

1. What is the basic construction of a Bipolar Junction Transistor (BJT)?

- a) It consists of two layers of P-type semiconductor sandwiching a layer of N-type semiconductor
- b) It consists of two layers of N-type semiconductor sandwiching a layer of P-type semiconductor
- c) It consists of a single layer of semiconductor
- d) It consists of multiple layers of semiconductor stacked together

Answer: b) It consists of two layers of N-type semiconductor sandwiching a layer of P-type semiconductor

Explanation: A BJT typically consists of three semiconductor regions: emitter (N-type), base (P-type), and collector (N-type), forming a sandwich-like structure.

2. What is the primary current component in a Bipolar Junction Transistor (BJT)?

- a) Emitter current (I_E)
- b) Base current (I_B)
- c) Collector current (I_C)
- d) Leakage current

Answer: c) Collector current (I_C)

Explanation: Collector current (I_C) is the primary current component flowing through the collector terminal of a BJT.

3. Which configuration provides a high input impedance and low output impedance in a BJT

amplifier?

- a) Common Base (CB)
- b) Common Emitter (CE)
- c) Common Collector (CC)
- d) None of the above

Answer: a) Common Base (CB)

Explanation: Common Base configuration provides a high input impedance and low output impedance, making it suitable for impedance matching applications.

4. What effect causes the Early effect in Bipolar Junction Transistors (BJTs)?

- a) Base width modulation
- b) Avalanche breakdown
- c) Saturation current
- d) Thermal runaway

Answer: a) Base width modulation

Explanation: The Early effect, also known as base width modulation, causes an increase in the width of the base as the collector-base voltage increases, leading to a reduction in the effective base width and an increase in collector current.

5. In which region of operation does a BJT operate as an amplifier?

- a) Active region

- b) Cut-off region
- c) Saturation region
- d) Inverse region

Answer: a) Active region

Explanation: The active region is where a BJT operates as an amplifier, characterized by both junctions being forward-biased.

6. Which model is commonly used to describe the behavior of a BJT in terms of current components?

- a) Kirchhoff's laws
- b) Ohm's law
- c) Ebers-Moll model
- d) Maxwell's equations

Answer: c) Ebers-Moll model

Explanation: The Ebers-Moll model is commonly used to describe the behavior of a BJT in terms of its current components, considering both forward and reverse biased junctions.

7. What is the maximum power dissipation rating of a transistor denoted as?

- a) P_{max}
- b) P_d
- c) $V_{ce(max)}$
- d) $I_b(max)$

Answer: b) P_d

Explanation: The maximum power dissipation rating of a transistor is denoted as P_d , which represents the maximum amount of power the transistor can dissipate without being damaged.

8. Which biasing method provides the most stable operating point in a BJT amplifier circuit?

- a) Fixed bias
- b) Self bias
- c) Voltage Divider bias
- d) Collector to base bias

Answer: b) Self bias

Explanation: Self biasing provides automatic stabilization of the operating point, making it the most stable among the given biasing methods.

9. What is the purpose of load-line analysis in BJT amplifier circuits?

- a) To determine the gain of the amplifier
- b) To calculate the biasing resistors
- c) To establish the operating point
- d) To minimize power dissipation

Answer: c) To establish the operating point

Explanation: Load-line analysis is used to establish the operating point of a BJT amplifier

circuit by graphically determining the intersection of the load line with the DC load line.

10. In which biasing configuration is the base-emitter junction reverse-biased?

- a) Fixed bias
- b) Self bias
- c) Voltage Divider bias
- d) Collector to base bias

Answer: d) Collector to base bias

Explanation: In Collector to base bias configuration, the base-emitter junction is reverse-biased, providing stability to the operating point.

11. Which region of operation is characterized by both junctions of a BJT being reverse-biased?

- a) Active region
- b) Cut-off region
- c) Saturation region
- d) Inverse region

Answer: b) Cut-off region

Explanation: In the cut-off region, both the base-emitter and collector-base junctions of a BJT are reverse-biased, resulting in minimal collector current.

12. What type of transistor is sensitive to light and commonly used in optoelectronic

applications?

- a) NPN transistor
- b) PNP transistor
- c) JFET
- d) Phototransistor

Answer: d) Phototransistor

Explanation: Phototransistors are transistors that are sensitive to light and are commonly used in optoelectronic applications for light detection and sensing.

13. Which method of bias stabilization uses a resistor connected between the collector and base terminals?

- a) Fixed bias
- b) Self bias
- c) Voltage Divider bias
- d) Collector to base bias

Answer: d) Collector to base bias

Explanation: Collector to base bias stabilization method uses a resistor connected between the collector and base terminals to stabilize the operating point.

14. What is the main purpose of transistor biasing circuits?

- a) To control the transistor's switching speed

- b) To control the transistor's amplification factor
- c) To establish the operating point
- d) To minimize power dissipation

Answer: c) To establish the operating point

Explanation: Transistor biasing circuits are used to establish the operating point of the transistor, ensuring proper amplification or switching behavior.

15. What happens to the collector current in a BJT when it operates in the saturation region?

- a) It decreases
- b) It remains constant
- c) It increases
- d) It becomes zero

Answer: c) It increases

Explanation: In the saturation region, the collector current of a BJT increases significantly due to both junctions being forward-biased and allowing maximum current flow.

16. Which configuration of a BJT amplifier provides a voltage gain greater than unity?

- a) Common Base (CB)
- b) Common Emitter (CE)
- c) Common Collector (CC)
- d) None of the above

Answer: b) Common Emitter (CE)

Explanation: Common Emitter configuration provides a voltage gain greater than unity, making it suitable for voltage amplification applications.

17. What effect can cause a BJT to undergo thermal runaway?

- a) Base width modulation
- b) Avalanche breakdown
- c) Saturation current
- d) Excessive heating

Answer: d) Excessive heating

Explanation: Excessive heating can cause a BJT to undergo thermal runaway, where increasing temperature leads to increased collector current, further heating the device.

18. What is the primary purpose of a BJT used as a switch?

- a) To amplify signals
- b) To regulate voltage
- c) To control current flow
- d) To generate oscillations

Answer: c) To control current flow

Explanation: A BJT used as a switch is primarily employed to control the flow of current through a circuit, either allowing it to flow (ON state) or preventing it (OFF state).

19. What is the primary difference between CB, CE, and CC configurations in a BJT amplifier?

- a) Their voltage gains
- b) Their input and output impedance
- c) Their biasing methods
- d) Their current gains

Answer: b) Their input and output impedance

Explanation: The primary difference between CB, CE, and CC configurations lies in their input and output impedance characteristics, affecting their suitability for different applications.

20. Which of the following is NOT a biasing method for BJT transistors?

- a) Fixed bias
- b) Thermal bias
- c) Voltage Divider bias
- d) Collector to base bias

Answer: b) Thermal bias

Explanation: "Thermal bias" is not a commonly recognized biasing method for BJT transistors. The other options are all valid methods used in transistor biasing circuits.