CHAPTER 5: ELECTRONIC CIRCUITS

1. Which of the following amplifier is considered linear?
   A. Class A
   B. Class B
   C. Class C
   D. Either A or B

2. The voltage gain of a common collector configuration is
   A. Unity
   B. Zero
   C. Very high
   D. Moderate

3. A two-transistor class B power amplifier is commonly called
   A. Push-pull amplifier
   B. Dual amplifier
   C. Symmetrical amplifier
   D. Differential amplifier

4. If a transistor is operated in such a way that output current flows for 160 degrees of the input signal, then it is ________ operation.
   A. Class A
   B. Class C
   C. Class B
   D. Class AB

5. Which coupling has the best frequency response?
   A. Direct
   B. RC
   C. Transformer
   D. Transistor

6. A transistor amplifier has high output impedance because
   A. Emitter is heavily doped
   B. Collector is wider than emitter or base
   C. Collector has reverse bias
   D. Emitter has forward bias
7. Which of the following is considered an amplifier figure of merit?
   A. Gain-bandwidth product
   B. Beta(β)
   C. Alpha(α)
   D. Temperature

8. What piece of equipment in an oscilloscope is used to indicate pulse condition in a digital logic circuit?
   A. Probe
   B. Test prods
   C. Connector
   D. Logic probe

9. What linear circuit compares two input signals and provides a digital level output depending on the relationship of the input signals?
   A. Comparator
   B. Controller
   C. Compressor
   D. Switch

10. What type of coupling is generally used in power amplifiers?
    A. Transformer
    B. Direct
    C. RC
    D. Inductive

11. Which amplifier whose output current flows for the entire cycle?
    A. Class A
    B. Class B
    C. Class C
    D. Class AB

12. The coupling capacitor Cc must be large enough to __________ in an RC coupling scheme.
    A. Pass dc between the stages
    B. Dissipate high power
    C. Prevent attenuation of low frequency
    D. Prevent attenuation of high frequency
13. What is the point of intersection of dc and ac load lines called?
   A. Operating point
   B. Cut off point
   C. Saturation point
   D. Breakdown

   A. Damped
   B. Modulated
   C. Undamped
   D. Sinusoidal

15. What is the operating point in the characteristic curve called?
   A. Quiescent point
   B. Load point
   C. Biasing point
   D. Saturation point

16. Oscillators operate on the principle of
   A. Positive feedback
   B. Negative feedback
   C. Signal feedthrough
   D. Attenuation

17. In a class A amplifier, the output signal is
   A. Distorted
   B. The same as the input
   C. Clipped
   D. Smaller in amplitude than the input

18. What happens if the input capacitor of a transistor amplifier is short-circuited?
   A. Biasing conditions will change
   B. Transistor will be destroyed
   C. Signal will not reach the base
   D. Biasing will stabilize
19. Which is used to establish a fixed level of current or voltage in a transistor?
   A. Biasing
   B. Loading
   C. Load line
   D. Coupling

20. Which power amplifier has the highest collector efficiency?
   A. Class A
   B. Class C
   C. Class B
   D. Class AB

21. What is a non-linear type of amplifier?
   A. Class C
   B. Class AB
   C. Class B
   D. Class A

22. An AF transformer is shielded to
   A. Keep the amplifier cool
   B. Prevent the induction due to stray magnetic fields
   C. Protect from rusting
   D. Prevent electric shock

23. Amplitude distortion is otherwise known as ________ distortion.
   A. Intermodulation
   B. Harmonic
   C. Phase
   D. Resonant

24. What represents common-emitter small signal input resistance?
   A. $h_{ie}$
   B. $h_{ne}$
   C. $h_{ib}$
   D. $h_{oe}$
25. The ear is not sensitive to _______ distortion.
   A. Frequency
   B. Amplitude
   C. Harmonic
   D. Phase

