Electronic Circuit Analysis (ECA) Mid-1 Questions

Long Answer Questions

1. Explain in detail about voltage series feedback amplifier with necessary circuits. Derive i) A_F ii) Z_{if} iii) Z_{of}
2. Explain in detail about voltage shunt feedback amplifier with necessary circuits.. Derive i) A_F ii) Z_{if} iii) Z_{of}
3. Explain in detail about current series feedback amplifier with necessary circuits. Derive i) A_F ii) Z_{if} iii) Z_{of}
4. Explain in detail about current shunt feedback amplifier with necessary circuits. Derive i) A_F ii) Z_{if} iii) Z_{of}
5. Define feedback. Draw the block diagram of general feedback amplifier and explain in detail. Classify different types of it.
6. Write the characteristics of negative feedback amplifiers. Give a comparison between different types of feedback amplifiers.
7. Define oscillator. Classify different types of it. Draw the general block diagram of oscillator and explain in detail. Write the conditions for oscillations.
8. Give a comparison between different types of oscillators.
9. What are the advantages, disadvantages and applications of different oscillators?
10. Explain the generalized analysis of LC oscillators with equations.
11. Explain about Colpitts oscillator with the help of circuit and Derive equation for frequency of oscillations.
12. Explain about Hartley oscillator with the help of circuit and Derive equation for frequency of oscillations.
13. Explain about Wien Bridge oscillator with the help of circuit and Derive equation for frequency of oscillations.
14. Explain about RC phase shift oscillator with the help of circuit and Derive equation for frequency of oscillations.
15. Write in detail about Crystal oscillator with necessary circuits and equations.
16. Write in detail about stability of oscillators.
17. Draw the circuit of Giacolletto model of BJT in CE mode and explain its features.
18. Write the relationship between low frequency h-parameters and high frequency parameters.
19. Define f_L, f_H, f_T, f_α, f_β, BW, feedback, oscillator, piezoelectric effect, frequency stability.
20. **All types of problems and definitions are important.**

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Note: Unit-1 carries 30Marks, **Unit-2** carries 20Marks (upto topics covered)

Electronic Circuit Analysis (ECA) Mid-1 bits

1. The gain of an amplifier with Negative feedback is given by _____.
2. The disadvantage of negative feedback is that gain _____.
3. With series feedback, input resistance of an amplifier will _____.
4. If negative feedback is used in amplifiers then Noise will _____.
5. If negative feedback is used in amplifiers then Bandwidth will _____.
6. If negative feedback is used in amplifiers then lower cut-off frequency will _____.
7. If negative feedback is used in amplifiers then higher cut-off frequency will _____.
8. If negative feedback is used in amplifiers then gain will _____.
9. If negative feedback is used in amplifiers then distortion will _____.
10. With shunt feedback, input resistance of an amplifier will _____.
11. Voltage series feedback amplifier is also called as _____.
12. Voltage shunt feedback amplifier is also called as _____.
13. Current series feedback amplifier is also called as _____.
14. Current shunt feedback amplifier is also called as _____.
15. Oscillator is a circuit which converts _____ to _____.
16. Sinusoidal oscillators are also called as _____.
17. Non-Sinusoidal oscillators are also called as _____.
18. Classification of oscillators based on output waveform are divided into _____ and _____.
19. Examples of Sinusoidal oscillators are _____.
20. Classification of oscillators based on working are divided into _____ and _____.
21. Classification of oscillators based on type of circuit are divided into _____ and _____.
22. Examples of non-sinusoidal waveforms are _____.
23. An oscillator uses _____ type of feedback.
24. RF oscillators are also called as _____.
25. AF oscillator has _____ range of frequencies.
26. RF oscillator has _____ range of frequencies.
27. VHF oscillator has _____ range of frequencies.
28. UHF oscillator has _____ range of frequencies.
29. MWF oscillator has _____ range of frequencies.
30. If $a=bx$, then $x =$ _____.
31. Log 10 = _____ and Log 10n = _____.
32. Logarithm taken to the base ‘e’ is called as _____.
33. Logarithm taken to the base ‘10’ is called as _____.

34. Hybrid-pi parameters are _____.

35. Examples of LC oscillators are _____ circuits.

36. Examples of RC oscillators are _____ circuits.

37. _____ Oscillator exhibits piezoelectric effect.

