

MULTIPLE CHOICE QUESTIONS - AE

On Rectifiers and Filters:

1. In a half wave rectifier, the load current flows for what part of the cycle.
 - a. 400
 - b. 900
 - c. 1800
 - d. 3600

2. In a full wave rectifier, the current in each diode flows for
 - a. whole cycle of the input signal
 - b. half cycle of the input signal
 - c. more than half cycle of the input signal
 - d. none of these

3. in a full wave rectifier, if the input frequency is 50 Hz, then output frequency will be
 - a. 50 Hz
 - b. 75 Hz
 - c. 100 Hz
 - d. 200 Hz

4. In a center tap full wave rectifier, if V_m is the peak voltage between center tap and one end of the secondary, the maximum voltage coming across the reverse bias diode is
 - a. V_m
 - b. $2 V_m$
 - c. $V_m/2$
 - d. $V_m/\sqrt{2}$

5. The maximum efficiency of full wave rectification is
 - a. 40.6%
 - b. 100%
 - c. 81.2%
 - d. 85.6%

6. In a bridge type full wave rectifier, if V_m is the peak voltage across the secondary of the transformer, the maximum voltage coming across each reverse biased diode is
 - a. V_m
 - b. $2 V_m$
 - c. $V_m/2$
 - d. $V_m/\sqrt{2}$

7. To get a peak load voltage of 40V out of a bridge rectifier. What is the approximate rms value of secondary voltage?
- a. 0 V
 - b. 14.4 V
 - c. 28.3 V
 - d. 56.6 V
8. If the line frequency is 50 Hz, the output frequency of bridge rectifier is
- a. 25 Hz
 - b. 50 Hz
 - c. 100 Hz
 - d. 200 Hz
9. The ripple factor of a bridge rectifier is
- a. 0.482
 - b. 0.812
 - c. 1.11
 - d. 1.21
10. The bridge rectifier is preferred to an ordinary two diode full wave rectifier because
- a. it needs much smaller transformer for the same output
 - b. no center tap required
 - c. less PIV rating per diode
 - d. all the above
11. The basic purpose of filter is to
- a. minimize variations in ac input signal
 - b. suppress harmonics in rectified output
 - c. remove ripples from the rectified output
 - d. stabilize dc output voltage
12. The use of a capacitor filter in a rectifier circuit gives satisfactory performance only when the load
- a. current is high
 - b. current is low
 - c. voltage is high
 - d. voltage is low
13. A half wave rectifier is equivalent to
- a. clamper circuit
 - b. a clipper circuit

- c. a clamper circuit with negative bias
- d. a clamper circuit with positive bias

14. The basic reason why a full wave rectifier has a twice the efficiency of a half wave rectifier is that

- a. it makes use of transformer
- b. its ripple factor is much less
- c. it utilizes both half-cycle of the input
- d. its output frequency is double the line frequency

15. In a rectifier, larger the value of shunt capacitor filter

- a. larger the peak-to-peak value of ripple voltage
- b. larger the peak current in the rectifying diode
- c. longer the time that current pulse flows through the diode
- d. smaller the dc voltage across the load

16. In a LC filter, the ripple factor,

- a. Increases with the load current
- b. increases with the load resistance
- c. remains constant with the load current
- d. has the lowest value

17. The main reason why a bleeder resistor is used in a dc power supply is that it

- a. keeps the supply ON
- b. improves voltage regulation
- c. improves filtering action
- d. both (b) and (c)

18. Which rectifier requires four diodes?

- a. half-wave voltage doubler
- b. full-wave voltage doubler
- c. full-wave bridge circuit
- d. voltage quadrupler

Answers

1. (c) 2. (b) 3. (c) 4. (b) 5. (c) 6. (a) 7. (c) 8. (c) 9. (a) 10. (d) 11. (c) 12. (b) 13. (b) 14. (c) 15. (b) 16. (c)
17. (d) 18. (c)

ON BJT:

1. In CE configuration the output V- I characteristics are drawn by taking

- (a) V_{CE} vs. I_C for constant value of I_E
- (b) V_{CE} vs. I_C for constant value of I_B
- (c) V_{CE} vs. I_C for constant value of V_{CB}
- (d) None of these