26. Class C is an amplifier whose output current flows for
   A. Less than one-half the entire input cycle
   B. The entire input cycle
   C. Twice the entire input cycle
   D. Greater than one-half the entire input cycle

27. If gain without feedback and feedback factor are A and \( \beta \) respectively, then gain with negative feedback is given by
   A. \( \frac{A}{1-A \beta} \)
   B. \( \frac{A}{1+\beta} \)
   C. \( 1+\beta / A \)
   D. \( (1+\beta) A \)

28. The collector current in an common base configuration is equal to
   A. Alpha times emitter current plus leakage current
   B. Alpha times base current plus leakage current
   C. Beta times emitter current plus leakage current
   D. Beta times collector current plus leakage current

29. Which is not a basic BJT amplifier configuration?
   A. Common-drain
   B. Common-base
   C. Common-emitter
   D. Common-collector

30. The value of collector load resistance in a transistor amplifier is _______ the output impedance of the transistor.
   A. Equal to
   B. More than
   C. Less than
   D. Not related
31. What is the purpose of RC or transformer coupling?
   A. To block ac
   B. To separate bias of one stage from another
   C. To increase thermal stability
   D. To block dc

32. The bandwidth of a single stage amplifier is ________ that of multistage amplifier.
   A. Equal to
   B. Less than
   C. More than
   D. Independent

33. What is the time taken by the electrons or holes to pass from the emitter to the collector?
   A. Transit time
   B. Recombination
   C. Transient time
   D. Duty cycle

34. To obtain good gain stability in a negative feedback amplifier, AB is
   A. Equal to 1
   B. Very much greater than 1
   C. Less than 1
   D. Zero

35. The basic concept of the electric wave filter was originated by
   A. Campbell and Wagner
   B. Norton
   C. Foster
   D. Bode and Darlington

36. Which configuration has the lowest current gain?
   A. Common-base
   B. Common-collector
   C. Common-emitter
   D. Emitter follower
37. Which transistor configuration offers no phase reversal at the output?
   A. Common-base
   B. Common-collector
   C. Common-emitter
   D. Both A and B

38. The number of stages that can be directly coupled is limited because
   A. Change in temperature can cause thermal instability
   B. Circuit becomes heavily and costly
   C. It becomes difficult to bias the circuit
   D. Circuits’ resistance becomes too large

39. The input capacitor in an amplifier is called __________ capacitor.
   A. Coupling
   B. Stray
   C. Bypass
   D. Electrolytic

40. AC load line has a/an __________ slope compared to that of dc load line.
   A. Zero
   B. Smaller
   C. Bigger
   D. Infinite

41. A multistage amplifier uses at least how many transistors?
   A. One
   B. Three
   C. Four
   D. Two

42. RC coupling is used for ________ amplification.
   A. Voltage
   B. Current
   C. Signal
   D. Power
43. An ammeter’s ideal resistance should be
   A. Zero
   B. Unity
   C. Infinite
   D. The same with the circuits resistance

44. What circuit increases the peak –to-peak voltage, current or power of a signal?
   A. Power supply
   B. Attenuator
   C. Amplifier
   D. Filter

45. When the non-linear distortion in an amplifier is $D$ without feedback, with negative voltage feedback it will be
   A. $D/ 1+A \beta$
   B. $1+A \beta / D$
   C. $D (1+A \beta)$
   D. $D (1-A \beta)$

46. A tuned amplifier uses what load?
   A. Resistive
   B. Capacitive
   C. LC tank
   D. Inductive

47. The voltage gain over mid- frequency range in an RC coupled amplifier
   A. Changes instantly with frequency
   B. Is constant
   C. Is independent of the coupling
   D. Is maximum

48. The input impedance of an amplifier _______ when negative voltage feedback is applied.
   A. Decreases
   B. Becomes zero
   C. Increases
   D. Is unchanged
49. The input impedance of an amplifier _______ when negative current feedback is applied.
   A. Remains unchanged
   B. Decreases
   C. Increases
   D. Becomes zero

