Electronics Devices and Circuits-2
BECE1-409
Question Bank

UNIT I - SINGLE STAGE AMPLIFIERS & MULTISTAGE AMPLIFIERS:
Part A

1. What is meant by unbiased PN junction?
2. What is meant by depletion layer in unbiased PN junction?
3. Define forward static and dynamic resistances of diode.
4. Define diffusion capacitance and transition capacitance.
5. Draw the V-I characteristics of PN junction Diode.
6. Write down the expression for Diode Current.
7. Write any two differences between Zener breakdown and Avalanche breakdown.
8. Define the ripple factor for a half-wave and full-wave rectifier.
9. Compare the performance of half-wave rectifier and full-wave rectifier.
10. Define Transformer utilization factor.
11. What are the advantages of Bridge rectifier?
12. How shunt regulator is differentiated from series regulator?
13. Draw the block diagram of shunt voltage regulator.
14. Draw the block diagram of series voltage regulator.
15. Compare the rectifier and regulator.
16. Write the diffusion current expression and state how this current is formed?
17. Write the temperature dependence of reverse saturation current of PN junction diode.
18. Draw the energy band diagram of a semiconductor.
19. Differentiate drift current and diffusion current.
20. Why Silicon is preferred over Germanium in the manufacture of semiconductor devices?
21. Define forbidden energy gap.
22. Define forward and reverse recovery time of a diode.
23. Define knee voltage and breakdown voltage with respect to diode.
24. Define avalanche breakdown and zener breakdown.
25. Write down the advantages of C filter.
26. Design a full wave rectifier with C filter for Vdc = 12 V; IL = 100 mA and ripple factor = 5%.
27. What is meant by mean life time of a carrier in semiconductor?
28. Define peak inverse voltage of diode.
29. Define load regulation and line regulation.
30. What are the limitations of using zener diode regulator?
31. Define filter.
32. Explain the operation of forward biased and reverse biased PN junction Diode.
33. (i) Explain the current components in a PN junction diode. (ii) Derive the diode current equation.
34. (i) Briefly explain about avalanche and zener breakdown.
(ii)Draw the display of number 1 using seven segment display and explain the theory of liquid crystal cells.
35. Explain the working of Bridge rectifier. Give the expressions for RMS current, PIV, ripple factor and efficiency.
36. (i) Explain about the switching characteristics of the diode.
(ii) Explain about the effect of temperature on diode characteristics.
37. What is transistor? Give its circuit symbol.
38. In a transistor operating in the active region although the collector junction is reverse

biased the collector current is quite large. Explain.
39. What is reverse saturation current?
40. Define α and β.
41. What is meant by punch through effect?
42. If the base current in a transistor is 30 micro amps when the emitter current is 2 m A.
43.What are the values of α and β?
44. Give the relation between α and β.
45. Draw the hybrid model for transistor.
46. Define the various h-parameters in a transistor.
47. List some applications of BJT.
48. Define cutoff and active region of a transistor.
49. Draw the output characteristics of a transistor in CE configuration.
50. Draw the small signal low frequency hybrid model of common base configuration.
51. Why base made thin in BJT?
52. Among CE, CB and CC configurations which is most popular? Why?
53. Define Base Width modulation.
54. What is meant by biasing a transistor?
55. In a common base connection, the emitter current is 1 mA, ICBO = 50 μ A, α =0.92.Find the total collector current.
56. Describe how amplification and switching achieved by a BJT?
57. What are the bias conditions of base-emitter and base-collector junction to operate a transistor in cut off region?
58. Define the current ICEO.
59. Why is emitter follower so named?
60. What do you understand by h-parameters?
61. What is the significance of h-parameters?
62. Which factors determine the switching speed of the transistor?
63. What are the limitations of switching parameter?
64. What is the need for small signal model of BJT?
65. Differentiate between rise time and storage time?
66. What are the factors that contribute to the delay time when the transistor is used as a switch?
67. Differentiate small signal model with large signal model.
68. Draw the ebers-moll model of CE transistor circuit.
69. Draw and explain the input and output characteristics of a transistor in CE configuration.
70. (i) Explain the operation of Power transistor.
(ii) Describe two applications of BJT.
71. Draw and explain the input and output characteristics of a transistor in CB configuration.
72. (i) Explain the working of NPN and PNP transistor.
(ii) With neat diagram, describe the principle and working of Optocoupler.
73. With necessary circuit and waveform, explain the switching characteristics of a transistor in detail.
74. (i) Distinguish between the different types of transistor configurations with necessary circuit diagrams.
(ii) With neat sketch, explain low frequency and high frequency model of a transistor.
75. Draw and explain the input and output characteristics of a transistor in CC configuration.
76. Derive the expression for AI, AV, Ri and Ro for CB amplifier using h-parameter model.
77. Derive the equations for voltage gain, current gain, input impedance and output admittance for a BJT using low frequency h-parameter model for (a) CE configuration (b) CB configuration and (c) CC configuration.

