Sushant University	School of Engineering & Technology QUESTION BANK (MSE)
Course Title: Basics of Electronics and Electrical Engineering Course Code: 23 BTC-0EE11C	

Q 1 Differentiate between conductors, semiconductors and insulators with the help of energy band gap.

Q 2 Explain the process of formation of p-n junction diode with neat diagram. What is the effect of doping on barrier potential?

Q 3 Write short notes on following with neat diagrams 9)

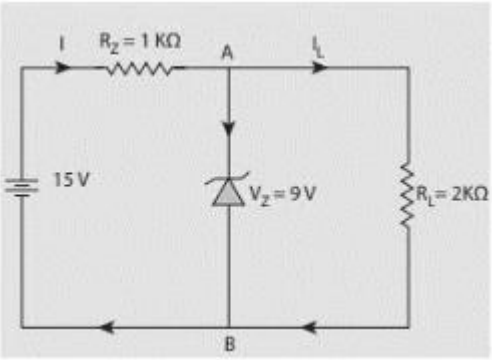
i. Logic Gates

ii. Transistor

iii. Rectifiers

Q 4 Design all gates using using universal gates

Q 5 Determine the current through the Zener diode when the load resistance is 2 KΩ. Use diode approximation.



Q 6 Explain the working principle of a half-wave rectifier, highlighting the role of the diode during positive and negative half-cycles of the AC input.

Q 7 Compare the performance of half-wave rectifiers and full-wave rectifiers in terms of:

- Output DC voltage
- Ripple factor
- Efficiency
- TUF

Q 8 Discuss how a bridge rectifier is different from a full-wave rectifier using a center-tapped transformer. Provide detailed circuit diagrams to illustrate the difference in their configurations.

Q 9 In a practical application, a bridge rectifier is connected to a 220V AC source. If the peak output voltage across the load resistor is measured to be 310V, calculate:

- The RMS value of the AC input voltage.
- The peak inverse voltage (PIV) of the diodes in the bridge rectifier.

Q 10 Explain the two types of breakdown mechanisms: Zener breakdown and avalanche breakdown.

Q 11Draw and explain the I-V characteristics of a PN junction diode in both forward and reverse bias.

Q 12. Explain the Working of a PN Junction Diode in Forward and Reverse Bias.

Q 13 a)Describe the formation of the depletion region at the junction of the P-type and N-type semiconductors.

b) Discuss what happens when the diode is reverse-biased and how reverse saturation current is generated.

Q 14. Explain the working of an NPN Transistor in Active Mode

Q 15. What happens to the depletion region under forward and reverse bias conditions, and how does this affect the conduction of the diode?

Q 16. Write short notes on following covering working and field of applications

a) Avalanche diode
b) Zener diode
c) Schottky Diode
d) LED

Q 17. A crystal diode having internal resistance $r_f = 20\Omega$ is used for half-wave rectification. If the applied voltage $v = 50 \sin \omega t$ and load resistance $R_L = 800\ \Omega$, find :
(i) Im, Idc, Irms (ii) a.c. power input and d.c. power output (iii) d.c. output voltage (iv) efficiency of rectification.

Q 18. A Zener diode is used in a voltage regulator circuit with a load resistance of 1 kΩ. The Zener diode has a Zener voltage of 5V. The supply voltage is 10V, and the series resistance is 500Ω.

- a) Calculate the current flowing through the series resistor.
- b) Calculate the current through the Zener diode.
- c) What is the voltage across the load?

Q 19. Which type of transistor is commonly used and why?

Q 20. (a) Define the current gain and voltage gain in a common emitter amplifier circuit.

(b) Calculate I_E in a transistor for which $\beta = 50$ and $I_B = 20\ \mu A$.

C) Given $\beta=60$ and $I_B=30\ \mu A$, determine I_E .

d) For a transistor with IB=50μA and $\beta=20$, calculate the emitter current I_E