

# **ANALOG ELECTRONICS EE-202-F**

## **IMPORTANT QUESTIONS**

1. Explain the working of PN junction diode.
2. How the PN junction diode acts as a rectifier.
3. Explain the switching characteristics of diode
4. Derive the expression for the ripple factor in case of half wave and full wave rectifier.
5. Explain the operation of the voltage –doubler circuit.
6. With the help of circuit diagram explain the working of full wave bridge rectifier.
7. Explain the V-I characteristics of PN junction diode.
8. What is the difference between clipper and clamper circuits
9. Explain the load line analysis of the diode
10. What is static and dynamic resistance of diode
11. Explain the need for biasing the BJT
12. Explain transistor RC coupled amplifier with reference to frequency response, advantages, disadvantages and applications
13. Draw and explain the input and output characteristics of CE configuration.
14. What is stability factor ? Derive the expression for stability factor of self bias method of transistor biasing.
15. A transistor with  $\beta = 100$  is used in CE configuration. The collector circuit resistance is  $R_c = 1\text{K}\Omega$  and  $V_{cc} = 20\text{V}$ . Assuming  $V_{BE} = 0$ , find the value of collector to base resistance, such that quiescent collector emitter voltage is 4 V.

16. Derive the expression for CE short circuit current gains  $A_i$  as a function of frequency.
17. Explain Hybrid  $\pi$  model of transistor.
18. Define Pinch-off voltage, amplification factor and Transconductance of FET. Explain with a circuit diagram how an FET is used as a VVR (Voltage Variable Resistance)
19. Explain construction and working of V-MOSFET.
20. Explain series and shunt voltage regulator
21. A BJT has  $h_{ie} = 2 \text{ K}\Omega$ ,  $h_{fe} = 100$ ,  $h_{re} = 2.5 \times 10^{-4}$  and  $h_{oe} = 25 \mu\text{A/V}$  as parameters in CE configuration. It is used as an emitter follower amplifier with  $R_s = 1 \text{ K}\Omega$  and  $R_L = 500 \Omega$ . Determine for the amplifier the voltage gain, the current gain, the input resistance  $R_i$  and output resistance  $R_o$ .
22. The load resistance of a centre-tapped full-wave rectifier is  $500 \Omega$  and the necessary voltage is  $60 \sin(100\pi t)$ . Calculate (i) Peak average and rms values of current (ii) Ripple factor Q (iii) efficiency of the rectifier. Each diode has an idealized I-V characteristics having slope corresponding to a resistance of  $50 \Omega$ .
23. Explain briefly filter circuits
24. Write short note on any two of the following :
  - (i) Thermistor and Sensistor Compensation
  - (ii) Miller's Theorem
  - (iii) Peak to peak detector.
25. Explain the following terms with respect to Diodes :-
  - a. Breakdown Voltage
  - b. Knee Voltage
  - c. Peak Inverse Voltage
  - d. Forward & Reverse Resistance
26. Derive the expression for the average value of current in a half-wave Rectifier.

27. The Forward Resistance  $R_F$  of a diode is  $20 \Omega$ . This diode is used in a Half wave Rectifier circuit. The applied Input voltage is  $v = 50 \sin \omega t$  and load Resistance  $R_L$  is  $800 \Omega$ . Determine :-
- $I_m, I_{dc}, I_{rms}$ .
  - AC Power Input and DC Power output.
  - Output DC voltage.
  - Rectification efficiency.
28. A CENTRE TAP Full wave Rectifier has load resistance  $R_L$  is  $1000 \Omega$ . The  $R_F$  of a diode is  $20 \Omega$ . The voltage across half of the secondary winding is given by the equation  $v = 200 \sin 314t$ . determine :
- Peak value of current
  - Average or  $Q_c$  value of current
  - rms value of current
  - Ripple Factor
29. Explain need for biasing G BJT. Draw a circuit of CE amplifier with n-b-n transistor, using self-biasing scheme and derive the expression for its stability factor.
30. Explain the small signal mode of an FET.
31. A transistor with  $\beta = 55$  is to be used in self biasing circuit such that  $V_{CC} = 22.5V$ ,  $R_c = 5.6 K\Omega$ ,  $R_E = 1 K\Omega$ ,  $R_2 = 10 K\Omega$ , and  $R_1 = 90 K\Omega$ ,  $V_{BE} = 0.6 V$ . The transistor operates in active region. Determine the Q-point & transistor and stability factor.
32. Explain R-C coupled amplifier with its frequency response.
33. Write short note on any two of the following :
- Series and shunt voltage regulator.
  - Peak to Peak detector.
  - MOSFET
34. Discuss the necessity for a regulated power supply
35. Explain the operation of UJT
36. Explain the breakdown that occurs in the diode
37. Draw the block diagram of SMPS
38. What are the power supply parameters

39. What is the use of compensation network. Explain various types of compensated network
40. Explain miller theorem and its importance
41. Compare CE, CB and CC.
42. Draw the equivalent circuit of transistor at high frequency.
43. What are the capacitance associated at high frequency
44. Explain peak to peak detector
45. What is V-MOSFET. How it is different from other MOSFET
46. Explain the biasing for the FET circuit
47. Compare BJT and FET
48. Explain three terminal IC regulator-7805
49. Discuss the procedure to determine DC operating point by using load line. Why it is selected at the middle of the load line.
50. Explain why inductor filter is not used in case of half wave rectifier.