78. (i)The h-parameters of a transistor are given below. The source and load resistances of a CE amplifier are equal to 2 kΩ.Compute AV, Ri and RO.
(ii)If the common-emitter h –parameters of a transistor are given by hie = 2000 Ω ,hfe = 49, hre = 5.5x10-4 and hoe = 2.5x10-5, find the common base h-parameters of the transistor.

UNIT II: TRANSFORMER COUPLED AUDIO AMPLIFIER & PUSH-PULL AMPLIFIERS

79. What do you mean by cascade the amplifiers?
80. Why does R-C coupling give constant gain over mid frequency range?
81. Comment on the maximum efficiency of class-B amplifier operation.
82. What is the effect of negative feedback on gain in an amplifier?
83. The voltage gain of an amplifier without feedback is 60dB.It increases to 40dB with feedback. Calculate the feedback factor.
84. Explain the basic principle of operation of RC oscillator.
85. Why are L-C resonant circuits impractical at audio frequencies?
86. Explain how Zener diode maintains constant voltage across the load.
87. What are various types of distortion present in power amplifier? How do you graphically determine the second order harmonic distortion?
88. What is difference between voltage and power amplifier? Discuss a method of determining the total harmonic distortion of power amplifier.
89. Explain two of stages RC coupled amplifier and derive expression for voltage gain and frequency response curve.
90. Derive an expression for the overall gain of voltage series and current series feedback amplifier.
91. What are push-pull amplifiers? Draw a model for 2-transistor in a push-pull arrangement
92. Draw and explain the circuit diagram of single and double tuned amplifier circuit. Also its frequency response.
93. Draw the small signal hybrid π-model at high frequency. Explain each component of this model and Prove that hfe = gm.rb'e.
94. Write short notes on any two of the following : i) Wein Bridge Oscillator ii) Stagger Tuned Amplifier iii) High Frequency T-model

UNIT III: FEEDBACK AMPLIFIERS & OSCILLATORS & A STABLE MULTIVIBRATORS

100. Differentiate between voltage and power amplifier.
101. What is an oscillator? How does it differ from an amplifier?
102. Define harmonic distortion.
103. What is the main advantage of using Transformer coupling over R-C coupling?
104. Draw h-parameter equivalent circuit of CB configuration.
105. Explain the principle of multistage amplifiers.
106. Why is crystal oscillator used in radio transmitter?
107. List all advantages of negative feedback in amplifier.
108. What is the principle of operation of oscillators?
109. Compare RC phase shift and crystal oscillator

110. Explain the working of Hartley oscillator and derive the expression for its frequency of operation
111. State Barkhausen's Criteria for Oscillation.
112. Define ICBO and ICEO. How are they different? How are they related? Are they typically close in magnitude?
113. Define αdc and αac . Find IE if IB = 40μA and αdc is 0.98.
114. What are the factors responsible for reduction in gain at high frequencies?
115. Define noise figure for an amplifier.
116. Write the principle of phase shift oscillator.
117. Draw the output waveforms for class A, class B, class AB and class C of power amplifier.
118. State what will happen to the voltage gain of an amplifier if the bypass capacitor is open circuited.
119. Define the parameter fT and discuss its significance,
120. Define Phase margin and Gain margin.
121. Show that maximum collector efficiency of class A transformer coupled power amplifier is 50%.
122. What are the advantages and disadvantages of negative feedback in amplifier? Discuss the current shunt negative feedback amplifier.
123. Draw the circuit diagram of Hartley oscillator using BJT and briefly explain how oscillations are maintained in this oscillator.
124. State and explain Miller's Theore