2. In CE configuration the input V-I characteristics are drawn by taking

- (a) V_{CE} vs. I_C for constant value of I_E
- (b) V_{BE} vs. I_E for constant value of V_{CE}
- (c) V_{BE} vs. I_B for constant value of I_C
- (d) V_{BE} vs. I_B for constant value of V_{CB}

3. The transistor is said to be in quiescent state when

- (a) it is unbiased
- (b) no current flows through it
- (c) no signal is applied to the input
- (d) emitter junction is just biased equal to collector junction

4. In CB configuration, the output V- I characteristics of the transistor are drawn by taking

- (a) V_{CB} vs. I_C for constant I_E
- (b) V_{CB} vs. I_B for constant I_E
- (c) V_{CB} vs. I_C for constant I_E
- (d) V_{CB} vs. I_B for constant I_E

5. When the collector junction in a transistor is biased in reverse direction and the emitter junction in the forward direction, the transistor is said to be is the

- (a) active region
- (b) cutoff region
- (c) saturation
- (d) none of them

6. To avoid thermal runaway in the design of analog circuits, the operating point of the BJT should be such that it satisfies the condition

- (a)
- (b)
- (c)
- (d)

7. Thermal runaway will take place if the quiescent point is such that

- (a)
- (b)
- (c)
- (d)

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8. The power dissipated by a transistor approximately equals the collector current times

- (a) base emitter voltage
- (b) collector emitter voltage
- (c) base supply voltage
- (d) 0.7V

9. Leakage current in CE configuration is

- (a) very high
- (b) very small
- (c) normal
- (d) not present

10. The dc current gain in common collector configuration is given by

- (a) α
- (b) β
- (c) $\beta + 1$
- (d) $\alpha + 1$

11. The leakage current I_{CBO} flows in

- (a) The emitter, base and collector leads
- (b) The emitter and base leads.
- (c) The emitter and collector leads.
- (d) The base and collector leads.

12. Early effect in BJT refers to

- (a) avalanche breakdown
- (b) thermal breakdown
- (c) base narrowing
- (d) Zener breakdown

13. The emitter of the transistor is generally doped the heaviest because it

- (a) has to dissipate maximum power

- (b) has to supply the charge carriers
- (c) is the first region of transistor
- (d) must possess low resistance

14. In a properly Biased NPN transistor most of the electrons from the emitter

- (a) recombine with holes in the base
- (b) recombine in the emitter its self
- (c) pass through the base to the collector
- (d) are stopped by the junction barrier

15. In a transistor amplifier, the reverse saturation current I_{co}

- (a) double for every 10° rise in temperature
- (b) doubles for every 10 rise in temperature
- (c) increase linearly with the temperature
- (d) doubles for every 50 rise in temperature

16. The collector characteristics of a common- emitter connected transistor may be used to find its

- (a) input resistance
- (b) base current
- (c) output resistance
- (d) voltage gain

17. Which of the following transistor configuration circuit is much less temperature dependent

- (a) common base
- (b) common emitter
- (c) common collector
- (d) none of the above

18. The CE amplifier circuit are preferred over CB amplifier circuit because they have

- (a) lower amplification factor
- (b) larger amplification factor
- (c) high input resistance and low output resistance
- (d) none of these

19. A transistor when connected in CE mode has

- (a) a low input resistance and a low output resistance
- (b) a high input resistance and high output resistance
- (c) a high input resistance and low output resistance
- (d) a medium input resistance and high output resistance

20. A transistor connected in common base configuration has

- (a) a high input resistance and low output resistance
- (b) a low input resistance and high output resistance
- (c) a low input resistance and low output resistance
- (d) a high input resistance and a high output resistance

Answers

1. (b) 2. (d) 3. (c) 4. (a) 5. (a) 6. (c) 7. (d) 8. (b) 9. (a) 10. (c) 11. (d) 12. (c) 13. (b) 14. (c)
15. (a) 16. (c) 17. (c) 18. (b) 19. (d) 20. (b)

Diode Clippers, Clampers & Voltage Multipliers

1. A circuit that removes positive or negative parts of waveform is called
- a. clamper
 - b. clipper
 - c. diode clamp
 - d. limiter
2. A circuit that adds positive or negative dc voltage to an input sine wave is called
- a. clamper
 - b. clipper
 - c. diode clamp
 - d. limiter
3. Voltage multipliers are circuits best used to produce
- a. low voltage and low current
 - b. low voltage and high current
 - c. high voltage and low current
 - d. high voltage and high current
4. Half wave voltage multiplier can provide any degree of voltage multiplication by cascading diodes and capacitors.
- a. only doubler
 - b. only tripler
 - c. any multiplication
 - d. none of the above
5. Consider the following statements: A clamper circuit
- 1. adds or subtracts a dc voltage to a waveform
 - 2. does not change the waveform
 - 3. amplifies the waveform
- Which are correct?
- a. 1, 2
 - b. 1, 3
 - c. 1, 2, 3
 - d. 2, 3
7. In the above figure D1 turns on when