38. Necessary conditions to be satisfied by any oscillator circuit are called as _____.

39. Two conditions to be satisfied by any oscillator circuit are given by _____ and _____.

40. Advantage of RC oscillator is _____.

41. Disadvantage of RC oscillator is _____.

42. RC phase shift oscillator has _____ no. of identical RC sections.

43. Each RC section in RC phase shift oscillator generates _____ amount of phase shift.

44. Advantage of LC oscillator is _____.

45. Disadvantage of LC oscillator is _____.

46. In Hartley Oscillator _____ are variable and _____ is constant.

47. In Colpitts Oscillator _____ are variable and _____ is constant.

48. In Wienbridge oscillator circuit, feedback network generates _____ amount of phase shift.

49. In tuned oscillator circuit, when supply is switched ON _____ is produced in tank circuit.

50. Other name of LC oscillators are _____.

51. Frequency stability of Crystal oscillator is in the range of _____.

52. Crystal oscillator can be used to generate frequencies of range _____.

53. Types of crystals are _____ and _____.

54. Examples of Piezo-electric materials are _____.

55. Hybrid-pi model is also called as _____.

56. _____ Capacitors effect is considered in low frequency response of amplifier circuit.

57. _____ Capacitors effect is considered in high frequency response of amplifier circuit.

58. Range of $r_{bb'}$ is _____.

59. Range of $r_{b'c}$ is _____.

60. Range of $r_{b'e}$ is _____.

61. Range of r_{ce} is _____.

62. Range of $C_{b'c}$ is _____.

63. Range of $C_{b'e}$ is _____.

64. Formula of $r_{bb'}$ is _____.

65. Formula of $r_{b'c}$ is _____.

66. Formula of $r_{b'e}$ is _____.

67. Formula of $C_{b'c}$ is _____.

68. Formula of $C_{b'e}$ is _____.

69. Formula of gm is _____.

70. Formula of V_T in terms of T in 0C is _____.

71. Formula of h_{ie} in terms of $r_{bb'}$ is _____.

72. Formula of Bandwidth is _____.

73. Relation between dB and Bel is _____.

74. f_T is called as _____.

75. f_β is called as _____.

76. f_α is called as _____.

77. f_β is also indicated as _____.

78. f_α is also indicated as _____.

79. f_T in terms of f_α is given by _____.

80. f_T in terms of f_β is given by _____.

81. The frequency of oscillations for Colpitt's oscillator is f_0 =_____.

82. The frequency of oscillations for Hartley oscillator is f_0 =_____.

83. The frequency of oscillations for RC phase shift oscillator is f_0 = _____.

84. The frequency of oscillations for Wienbridge oscillator is f_0 = _____.

85. The frequency of oscillations for Crystal oscillator is _____.

86. Advantages of Crystal oscillator are _____.

87. Generalized equation of LC oscillators is given by _____.

88. The frequency stability of oscillators is depending on _____.

89. Frequency stability may be in between _____ and _____.

90. Frequency may vary because of _____.

91. For any oscillator, Variation of frequency with temperature is given by _____.

92. Unit for $S_{w,T}$ are _____.

93. Frequency stability is given by formula _____.

94. Frequency stability can be increased by _____.

95. Range of h_{ie} is _____ and hoe is _____.

96. Range of h_{fe} is _____ and hre is _____.

97. Formula for gain in dB in terms of power levels P_1, P_2 is _____.

98. Formula for gain in dB in terms of voltage levels V_1, V_2 is _____.

99. Formula for gain in dB in terms of current levels I_1, I_2 is _____.

100. **All definitions are important.**

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Electronic Circuit Analysis (ECA) Mid-2 Questions

Long Answer Questions

1. Define amplifier. Classify different types of amplifiers.
2. Explain about different methods of coupling.
3. Explain in detail about RC coupling with necessary circuit. Mention its advantages and disadvantages.
4. Explain in detail about transformer coupling with necessary circuit, advantages and disadvantages.
5. Explain in detail about direct coupling with necessary circuit, advantages and disadvantages.
6. Explain in detail about RC coupling with necessary circuit.
7. Explain different types of coupling. When two identical stages are cascaded, obtain voltage gain, current gain and power gain.
8. Compare different methods of coupling.
9. Derive an equation for voltage gain, current gain, input impedance and output impedance of Darlington emitter follower.
10. Write in detail about Cascode amplifier.
11. Compare Darlington pair and Cascode amplifiers.
12. Define Differential amplifier. Classify different types of it. Compare them.
13. Explain in detail about DC analysis of Differential amplifier using BJT. Derive its factors.
14. Explain in detail about AC analysis of Differential amplifier using BJT. Derive its factors.
15. Compare all Differential amplifiers.
16. Define Power amplifier. Classify different types of it.
17. Describe class-A large signal amplifier and also obtain the efficiency.
18. Define second harmonic distortion. Derive an expression for second harmonic component of transmitter amplifier.
19. Write in detail about Higher order harmonic Distortion with necessary equations.
20. Explain in detail about Class-B Amplifier, derive the efficiency.
21. Draw and explain about Complementary Symmetry push pull amplifier.
22. Draw and explain class-B push pull amplifier.
23. Compare Class-A and Class-B Amplifiers.
24. Compare various types of Power Amplifiers.
25. Define Thermal stability and explain about it in detail.
26. Define Heat sink. Classify different types of it. Write about importance of heat sink in power amplifier.
27. Define Tuned Amplifier. Classify different types of it.
28. Define Q-factor. What are the advantages of tuned amplifiers?
29. Define Q-factor for inductor and derive the Q-factor formula.
30. Define Q-factor for capacitor and derive the Q-factor formula.
31. Define Q-factor for lossy capacitor and derive the Q-factor formula.
32. Define loaded Q and unloaded Q with formulas.

