefore$  Voltage gain = current gain  $\times$   $R_{gain}$

$$\text{Voltage gain} = 30 \times 6 = 180$$

$$\therefore R_{gain} = \frac{6}{1} = 6$$

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**7. What are the advantages and disadvantages of semiconductor devices over vacuum tubes?**

**Ans.** Advantages – Semiconductor devices are very small in size as compared to the vacuum tubes. It requires low voltage for their operation

Disadvantage – Due to the rise in temperature and by applying high voltage it can be damaged.

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**8. The base of a transistor is lightly doped. Explain why?**

**Ans.** In a transistor, the majority carriers from emitter region moves towards the collector region through base. If base is made thick and highly doped, majority carriers will combine with the other carriers within the base and only few are collected by the collector which leads to small output collector current. Thus in order to have large output collector current, base is made thin and lightly doped.

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**9. Determine the currents through resistance R of the circuits (i) and (ii) when similar diodes are connected as shown in the figure.**

**Ans.** In figure (i)  $D_1$  and  $D_2$  are forward biased

In figure (ii)  $D_1$  is forward biased but  $D_2$  is reverse biased due to which  $D_1$  and  $D_2$  offers infinite resistance

$$\Rightarrow I = \frac{V}{R} = \frac{2}{20} = 0.1A$$

$$\therefore I = 0$$

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**10. What do you mean by hole in a circuit? Write its two characteristics?**

**Ans.** A vacancy created in a covalent bond in a semiconductor due to the release of electron is known as hole in a semiconductor.

**Characteristics of hole**

- (i) Hole is equivalent to a positive electronic charge.
- (ii) Mobility of hole is less than that of an electron