50. To obtain the frequency response curve of an amplifier _______ is kept constant.
   A. Generator output level
   B. Amplifier output
   C. Generator frequency
   D. Amplifier frequency

51. A type of oscillator wherein the frequency is determined by the charge and discharge of resistor-capacitor networks used in conjunction with amplifiers or similar devices.
   A. Sine wave oscillator
   B. Beta generating circuit
   C. Relaxation oscillator
   D. Simply an oscillator

52. The driver transformer has center-tapped secondary to provide
   A. Forward bias to transistors of push-pull circuit
   B. Two signals 180 degrees out of phase to transistors of push-pull circuit
   C. Impedance matching
   D. Two signals in phase with each other

53. What is the advantage of RC coupling scheme?
   A. Good impedance matching
   B. Economy
   C. High efficiency
   D. Simplicity

54. A type of filter which is having a single continuous transmission band with neither the upper nor the lower cut-off frequencies being zero or infinite is called
   A. Band stop filter
   B. Low pass filter
   C. High pass filter
   D. Band pass filter
55. An instrument use to measure ones location in terms of coordinates
   A. GPS
   B. ILS
   C. FANS
   D. GSM

56. Transformer coupling is used for _______ amplification.
   A. Current
   B. Power
   C. Voltage
   D. Signal

57. What is the typical value of coupling capacitor Cc in RC coupling?
   A. About 100 pF
   B. About 0.1μF
   C. About 10μF
   D. About 0.01μF

58. An electronic transfer from one stage to the next is termed as _______
   A. Doping
   B. Mixing
   C. Coupling
   D. Connecting

59. An amplifier configuration where the input signal is led to the emitter terminal and
    the output from the collector terminal is called
   A. Common base
   B. Common emitter
   C. Clipper
   D. Common collector

60. If the noise factor of an ideal amplifier expressed in dB, then it is
   A. 0
   B. 0.1
   C. 1
   D. 10
61. A feedback circuit is _________ frequency
   A. Independent of
   B. Strongly dependent on
   C. Moderately dependent on
   D. Relatively dependent on

62. What is the basic purpose of applying negative feedback to an amplifier?
   A. To increase gain
   B. To reduce distortion
   C. To keep the temperature within limits
   D. To increase input signal

63. The capacitors are considered __________ in the dc equivalent circuit of a transistor amplifier.
   A. Short
   B. Partially short
   C. Open
   D. Partially open

64. Which frequency produces the highest noise factor?
   A. 10kHz
   B. 500Hz
   C. 1kHz
   D. 100 Hz

65. Power amplifiers handle __________ signals.
   A. Very small
   B. Small
   C. Large
   D. Very large

66. The operating point is generally located at _________ of dc load line in class A operation
   A. The middle
   B. Saturation point
   C. Cut off point
   D. End point
67. Which of the following describes a common collector amplifier?
   A. Low voltage gain
   B. Low current gain
   C. Low power gain
   D. Low input resistance

68. The general characteristics of a common base amplifier are
   A. High voltage gain, low current gain, high power gain and very low input resistance
   B. High voltage, high current gain, high power gain and low input resistance
   C. Low voltage gain, high current gain, very high power gain and low input resistance
   D. None of the choices

69. To amplify dc signals, multistage amplifier uses what coupling?
   A. RC
   B. Direct
   C. Transformer
   D. Resistor

70. What oscillator is used on order to produce frequencies in the microwave region?
   A. Wien bridge
   B. Hartley
   C. Klystron
   D. Crystal

71. Practically, the voltage gain of an amplifier is expressed
   A. In volts unit
   B. In dB unit
   C. As an absolute value
   D. As a whole number

72. What coupling provides maximum voltage gain?
   A. RC
   B. Direct
   C. Transformer
   D. Resistor
73. The gain of an amplifier ________ when negative feedback is added.
   A. Increases
   B. Remains unchanged
   C. Reduces
   D. Becomes infinite