33. Describe the operation of single tuned amplifier with neat circuit diagram and relevant expression.
34. With neat circuit diagram, describe the operation of capacitance single tuned amplifier.
35. Derive the expression for bandwidth and Q factor of single tuned capacitive coupled amplifier.
36. Illustrate the operation of double tuned amplifier with neat circuit diagram and necessary equation.
37. Differentiate Single tuned and double tuned amplifiers.
38. Explain the effect of Cascading Single tuned amplifiers on Band width.
39. Explain the effect of Cascading Double tuned amplifiers on Band width.
40. Write in detail about Staggered tuned amplifiers with its equations and advantages..
41. Explain about the Stability of tuned amplifiers with necessary circuits.
42. Write in detail about Neutralization techniques.
43. **All definitions and problems are important.**

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Electronic Circuit Analysis (ECA) Mid-2 bits

1. Multistage amplifier means _____.
2. The disadvantage single stage amplifier is _____.
3. In multistage amplifier, _____ of one stage is connected to _____ of next stage.
4. Cascading means _____.
5. Advantage of cascading is _____.
6. Cascaded amplifier means _____.
7. Cascode amplifier means _____.
8. _____ Types of coupling schemes are used in amplifiers.
9. Different coupling schemes used in amplifiers are _____.
10. Advantages of coupling networks are _____ and _____.
11. Coupling network transfers _____ of one stage to the _____ of next stage.
12. Coupling network isolates _____ of one stage to the next stage.
13. _____ is most commonly used coupling scheme in multistage amplifiers.
14. _____ coupling scheme is least expensive.
15. _____ coupling scheme has satisfactory frequency response.
16. In _____ coupling, signal developed across collector resistor is coupled through capacitor into base of next stage.
17. _____ isolates the dc conditions of one stage to next stage.
18. Amplifier which uses Resistance capacitance coupling scheme are called as _____ amplifiers.
19. In _____ coupling, primary winding of transformer acts as a collector load and secondary winding transfers the ac output signal directly to the base of next stage.

20. _____ coupling scheme has very high voltage gain.
21. _____ coupling scheme has high level of impedance matching.
22. _____ coupling scheme was very expensive.
23. _____ coupling scheme is restricted to power amplifiers.
24. Amplifiers which uses transformer coupling scheme are called as _____ amplifiers.
25. In _____ coupling, ac output signal is fed directly to the next stage.
26. In _____ coupling, no reactive elements are used.
27. In _____ coupling, special dc voltage level circuits are used.
28. Amplifiers which uses direct coupling scheme are called as _____ amplifiers.
29. Direct coupled amplifiers are also called as _____.
30. Frequency response means_____.
31. Entire frequency range is divided into _____ number of ranges.
32. The three frequency ranges are _____, _____&_____.
33. Lower cutoff frequency means _____.
34. Higher cutoff frequency means _____.
35. Bandwidth means _____.
36. The overall voltage gain of 'n' stages of cascaded amplifier is given by_____.
37. The overall phase shift of 'n' stages of cascaded amplifier is given by_____.
38. General formula for voltage gain is given by _____.
39. General formula for current gain is given by _____.
40. General formula for power gain is given by _____.
41. One advantage of RC coupling is _____.
42. _____ Coupling is cheap, small, and light.
43. _____ Coupling gives uniform voltage amplification.
44. _____ Coupling does not require any coil or transformer.
45. _____ Coupling has minimum possible distortion.
46. One disadvantage of RC coupling is _____.
47. _____ Coupling is noisy in humid weather.
48. _____ Coupling has poor impedance matching.
49. Applications of RC coupling are _____.
50. Applications of transformer coupled amplifiers are _____.
51. Relation between N1 and N2 for transformer coupling is given by _____.
52. Applications of direct coupling are _____.
53. Capacitors are not used in DC amplifiers because _____.

