



**NARSIMHA REDDY
ENGINEERING COLLEGE**

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
ELECTRONIC DEVICES AND CIRCUITS (25EC303)

TUTORIAL QUESTIONS

Unit-1

PART A: Multiple choice questions

1. For a silicon diode, the forward voltage drop decreases by approximately $2 \text{ mV}/^\circ\text{C}$ with increasing temperature. This is due to

- A) Increase in barrier potential
- B) Decrease in barrier potential
- C) Increase in depletion width
- D) Increase in breakdown voltage

Answer: B

2. The dynamic resistance of a diode is inversely proportional to

- A) Junction area
- B) Forward current
- C) Reverse current
- D) Barrier voltage

Answer: B

3. The depletion region width of a PN junction is maximum under

- A) Zero bias
- B) Forward bias
- C) Reverse bias
- D) Breakdown

Answer: C

4. Which diode model provides the best trade-off between accuracy and simplicity?

- A) Ideal model
- B) Simplified model
- C) Piecewise linear model
- D) Exponential model

Answer: C

5. The ripple factor of a bridge rectifier is lower than that of a half-wave rectifier because

- A) Higher PIV
- B) Utilizes both half cycles
- C) Uses four diodes
- D) Lower transformer rating

Answer: B

6.For identical transformer ratings, the highest Transformer Utilization Factor (TUF) is obtained in

- A) Half-wave rectifier
- B) Center-tap rectifier
- C) Bridge rectifier
- D) Clamper

Answer: C

7.A bridge rectifier continues to operate even if the transformer has

- A) No secondary winding
- B) No center tap
- C) No primary winding
- D) No load

Answer: B

8.The principal disadvantage of a center-tapped rectifier compared to a bridge rectifier is

- A) Higher efficiency
- B) Requirement of center-tapped transformer
- C) Lower PIV
- D) Less ripple

Answer: B

9.In a capacitor-filtered rectifier, the capacitor charges when

- A) Input voltage falls below capacitor voltage
- B) Diode is reverse biased
- C) Input voltage exceeds capacitor voltage
- D) Load current becomes zero

Answer: C

10.Increasing filter capacitance primarily affects

- A) Transformer frequency
- B) Ripple voltage
- C) PIV
- D) Cut-in voltage

Answer: B

11.A clipper circuit is fundamentally a

- A) Frequency-selective circuit
- B) Amplitude-selective circuit
- C) Phase-shifting circuit
- D) Oscillator

Answer: B

12.A biased clipper differs from an unbiased clipper because it

- A) Changes frequency
- B) Clips at a predetermined voltage level
- C) Amplifies signal
- D) Increases current gain

Answer: B

13.The primary function of a clamper is to

- A) Limit signal amplitude
- B) Shift average signal level
- C) Rectify AC
- D) Reduce ripple

Answer: B

14.A Zener diode is normally operated in

- A) Forward conduction region
- B) Reverse breakdown region
- C) Cutoff region
- D) Saturation region

Answer: B

15.The voltage across an ideal Zener diode remains almost constant because of

- A) Infinite resistance
- B) Constant current
- C) Sharp breakdown characteristic
- D) Zero power dissipation

Answer: C

16.The dominant breakdown mechanism in lightly doped junctions is

- A) Zener breakdown
- B) Avalanche breakdown
- C) Punch-through
- D) Thermal runaway

Answer: B

17.Avalanche breakdown occurs due to

- A) Tunneling
- B) Impact ionization
- C) Recombination
- D) Diffusion

Answer: B

18.A voltage regulator using a Zener diode is generally connected

- A) In series with load
- B) Parallel with load
- C) Parallel with source only
- D) In series with source only

Answer: B

19.The reverse saturation current of a diode mainly depends on

- A) Junction area and temperature
- B) Forward current only
- C) Load resistance
- D) Supply frequency

Answer: A

20.The major limitation of the ideal diode model is the neglect of

- A) Switching action
- B) Cut-in voltage and resistance
- C) Reverse bias
- D) Load current

Answer: B

PART:B Fill in the Blanks

1. The capacitance associated with charge storage in a forward-biased diode is called _____ capacitance.

Answer: Diffusion

2. The capacitance associated with the depletion region is called _____ capacitance.

Answer: Transition

3. The mathematical relation between diode current and voltage is given by the _____ equation.

Answer: Shockley

4. The ideality factor of a practical diode generally lies between _____ and _____.

Answer: 1, 2

5. In a half-wave rectifier, current flows through the load during only one _____ of the input cycle.

Answer: Half

6. The maximum rectification efficiency of a half-wave rectifier is _____%.

Answer: 40.6

7. The ripple frequency of a full-wave rectifier is _____ times the supply frequency.

Answer: Two

8. The Peak Inverse Voltage of each diode in a center-tapped full-wave rectifier is _____.

Answer: 2 V_m

9. The output of an unfiltered rectifier is called _____ DC.

Answer: Pulsating

10. A capacitor filter behaves as an open circuit for _____.

Answer: DC

11. In a negative clamper, the waveform is shifted towards the _____ direction.

Answer: Negative

12. The combination of diode and capacitor is essential for a _____ circuit.

Answer: Clamper

13. The Zener effect is dominant in _____ doped PN junctions.

Answer: Heavily

14. The breakdown voltage of a Zener diode is represented by the symbol _____.

Answer: VZ

15. The series resistor in a Zener regulator is used to limit _____.

Answer: Current

16. The current flowing through a reverse-biased diode before breakdown is called _____ current.

Answer: Leakage

17. The region between P and N materials depleted of mobile carriers is called the _____ region.

Answer: Depletion

18. The barrier potential of a silicon diode at room temperature is approximately _____ volts.

Answer: 0.7

19. In reverse bias, the width of the depletion region _____.

Answer: Increases

20. The diode is a _____ terminal semiconductor device.

Answer: Two