74. Feedback factor is always
   A. Less than 1
   B. Equal to 1
   C. More than 1
   D. Zero

75. What class of operation is used for general amplification where no distortion can be tolerated?
   A. Class A
   B. Class B
   C. Class AB
   D. Class C

76. What class of operation is used either where the signal needs to be cut in half, such as in pulse detector or noise detectors or where push-pull operation of two stages is required?
   A. Class A
   B. Class B
   C. Class AB
   D. Class C

77. What class of operation is used where a portion of a signal only is required, such as the synchronizing pulse separator of a television receiver?
   A. Class A
   B. Class B
   C. Class AB
   D. Class C

78. What class of operation has little use in general purpose amplifiers, but is used in high frequency oscillators?
   A. Class A
   B. Class AB
   C. Class B
   D. Class C
79. Why is transformer coupling provides high frequency?
   A. DC resistance is low
   B. Collector voltage is stepped up
   C. Collector voltage is stepped down
   D. AC resistance is high

80. For constant- K high-pass filter cut-off frequency (in Hz) is given by
   A. \(\frac{1}{(4\pi\sqrt{LC})}\)
   B. \(\frac{1}{(\pi\sqrt{LC})}\)
   C. \(\frac{1}{(2\pi\sqrt{LC})}\)
   D. \(\pi/\sqrt{LC}\)

81. Class C operation can have ________ percent efficiency.
   A. 100%
   B. 78.5%
   C. 50%
   D. 70%

82. The efficiency of class AB operation has a maximum of between ________ percent.
   A. 90 to 100%
   B. 60 to 80%
   C. 50 to 78.5%
   D. 40.5 to 60%

83. Transformer coupling is generally employed when load resistance is
   A. Large
   B. Very large
   C. Small
   D. Zero

84. A dc voltage supply provides 60V when the output is unloaded. When connected to a load the output drops to 56V. Calculate the value of the voltage regulation.
   A. 8.1%
   B. 7.1%
   C. 5%
   D. 12%

85. The ________ the voltage regulation, the better the operation of the voltage supply circuit.
   A. Smaller
   B. Bigger
   C. Moderate
   D. Biggest

86. In transistor amplifiers, what transformer is used for impedance matching?
A. Step up
B. Power
C. Step down
D. Isolation

87. If an amplifier has a power gain of 100, then its dB gain is
A. 10
B. 40
C. 20
D. 100

88. In order to have more voltage gain from a transformer amplifier the transistor used should have
A. Thin collector
B. Thin base
C. Wide emitter
D. Thin emitter

89. The final stage of an amplifier uses ______ coupling.
A. Direct
B. RC
C. Transformer
D. Impedance

90. The largest theoretical voltage gain obtained with a common collector amplifier is
A. 100
B. 10
C. Unity
D. Infinite

91. Increasing the overall Beta is an advantage of
A. Clap oscillator
B. Crystal oscillator
C. Darlington pair
D. CE amplifier

92. The frequency of oscillation is __________ L and C in an LC oscillator.
A. Inversely proportional to square root of
B. Directly proportional to
C. Independent of the values of
D. Proportional to square of

93. An oscillator employs ________ feedback.
A. Positive
B. Negative
C. Both positive and negative
D. Neither positive nor negative

94. What is the reason why RC coupling is not used to amplify extremely low frequencies?
   A. There is considerable power loss
   **B. Electrical size of coupling capacitor becomes very large**
   C. There is a hum in the output
   D. Electrical size of coupling capacitor becomes very small

95. Given three amplifiers with a gain of 10 and are connected in cascade. How much is the overall gain?
   A. 24
   B. 10,000
   **C. 36**
   D. 20