54. No. of techniques available for amplifying low frequency signals that change very slowly are _____.
55. One technique to amplify low frequency signal is _____.
56. Second technique to amplify low frequency signal is _____.
57. The drawback of DC amplifiers is _____.
58. Voltage offset means _____.
59. Offset current means _____.
60. Generally Voltage offset is measured in _____.
61. Generally offset current is measured in _____.
62. Cascode amplifier means _____.
63. Drawback of CB amplifier is _____.
64. Advantage of CE amplifier is _____.
65. Cascode amplifier has voltage gain as that of _____ amplifier.
66. Cascode amplifier has current gain as that of _____ amplifier.
67. Cascode amplifier has input impedance as that of _____ amplifier.
68. Overall voltage gain for cascode amplifier is given by _____.
69. Darlington pair transistor is also called as _____,
70. Main feature of Darlington pair is _____.
71. If β_1, β_2 are current gains of two different transistors, then current gain of Darlington pair is given by formula _____.
72. If two transistors are matched in Darlington pair connection, then current gain of Darlington pair is given by _____.
73. Darlington pairs are generally available in _____ packages.
74. Darlington pair is commonly used in _____ circuit.
75. _____ is having high current gain.
76. _____ is having high input impedance.
77. Base current of Darlington circuit is given by equation _____.
78. Emitter current of Darlington circuit is given by equation _____.
79. Emitter voltage of Darlington circuit is given by equation _____.
80. Base voltage of Darlington circuit is given by equation_____.
81. AC input impedance of Darlington circuit is given by equation _____.
82. AC output impedance of Darlington circuit is given by equation _____.
83. AC current gain of Darlington circuit is given by equation_____.
84. AC voltage gain of Darlington circuit is given by equation_____.
85. For 'n' no. of stages, formula for lower cutoff frequency f'_L is given by _____.
86. For 'n' no. of stages, formula for higher cutoff frequency f'_H is given by _____.
87. For n=2, upper cutoff frequency changes by _____ of value obtained for single stage.
88. For n=2, lower cutoff frequency changes by _____ of value obtained for single stage.

89. For n=3, upper cutoff frequency changes by _____ of value obtained for single stage.
90. For n=3, lower cutoff frequency changes by _____ of value obtained for single stage.
91. Tuned amplifier means _____.
92. Tuned circuit means _____.
93. Advantage of tuned amplifier is _____.
94. Applications of tuned amplifier are _____ and _____.
95. Formula for resonant frequency f_0 is given by_____.
96. Response of tuned amplifier is _____ at resonant frequency and for frequencies below f_0 and above f_0, response will _____.
97. At resonance, tuned circuit act as _____.
98. At resonance, both Voltage and Current are _____.
99. For frequencies above f_0, tuned circuit act as _____.
100. For frequencies above f_0, Current _____ applied Voltage.
101. For frequencies below f_0, tuned circuit act as _____.
102. For frequencies below f_0, Current _____ applied Voltage.
103. Gain of transistor amplifier is _____ proportional to its load impedance.
104. A parallel tuned circuit has _____ impedance at its resonant frequency.
105. Tuned amplifiers are used for amplification of _____ of frequencies.
106. Tuned amplifiers are classified into _____ no. of types.
107. Tuned amplifiers are classified as _____ and _____.
108. Small signal Tuned amplifiers are used for amplification of _____ at RF.
109. Small signal Tuned amplifiers are operated under _____ mode as power involved is _____.
110. Small signal Tuned amplifiers has _____ distortion.
111. Small signal Tuned amplifiers has _____ efficiency.
112. Large signal Tuned amplifiers are used for amplification of _____ at RF.
113. Large signal Tuned amplifiers are operated under _____ mode as power involved is_____.
113. Large signal Tuned amplifiers has _____ distortion.
114. Large signal Tuned amplifiers has _____ efficiency.
115. Q-factor means _____.
116. Formula for Q-factor _____.
117. Q-factor for inductor is given by formula _____.
118. Q-factor for capacitor is given by formula _____.
119. Q-factor for lossy capacitor is given by formula _____.
120. Unloaded Q means _____.

