

Transistors

1. A current ratio of I_C/I_E is usually less than one and is called:
A. Beta B. Theta C. Alpha D. Omega

Answer: Option C

2. Which is beta's current ratio?
A. I_C / I_B
B. I_C / I_E
C. I_C / I_E
D. I_E / I_B

Answer: Option A

3. A collector characteristic curve is a graph showing:
A. emitter current (I_E) versus collector-emitter voltage (V_{CE}) with (V_{BB}) base bias voltage held constant
B. collector current (I_C) versus collector-emitter voltage (V_{CE}) with (V_{BB}) base bias voltage held constant
C. collector current (I_C) versus collector-emitter voltage (V_{CE}) with (V_{BB}) base bias voltage held constant
D. collector current (I_C) versus collector-emitter voltage (V_{CC}) with (V_{BB}) base bias voltage held constant

Answer: Option B

4. When a silicon transistor is properly biased, what is V_{BE} for a C-E configuration?
A. voltage-divider bias
B. 0.3 V
C. 0.7 V
D. 0.0 V

Answer: Option C

5. With a PNP circuit, the most positive voltage is probably:
A. Ground
B. V_C
C. V_{BE}
D. V_{CC}

Answer: Option A

6. Most of the electrons in the base of an NPN transistor flow:
A. out of the base lead
B. into the collector
C. into the emitter
D. into the base supply

Answer: Option B

7. In a transistor, collector current is controlled by:
A. collector voltage
B. base current
C. collector resistance
D. all of the above

Answer: Option B

8. Total emitter current is:

- A. $I_E - I_C$
- B. $I_C + I_E$
- C. $I_B + I_C$
- D. $I_B - I_C$

Answer: Option C

9. For a C-C configuration to operate properly, the collector-base junction should be reverse biased, while forward bias should be applied to which junction?

- A. collector-emitter
- B. base-emitter
- C. collector-base
- D. cathode-anode

Answer: Option A

10. A JFET

- A. is a current-controlled device
- B. has a low input resistance
- C. is a voltage-controlled device
- D. is always forward-biased

Answer: Option C

11. The depletion-mode MOSFET

- A. The depletion-mode MOSFET
- B. The depletion-mode MOSFET
- C. cannot operate in the ohmic region
- D. can operate with positive as well as negative gate voltages

Answer: Option D

12. Which of the following conditions are needed to properly bias an *npn* transistor amplifier?

- A. Forward bias the base/emitter junction and reverse bias the base/collector junction.
- B. Forward bias the collector/base junction and reverse bias the emitter/base junction.
- C. Apply a positive voltage on the *n*-type material and a negative voltage on the *p*-type material.
- D. Apply a large voltage on the base.

Answer: Option A

13. Junction Field Effect Transistors (JFET) contain how many diodes?

- A. 4
- B. 3
- C. 2
- D. 1

Answer: Option D

14. A "U" shaped, opposite-polarity material built near a JFET-channel center is called the:

- A. Gate
- B. Block
- C. Drain
- D. heat sink

Answer: Option A

15. In the constant-current region, how will the I_{DS} change in an n-channel JFET?

- A. As V_{GS} decreases I_D decreases.

- B. As V_{GS} increases I_D increases.
- C. As V_{GS} decreases I_D remains constant.
- D. As V_{GS} increases I_D remains constant.

Answer: Option A

16. A MOSFET has how many terminals?

- A. 2 or 3
- B. 3
- C. 4
- D. 3 or 4

Answer: Option D

17. I_{DSS} can be defined as:

- A. the minimum possible drain current
- B. the maximum possible current with V_{GS} held at -4 V
- C. the maximum possible current with V_{GS} held at 0 V
- D. the maximum drain current with the source shorted

Answer: Option C

18. What is the input impedance of a common-gate configured JFET?

- A. very low
- B. low
- C. high
- D. very high

Answer: Option A

19. JFET terminal "legs" are connections to the drain, the gate, and the:

- A. Channel
- B. Source
- C. Substrate
- D. Cathode

Answer: Option B

20. With the E-MOSFET, when gate input voltage is zero, drain current is:

- A. at saturation
- B. zero
- C. I_{DSS}
- D. widening the channel

Answer: Option B

21. Which JFET configuration would connect a high-resistance signal source to a low-resistance load?

- A. source follower
- B. common-source
- C. common-drain
- D. common-gate

Answer: Option A

22. How will electrons flow through a p-channel JFET?

- A. from source to drain
- B. from source to gate
- C. from drain to gate
- D. from drain to source

