

## **Basic Concepts**

1. Define an electronic circuit and explain its significance.
2. Differentiate between active and passive components with examples.
3. What are the basic laws governing electronic circuits?
4. Explain the concept of voltage, current, and resistance.

## **Diodes**

5. What is a semiconductor diode, and how does it operate?
6. Explain the characteristics of a diode and its V-I curve.
7. What is a Zener diode, and how is it used in voltage regulation?
8. Describe the working principle of a light-emitting diode (LED).

## **Transistors**

9. Explain the working principle of a Bipolar Junction Transistor (BJT).
10. What are the different configurations of BJTs, and how do they affect performance?
11. Describe the operation of a Field-Effect Transistor (FET).
12. What is the difference between N-channel and P-channel MOSFETs?

## **Amplifiers**

13. Define an amplifier and its classification based on operation.
14. Explain the concept of gain in amplifiers.
15. What is an operational amplifier (op-amp), and what are its applications?
16. Describe the feedback concept in amplifiers.

## **Oscillators**

17. What is an oscillator, and how does it function?
18. Explain the working principle of a sine wave oscillator.
19. Describe the concept of frequency stability in oscillators.
20. What are the applications of oscillators in electronic circuits?

## **Filters**

- 21. Define an electronic filter and explain its types.
- 22. Explain the working of a low-pass filter.
- 23. What is a high-pass filter, and how is it designed?
- 24. Describe the concept of a band-pass filter.

### **Signal Processing**

- 25. What is modulation, and why is it used in electronic communication?
- 26. Explain the difference between analog and digital signals.
- 27. What are the common types of modulation techniques?
- 28. Describe the process of demodulation.

### **Circuit Analysis**

- 29. How do you analyze a simple RC circuit?
- 30. What is Thevenin's theorem, and how is it applied in circuit analysis?
- 31. Explain Norton's theorem and its significance.
- 32. Describe the use of nodal and mesh analysis in circuit analysis.

### **Practical Applications**

- 33. Discuss the role of simulation software in circuit design.
- 34. What are the common testing methods used in electronic circuits?
- 35. Explain the significance of PCB design in electronic circuit implementation.