- a. V_i is more positive than V_1
- b. V_i is less than V_1
- c. V_i is between V_1 and V_2
- d. none of the above

8. In the given Figure D2 turns on when

- a. V_i is more positive than V_1
- b. V_i is less positive than v_1
- c. V_i is more negative than V_2
- d. V_i is less negative than V_2

9. A voltage tripler circuit uses

- a. 2 diodes and 2 capacitors
- b. 3 diodes and 3 capacitors
- c. 2 diodes and 3 capacitors
- d. 3 diodes and 2 capacitors

10. A voltage doubler circuit is fed by a voltage $V_m \sin \omega t$. The output voltage will be nearly $2 V_m$ only if

- a. load resistance is small
- b. load resistance is large
- c. load resistance neither small nor large
- d. either (a) or (c)

Answers

1. (b) 2. (a) 3. (c) 4. (c) 5. (a) 7. (a) 8. (c) 9. (b) 10. (b)

FET-AMPLIFIER

1. A field effect transistor (FET)

- a. Uses a forward bias p-n junction
- b. Uses a high concentration emitter junction
- c. Has a very high input resistance
- d. Depends on flow of minority carrier

2. As compared to transistor amplifier JFET amplifier has

- a. Higher voltage gain, less input impedance
- b. Less voltage gain, less input impedance
- c. Less voltage gain, higher input impedance
- d. Higher voltage gain, higher input impedance

3. The best location for setting a Q-point on dc load line of an FET Amplifier is at

- a. Saturation point
- b. Cutoff point

- c. Mid- point
- d. None of these

4. The pinch off voltage is the voltage
- a. At which gate source junction breaks down
 - b. Which causes depletion regions to meet
 - c. The voltage applied between drain & source
 - d. Neither of these

5. If properly biased JFET acts as
- a. Current controlled current source
 - b. Voltage controlled voltage source
 - c. Voltage controlled current source
 - d. Current controlled voltage source

6. The voltage gain of a common source JFET amplifier depends upon its
- a. Transconductance (g_m)
 - b. Amplification factor (μ)
 - c. External load resistance
 - d. Both (a) and (c)

7. A common gate amplifier has
- a. High input resistance and high output resistance
 - b. Low input resistance and high output resistance
 - c. Low input resistance and low output resistance
 - d. High input resistance and low output resistance

9. A transconductance amplifier has
- a. High input impedance and low output impedance
 - b. Low input impedance and high output impedance
 - c. High input and output impedances
 - d. Low input and output impedances

10. A JFET is similar in operation to
- a. Diode
 - b. Pentode
 - c. Triode
 - d. Tetrode

11. In a common source JFET amplifier the output voltage is
- a. 180° out of phase with input
 - b. In phase with input

- c. 90° out of phase with input
- d. None of the above

12. A common source (CS) amplifier has a voltage gain of

- a. $g_m r_d$
- b. $g_m r_s$
- c. $g_m r_s / (1 + g_m r_s)$
- d. $g_m r_d / (1 + g_m r_d)$

13. A source follower has a voltage gain of

- a. $g_m r_d$
- b. $g_m r_s$
- c. $g_m r_s / (1 + g_m r_s)$
- d. $g_m r_d / (1 + g_m r_d)$

14. A cascode amplifier has the advantage of

- a. Large voltage gain
- b. Low input capacitance
- c. Low input impedance
- d. Higher g_m

15. If a JFET has $I_{DSS}=8\text{mA}$ and $V_P=4\text{V}$, then R_{DS} equals

- a. 200Ω
- b. 320Ω
- c. 500Ω
- d. $5\text{K}\Omega$

Answers

1. (c) 2. (c) 3. (c) 4. (b) 5. (c) 6. (d) 7. (b) 9. (a) 10. (b) 11. (a) 12. (a) 13. (c) 14 (b) 15. (c)