Answer: Option A

23. When $V_{GS} = 0$ V, a JFET is:

- A. Saturated
- B. an analog device
- C. an open switch
- D. cut off

Answer: Option A

24. When applied input voltage varies the resistance of a channel, the result is called:

- A. Saturization
- B. Polarization
- C. Cutoff
- D. field effect

Answer: Option D

25. When the JFET is no longer able to control the current, this point is called the:

- A. breakdown region
- B. depletion region
- C. saturation point
- D. pinch-off region

Answer: Option A

26. With a JFET, a ratio of output current change against an input voltage change is called:

- A. Transconductance
- B. Siemens
- C. Resistivity
- D. Gain

Answer: Option A

27. The transconductance curve of a JFET is a graph of:

- A. I_S versus V_{DS}
- B. I_C versus V_{CE}
- C. I_D versus V_{GS}
- D. $I_D \times R_{DS}$

Answer: Option C

28. The common-source JFET amplifier has:

- A. a very high input impedance and a relatively low voltage gain
- B. a high input impedance and a very high voltage gain
- C. a high input impedance and a voltage gain less than 1
- D. no voltage gain

Answer: Option A

29. Which component is considered to be an "OFF" device?

- A. Transistor
- B. JFET
- C. D-MOSFET
- D. E-MOSFET

Answer: Option D

30. In an n-channel JFET, what will happen at the pinch-off voltage?

- A. the value of V_{DS} at which further increases in V_{DS} will cause no further increase in I_D

- B. the value of V_{GS} at which further decreases in V_{GS} will cause no further increases in I_D
- C. the value of V_{DG} at which further decreases in V_{DG} will cause no further increases in I_D
- D. the value of V_{DS} at which further increases in V_{GS} will cause no further increases in I_D

Answer: Option A

31. In a common emitter transistor amplifier, the output resistance is $500\text{ K}\Omega$ and the current gain $\beta = 49$. If the power gain of the amplifier is 5×10^6 , the input resistance is
- A. $325\ \Omega$ B. $165\ \Omega$ C. $225\ \Omega$ D. $240\ \Omega$

Answer: Option D

32. The current gain of a transistor in common base mode is 0.995. The current gain of the same transistor in common emitter mode is
- A. 197 B. 201 C. 198 D. 199

Answer: Option D

33. A transistor amplifier circuit is operated with an emitter current of 2 mA. The collector current is 1.98 mA. The common emitter current gain (β_{dc}) of the transistor used in the circuit is
- A. 50 B. 100 C. 125 D. 200

Answer: Option B

34. In an NPN transistor 108 electrons enter the emitter in 10^{-8} s. If 1% electrons are lost in the base, the fraction of current that enters the collector and current amplification are respectively
- A. 0.8 and 49 B. 0.9 and 90
C. 0.7 and 50 D. 0.99 and 99

Answer: Option D

35. In an npn power transistor, the collector current is 20 mA. If 98% of the electrons injected in to the base region reach the collector, the base current in mA is nearly
- A. 2 mA B. 1 mA C. 0.5 mA D. 0.4 mA

Answer: Option D

36. The current gain α of a transistor is 0.995. If the change in emitter current is 10 mA, the change in base current is
- A. $50\ \mu\text{A}$ B. $100\ \mu\text{A}$ C. $500\ \mu\text{A}$ D. $25\ \mu\text{A}$

Answer: Option A

37. If α and β are the current gains in the CB and CE configurations respectively of the transistor circuit, then $(\beta - \alpha)/\alpha\beta =$
- A. ∞ B. 1 C. 2 D. 0.5

Answer: Option B

38. A transistor has a β_{dc} of 250 and a base current, I_B , of $20\ \mu\text{A}$. The collector current, I_C , equals:
- A. $500\ \mu\text{A}$
B. 5 mA
C. 50 mA
D. 5 A