96. A pair of filter common on high fidelity system which separate audio frequency band signals into two separate groups, where one is fed to the tweeter and the other to the woofer is called
   A. Equalizer
   B. Synthesizer
   **C. Cross over network**
   D. Hybrid

97. The frequency response of transformer coupling is
   A. Good
   B. Excellent
   **C. Poor**
   D. Very good

98. The simplest variable frequency sinusoidal oscillator is the
   A. Complicated Colpitts circuit
   B. Crystal circuit
   **C. Armstrong circuit**
   D. Phase shift circuit

99. Which of the following is provided by a CB transistor amplifier?
   A. Voltage gain
   B. Power gain
   **C. Current gain**
   D. Gain stability
100. In the initial stages of a multistage amplifier, _______ coupling is used.
   A. Link
   B. RC
   C. Transformer
   D. Impedance

101. The three amplifiers are connected in a multistage arrangement each with a voltage gain of 30. Compute for the overall voltage gain.
   A. 90
   B. 27,000
   C. 10
   D. 30

102. If Av is 50 Ai is 200, what is the power gain of a common emitter amplifier?
   A. 1,000
   B. 10,000
   C. 100
   D. 100,000

103. The gain of an amplifier with feedback is known as _______ gain.
   A. Closed loop
   B. Resonant
   C. Open loop
   D. Unity

104. Negative feedback is employed in
   A. Oscillators
   B. Rectifiers
   C. Amplifiers
   D. Receivers

105. The gain of an amplifier is expressed in dB unit because
   A. It is a simple unit
   B. Calculations become easy
   C. Human ear response is logarithmic
   D. It is the most appropriate unit

106. What is the typical value of the emitter bypass capacitor CE in a multistage amplifier?
   A. About 0.1μF
   B. About 50μF
   C. About 100pF
   D. About 0.01μF
107. In a multistage amplifier, if the stages have R and C component only, ________ operation is apparent.
   A. Class B
   B. Class C
   C. Class A
   D. Class AB

108. In practice, what is normally varied in order to change the frequency of oscillation?
   A. Capacitance
   B. Inductance
   C. Resistance
   D. Impedance

109. What is the main consideration in the output stage of an amplifier?
   A. Power output
   B. Voltage gain
   C. Power gain
   D. Current gain

110. Transformer coupling provides high gain because
   A. Transformer is very efficient
   B. Impedance matching can be achieved
   C. Transformer steps up the voltage
   D. Transformer steps up the current

111. When negative voltage feedback is applied to an amplifier, its output impedance
   A. Remains unchanged
   B. Decreases
   C. Increases
   D. Becomes zero

112. An LC oscillator cannot be used to produce ______ frequencies.
   A. High
   B. Very high
   C. Audio
   D. Very low

113. A transistor converts
   A. Dc power into ac power
   B. Ac power into dc power
   C. High resistance into low resistance
   D. Low resistance into high resistance
114. Hartley oscillator is commonly used in which of the following?
   A. Radio receivers
   B. TV receivers
   C. Radio transmitters
   D. CATV

115. An oscillator oscillates due to
   A. Negative feedback
   B. Positive feedback
   C. Both positive and negative feedback
   D. Neither positive nor negative feedback

116. Generally tuned amplifiers are operated in
   A. Class C
   B. Class A
   C. Class B
   D. Class AB

117. A tuned amplifier is used in what application?
   A. Radio frequency
   B. Audio frequency
   C. Intermediate frequency
   D. Low frequency

118. What is the ratio of output to input impedance of a CE amplifier?
   A. Very low
   B. Very high
   C. Moderate
   D. Approximately 1

119. For a constant output frequency, the simplest sinusoidal oscillator is the ________.
    A. Crystal oscillator
    B. Phase-shift circuit
    C. Colpitts circuits
    D. Hartley circuit

120. The frequency stability of the oscillator output is maximum in ________ oscillator.
    A. LC
    B. Crystal
    C. Phase-shift
    D. Wien bridge
121. Transformer coupling introduces what type of distortion?
   A. Amplitude
   B. **Frequency**
   C. Phase
   D. Intermodulation