121. Loaded Q means _____.
122. Formula for Loaded Q is given by _____.
123. Relation between Q-factor and BW is _____.
124. Q-factor and BW are _____ proportional.
125. For high values of Q, BW is _____.
126. For low values of Q, BW is _____.
127. No. of tuned amplifier stages are cascaded to _____.
128. Cascaded tuned amplifiers are classified into _____ no. of types.
129. Types of Cascaded tuned amplifier are _____.
130. Single tuned amplifier uses _____ parallel resonant circuit per each stage.
131. Double tuned amplifier uses _____ parallel resonant circuits per each stage.
132. Single tuned amplifier uses _____ coupling.
133. Double tuned amplifier uses _____ coupling.
134. Stagger tuned amplifier uses no. of _____ in cascade.
135. In Single tuned amplifiers cascading, all tuned circuits are tuned to _____ frequency.
136. In Double tuned amplifiers cascading, all tuned circuits are tuned to _____ frequency.
137. In Double tuned amplifiers all tuned circuits are tuned to _____ frequency.
138. Single tuned amplifiers are classified as _____ no. of types.
139. Types of Single tuned amplifiers are _____.
140. Relative gain formula for single capacitance coupled amplifier is given by _____.
141. Phase angle of for single capacitance coupled amplifier is given by _____.
142. For tuned amplifiers, δ means _____.
143. For tuned amplifiers, formula for δ is given by _____.
144. 3dB BW formula for double tuned amplifier is given by _____.
145. For double tuned amplifiers, factor ‘b’ means _____.
146. Range of factor ‘b’ is from _____ and _____.
147. For double tuned amplifiers, factor ‘b’ is always _____.
148. Formula for effect of cascading Single tuned amplifiers on BW is _____.
149. Formula for effect of cascading Double tuned amplifiers on BW is _____.
150. Formula for resultant relative gain for stagger tuned amplifiers is _____.
151. Large signal tuned amplifiers are generally operated in _____ mode.
152. Conduction angle means _____.
153. Neutralization means _____.
154. _____ Neutralization technique is generally used to avoid oscillations in tuned amplifiers.
155. Other name of large signal amplifier is _____.

156. Based on operation, power amplifiers are classified as _____.
157. In a Class-A amplifier, output transistor conducts for _____.
158. Theoretical max. Efficiency in a Class-A amplifier is _____.
159. Theoretical max. Efficiency for a series fed Class-A amplifier is _____.
160. Theoretical max. Efficiency in a Class-A amplifier by using inductors or transformers is _____.
161. In Class-B amplifier, transistors conduct for _____.
162. Theoretical max. Efficiency in Class-B amplifier is _____.
163. Class-A amplifier means _____.
164. Class-B amplifier means _____.
165. Class-AB amplifier means _____.
166. Class-C amplifier means _____.
167. Formula for efficiency is given by _____.
168. Formula for input power of Class-A amplifier is given by _____.
169. Formula for output power of Class-A amplifier is given by _____.
170. Amplitude distortion is also called as _____.
171. Distortion means _____.
172. Harmonic Distortion is caused by _____.
173. The second harmonic distortion in percentage is given by _____.
174. Total Harmonic Distortion means _____.
175. Total Harmonic Distortion is also called as _____.
176. Total Harmonic Distortion is denoted by _____.
177. Total Harmonic Distortion is given by formula _____.
178. The max. possible Total Harmonic Distortion for high quality audio amplifiers is _____.
179. As the power level increases, the harmonic distortions will be_____.
180. Effective resistance formula for transformer coupled amplifier is given by _____.
181. Voltage transformation ratio ‘n’ is given by _____.
182. Conduction angle in Class-A amplifiers is _____.
183. Conduction angle in Class-B amplifiers is _____.
184. Advantages of Class-B amplifiers are _____.
185. Class-B amplifiers have _____output power than Class-A amplifier.
186. Class-B amplifiers have _____ efficiency than Class-A amplifier.
187. Class-B amplifiers have _____ power loss than Class-A amplifier.
188. Class-B amplifiers are having _____ type of distortion.
189. Advantage of Class-B push pull amplifier is _____.
190. Disadvantage of Class-B push pull amplifier is _____.
191. Phase inverter means _____.
192. Drawbacks of phase inverters are _____.

193. Thermal resistance means _____.
194. Thermal resistance is denoted by _____.
195. Thermal resistance is measured in _____.
196. Thermal resistance min. value is _____ and max. value is _____.
197. Thermal resistance formula is given by _____.
198. Junction Temperatures of transistor can be reduced by using _____.
199. Different types of heat sinks are _____.
200. Heat sinks are used to _____.
201. Different types of low power transistor heat sinks are _____.
202. _____ and _____ types heat sinks are used for high power transistors.

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