Answer: Option B

39. If an input signal ranges from 20–40 μA (microamps), with an output signal ranging from .5–1.5 mA (milliamps), what is the ac beta?
- A. 0.05
 - B. 20
 - C. 50
 - D. 500

Answer: Option C

40. What is the current gain for a common-base configuration where $I_E = 4.2 \text{ mA}$ and $I_C = 4.0 \text{ mA}$?
- A. 16.80
 - B. 1.05
 - C. 0.20
 - D. 0.95

Answer: Option D

41. What is the collector current for a C-E configuration with a beta of 100 and a base current of 30 μA ?
- A. 30 μA
 - B. 0.3 μA
 - C. 3 mA
 - D. 3 MA

Answer: Option C

42. If the common emitter current gain β_{dc} of the transistor used in the amplifier circuit is 200 and the quiescent emitter current is 1 mA, the quiescent base current of the transistor is very nearly equal to
- A. 1 mA
 - B. 1 μA
 - C. 2 μA
 - D. 5 μA

Answer: Option D

43. The collector supply voltage is 6 V and the voltage drop across a resistor of 600 Ω in the collector circuit is 0.6 V, in a transistor connected in common emitter mode. If the current gain is 20, the base current is
- A. 0.25 Ma
 - B. 0.05 mA
 - C. 0.02 mA
 - D. 0.07 mA

Answer: Option B

44. In CB Configuration of transistor, the input impedance is
- A. High
 - B. Medium
 - C. Low
 - D. none of these

Answer: Option C

45. BJT is _____Device
- A. Bipolar
 - B. Unipolar
 - C. Constant current
 - D. Constant voltage

Answer: Option A

46. Transistor is used as
- A. Switch

- B. Amplifier
- C. Both (a) & (b)
- D. None of these

Answer: Option C

47. For a common emitter circuit if $I_C/I_E = 0.98$ then current gain for common emitter circuit will be
- A. 49
 - B. 98
 - C. 4.9
 - D. 25.5

Answer: Option A

48. When a n-p-n transistor is used as an amplifier then ?
- A. the electrons flow from emitter to collector
 - B. the holes flow from emitter to collector
 - C. the electrons flow from collector to emitter
 - D. the electrons flow from battery to emitter

Answer: Option A

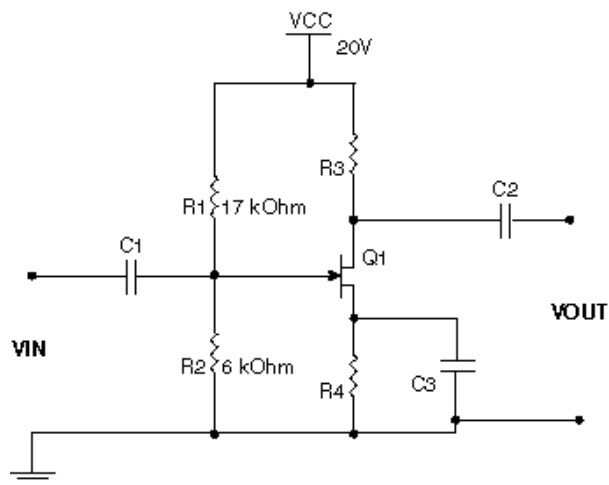
49. The current gain for a transistor working as common-base amplifier is 0.96. If the emitter current is 7.2 mA, then the base current is
- A. 0.29mA
 - B. 0.35mA
 - C. 0.39 mA
 - D. 0.43 mA

Answer: Option A

50. In a common base amplifier the phase difference between the input signal voltage and the output voltage is?
- A. 0
 - B. $\pi / 4$
 - C. $\pi / 2$
 - D. π

Answer: Option D

51. Using voltage-divider biasing, what is the voltage at the gate V_{GS} ?



- A. 5.2 V
- B. 4.2 V
- C. 3.2 V
- D. 2.2 V

Answer: Option A

52. What is the transconductance of an FET when $\Delta I_D = 1 \text{ mA}$ and $\Delta V_{GS} = 1 \text{ V}$?

- A. 1 kS
- B. 1 mS
- C. 1 k Ω
- D. 1 m Ω

Answer: Option B