122. A pulsating dc applied to power amplifiers causes
   A. Burning of transistor
   B. **Hum in the circuit**
   C. Excessive forward voltage
   D. Excessive reverse voltage

123. What is the disadvantage of impedance matching?
   A. It gives distorted output
   B. It requires a transformer
   C. It gives low power output
   D. It is expensive

124. In a phase-shift oscillator, _________ RC sections are generally used.
   A. Three
   B. Four
   C. Two
   D. Five

125. In phase-shift oscillator, what are the frequency determining elements?
   A. L and C
   B. R, L and C
   C. **R and C**
   D. R and L

126. When the gain is 20 without feedback and 12 with negative feedback, feedback factor is
   A. **0.033**
   B. 3/5
   C. 5/3
   D. 1/5

127. The input impedance of which amplifier depends strongly on load resistance?
   A. CE
   B. **CC**
   C. CB
   D. CD
128. What capacitors are used in transistor amplifiers?
   A. Paper
   **B. Electrolytic**
   C. Mica
   D. Mylar

129. An important limitation of crystal oscillator is
   A. **Its low output**
   B. Its high Q
   C. Less availability of quartz crystal
   D. Its high output

130. What type of feedback is used in Wien bridge oscillator?
   A. Positive
   B. Negative
   **C. Both positive and negative**
   D. Either positive or negative

131. Which of the items below is not a description of the two-stage amplifier?
   A. The input resistance is equal to the input resistance of the first stage unless feedback is applied
   B. Its output resistance is equal to the output resistance of the final stage unless feedback is applied
   C. Its noise level is equal to the accumulated noise of the two stages, either by multiplying the noise voltage amplitudes together or by adding the noise decibel levels together
   **D. The output resistance is equal to the output resistance of the first stage unless feedback is applied.**

132. What is the most costly coupling?
   A. RC coupling
   B. Direct
   **C. Transformer**
   D. Inductive

133. When the output of an amplifier is 10V and 100mV from the output is fed back to the input, feedback factor is
   A. 10
   B. 0.1
   **C. 0.01**
   D. 0.15
134. What is the piezoelectric effect in a crystal?
   A. **Voltage is developed because of mechanical stress**
   B. Change in resistance because of temperature
   C. Change of frequency because of temperature
   D. Current is developed due to force applied

135. The input resistance of a common emitter amplifier is affected by
   A. \( R_c, r_c \) and \( \beta \)
   B. \( R_c \) and \( r_c \)
   C. \( \beta \) and \( r_c \)
   D. \( \alpha \) and \( r_c \)

136. What is the typical Q of a crystal?
   A. 100
   B. 50
   C. 1000
   D. **More than 10,000**

137. What is the axis that connects the corners of a crystal?
   A. \( X \)
   B. Mechanical
   C. \( Y \)
   D. \( Z \)

138. Determine the attenuation in dB for a T-pad for which \( R_1=R_2=40\Omega \) and \( R_3=36\Omega \). The pad connects a 50 \( \Omega \) generator to a 50 \( \Omega \) load.
   A. 9.83 dB
   B. 83.93 dB
   C. 10.83 dB
   D. 11.93 dB

139. What is usually employed at the output stage of an amplifier?
   A. Class A power amplifier
   B. **Push-pull amplifier**
   C. Pre-amplifier
   D. Differential amplifier

140. Why is it that the size of a power transistor is made considerably large?
   A. To provide easy handling
   B. **To dissipate more heat**
   C. To simply construction
   D. To facilitate connections
141. When crystal frequency increases with temperature, it has _______ temperature coefficient.
   A. Positive
   B. Negative
   C. Zero
   D. Infinite

