

Questions for Practice

1. (a) Find the diode current if a silicon diode with reverse saturation current 20nA is operated at 35°C and connected with a 2V supply.
 (b) Write at least four differences between BJT and FET.
 (c) Find the collector current for the transistor operating in CE configuration with $I_{\text{CBO}}=20\mu\text{A}$, $I_{\text{B}}=0.02\text{ mA}$, $\beta=100$.

6. (a) Differentiate full wave and half wave rectifier with respect to average current, efficiency, ripple factor and PIV. Derive expression for RMS current for a half wave rectifier.
 (b) For the Zener diode network shown in Fig-3, determine V_0 , V_R and I_Z .

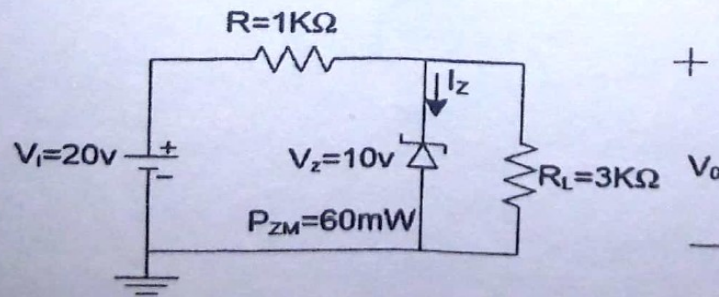


Fig-3

5.
 - a) With proper diagram explain the operation of bridge full wave rectifier. Also find its efficiency and ripple factor. [3]
 - b) What do you mean by equivalent circuit. Briefly explain the diode equivalent circuit. [2]
6.
 - a) Explain the operation of Zener diode as a voltage regulator. [3]
 - b) Define the static and dynamic resistance of p-n diode. [2]
7. A center tap full wave rectifier uses two diodes with an equivalent forward resistance 50Ω . If the input ac Voltage is $50 \sin(200\pi t)$ and the load resistance of 950Ω . [5]
 Determine:
 - (i) Peak, avg. and rms value of current
 - (ii) Efficiency
 - (iii) Ripple factor of the rectifier.

1. [2×5]
- (a) In an extrinsic semiconductor concentration of holes is $5.2 \times 10^{10} \text{ cm}^{-3}$. Calculate concentration of electrons. Intrinsic concentration = $2.3 \times 10^{13} \text{ cm}^{-3}$ at 300K.
- (b) Write down the diode current equation and define each variable.
- (c) What is the effect of temperature on the conductivity of semiconductor and conductor?
- (d) Write down two difference and two similarity between center tap and full wave bridge rectifier
- (e) Differentiate between zener diode and rectifying diode.

- 2.
- a) Classify the materials on the basis of energy band diagram with proper description. [3]
- b) Explain Drift and Diffusion current with proper diagram. [2]

1. [1×5]
- a) For a silicon diode at a working temperature 25°C , the forward voltage applied across the diode is 0.5V. Determine its forward current if the reverse saturation current is 10nA.
- b) Define PIV. Find PIV for all rectifier circuit.
- c) What is the effect of temperature on the conductivity of semiconductor and conductor?
- d) In which bands do the movement of electrons and holes take place?
- e) Define ideal diode. Draw its I-V characteristics.

- 2.
- a) Classify the materials on the basis of energy band diagram with proper description. [3]
- b) Explain Drift and Diffusion current with proper diagram. [2]

- b) What do you mean by equivalent circuit. Briefly explain the diode equivalent circuit. [2]

- 6.
- a) State and explain mass action law for semiconductors. In an extrinsic semiconductor concentration of holes is $5.2 \times 10^{10} \text{ cm}^{-3}$. Calculate concentration of electrons. Intrinsic concentration = $2.3 \times 10^{13} \text{ cm}^{-3}$ at 300K. [3]
- b) Define the static and dynamic resistance of p-n diode. [2]

7. A center tap full wave rectifier uses two diodes with an equivalent forward resistance 50Ω . If the input ac Voltage is $50 \sin(200\pi t)$ and the load resistance of 950Ω . [5]

Determine:

- (i) Peak, avg. and rms value of current
- (ii) Efficiency
- (iii) Ripple factor of the rectifier.
- b) Write the difference between half wave and center tap full wave rectifier in terms of efficiency, PIV, ripple factor and circuit diagram.

- 1) (a) What is the effect of temperature on the conductivity of semiconductor?
- (b) Discuss the significance of PIV in a full wave rectifier
- (c) Name any two factors which make the JFET superior to BJT.
- (d) If value of β is 150. Find out value of α .

a)) Differentiate between CE,CB,CC configuration [2]

(4) | a) Describe the characteristics of a Zener diode and discuss how it can be used as a voltage regulator. [3]

b) What is the effect of adding a capacitor across the load in a rectifier circuit? Explain with diagram. [2]

2. Differentiate between Avalanche breakdown and Zener breakdown.(2)
3. What will happen if an extrinsic semiconductor is heated to very high temperature? (1)
5. Explain how forward and reverse bias condition achieved in diode. Draw its characteristics graph. (3)
6. What happens to the depletion region when a Si diode is forward and reverse biased? (2)
8. Classify the materials on the basis of energy band diagram with proper description. Arrange in ascending order on the basis of conductivity-GaAs, Ge, Si. (3)
9. How semiconductor acts as an insulator? Justify - Semiconductor is a negative temperature coefficient of resistance? (2)
10. What is the difference between intrinsic and extrinsic semiconductor? (2)
11. Define ideal diode. Draw its I-V characteristics. (2)
12. Explain Drift and Diffusion current with proper diagram. (2)
13. What is P.I.V. (Peak Inverse Voltage) of diode?(1)
14. Draw any one circuit diagram for Rectifier. (2)
15. What do you mean by equivalent circuit? Briefly explain the diode equivalent circuit.(2)
17. A Ge diode display a forward voltage of 0.25V at 10mA current at room temperature 300K, Calculate the value of reverse saturation current, I_s =? (2)
18. Define the static and dynamic resistance of p-n diode. (2)
- 20 A center tap full wave rectifier uses two diodes with an equivalent forward resistance 50Ω . If the input ac Voltage is $50 \sin(200 t)$ and the load resistance of 950Ω . (3)
Determine: (i) Efficiency (iii) Ripple factor of the rectifier.