142. What is the purpose of the bypass capacitor in a common-emitter amplifier?
   A. It increases voltage gain
   B. It decreases voltage gain
   C. It provides ac grounding
   D. No effect in the circuit

143. An emitter follower is equivalent to
   A. Common emitter amplifier
   B. **Common collector amplifier**
   C. Common base amplifier
   D. Hybrid connection

144. The crystal oscillator frequency is very stable due to _________ of the crystal.
   A. Rigidity
   B. Ductility
   C. High Q
   D. Low Q

145. The bandwidth of an amplifier _______ when negative feedback is applied.
   A. Decreases
   B. Remains unchanged
   C. Becomes infinite
   **D. Increases**

146. The term $1 + A\beta$ in the expression for gain with negative feedback is known as
   A. Gain factor
   B. **Sacrifice factor**
   C. Feedback factor
   D. Quality factor

147. Emitter follower employs _______ negative feedback.
   A. 50%
   B. 25%
   C. 75%
   **D. 100%**
148. What application where one would most likely find a crystal oscillator?
   A. Radio transmitter
   B. AF generator
   C. Radio receiver
   D. Oscilloscope

149. What is the most important consideration in power amplifiers?
   A. Collector efficiency
   B. Biasing the circuit
   C. To keep the transformer cool
   D. Amplifier distortion

150. When the gain versus frequency curve of a transistor amplifier is not flat, __________ distortion is present.
   A. Amplitude
   B. Frequency
   C. Intermodulation
   D. Phase

151. In a Colpitt’s oscillator, feedback is obtained
   A. By magnetic induction
   B. By a tickler coil
   C. From the center of split capacitors
   D. From the center of split inductors

152. When the collector resistor in a common emitter amplifier is increased in value the voltage gain
   A. Increases
   B. Decreases
   C. Remain the same
   D. Becomes erratic

153. The output signal of CE amplifier is always
   A. Out of phase with the input signal
   B. Equal to the input signal
   C. In phase with the input signal
   D. Larger than the input signal

154. What is the purpose of capacitors in a transistor amplifier?
   A. To protect the transistor
   B. To cool the transistor
   C. To couple or bypass ac component
   D. To provide biasing
155. What is the phase difference between voltage across collector load and signal voltage in a common emitter amplifier?
   A. 0°
   B. 270°
   C. 180°
   D. 90°

156. When CE configuration is used for an oscillator, the voltage fed back must
   A. Be inverted by 180°
   B. Be taken from a capacitor
   C. Have a 0° phase shift
   D. Taken from an inductor

157. Class B operation has a maximum possible frequency of ______ percent.
   A. 100%
   B. 78.5%
   C. 75%
   D. 2.2%

158. What is the most stable sine-wave oscillator which uses piezo-electric quartz crystal?
   A. Crystal oscillator
   B. Wien-bridge oscillator
   C. DC restorer
   D. Hartley and Colpitts oscillator

159. To sustain oscillations, the power gain of the amplifier may be
   A. Between 0.1 and 0.5
   B. Any value form 0.5 upward
   C. Equal to or greater than 1
   D. Infinite

160. In a phase shift oscillator, 180° phase-shift is obtained
   A. A transformer
   B. LC tank circuit
   C. Three RC sections
   D. Three LC sections

161. Feedback circuit usually employs ______ network
   A. Resistive
   B. Inductive
   C. Capacitive
   D. Active
162. Emitter follower is used for
   A. Impedance matching
   B. Voltage gain
   C. Current gain
   D. Power gain

163. One of the items below is a characteristic of cascaded amplifiers?
   A. Doubles transconductance
   B. Total gain is lessen
   C. Increased overall gain
   D. Increased overall amplification ratio

164. Logic analyzer is used to
   A. Verify the logic operation of the gates in a circuit
   B. To display the fall time
   C. To sample and display systems signal
   D. To analyze the logic operation of the system

165. Quartz crystal is most commonly used in crystal oscillators because
   A. It is easily available
   B. It has superior electrical properties
   C. It is quite inexpensive
   D. It is very rugged

166. The operating frequency of a Wien-bridge oscillator is given by
   A. $1/(2\pi \sqrt{LC})$
   B. $1/(2\pi RC)$
   C. $1/(4\pi LC)$
   D. $1/2\pi RC$

167. Which operation gives the maximum distortion?
   A. Class A
   B. Class C
   C. Class B
   D. Class AB

168. Low efficiency of a power amplifier results in
   A. Low forward bias
   B. Less battery consumption
   C. More battery consumption
   D. Low power output
169. In an LC oscillator, the frequency of oscillations is given by
   A. \( \frac{1}{(2\pi\sqrt{LC})} \)
   B. \( 2\pi\sqrt{LC} \)
   C. \( \sqrt{LC}/2\pi \)
   D. \( 2\pi/\sqrt{LC} \)

170. Class A operation has a maximum possible efficiency of ______ percent.
   A. 100%
   B. 50%
   C. 75%
   D. 25%

171. Which of the following amplifier below is a choice when higher power gain is a requirement?
   A. Common base
   B. **Common emitter**
   C. Common collector
   D. Hybrid connection

172. The signal generator generally used in laboratories is ______ oscillator
   A. Crystal
   B. **Wien-bridge**
   C. Hartley
   D. Phase-shift

173. A buffer amplifier is used for
   A. Maximum loading and minimum mismatch
   B. **Minimum loading and minimum mismatch**
   C. Maximum loading and maximum mismatch
   D. Minimum loading and maximum mismatch

174. Parasitic oscillations are caused by
   A. Output negative feedback
   B. Push-pull operation
   C. Poor interstage coupling
   D. **Transistor interelectrode capacitance**

175. Which is a fixed-frequency oscillator
   A. Phase-shift oscillator
   B. Colpitt’s oscillator
   C. Hartley oscillator
   D. **Crystal oscillator**
176. The approximate operating frequency of a phase shift oscillator is given by
   A. \( \frac{1}{2\pi\sqrt{LC}} \)
   B. \( \frac{1}{2\pi\sqrt{RC}} \)
   C. \( \frac{1}{2\pi}RC \)
   D. \( \frac{1}{29RC} \)

177. The frequency of the ripple voltage at the output of a full-wave rectifier at 60 cycles.
   A. 120 cycles
   B. 60 cycles
   C. 240 cycles
   D. 480 cycles

178. Cascaded amplifiers total decibel gain is equal to
   A. The sum of the individual gains
   B. The product of the individual gains
   C. The difference of the individual gains
   D. The quotient of the individual gains

179. In an LC oscillator, if the value of L is increased four times, then the frequency of oscillation is
   A. Decreased 2 times
   B. Decreased 4 times
   C. Increased 2 times
   D. Increased 4 times

180. A class A power amplifier is otherwise known as
   A. Single ended amplifier
   B. Darlington amplifier
   C. Symmetrical amplifier
   D. Differential amplifier

181. The power input to a power amplifier is __________ quantity.
   A. ac
   B. Pulsating dc
   C. dc
   D. sinusoidal

182. When shock-excited, a crystal will produce alternating emf longer than an LC circuit because
   A. has greater mechanical strength
   B. has fewer losses
   C. is small-sized
   D. is very rigid
183. The stability of a regulated power supply is equivalent to
   A. change of output voltage over the change in supply voltage
   B. change in supply voltage over the change of output voltage
   C. product of the output voltage and supply voltage
   D. the difference of an output voltage to its supply voltage

184. What oscillator circuit uses a tapped coil in the tuned circuit?
   A. Hartley
   B. Colpitts
   C. Crystal
   D. Pierce

185. If you move towards an oscillating circuit, its frequency changes because of
   A. Hand capacitance
   B. Movement of the body
   C. Noise of foot
   D. Stray capacitance

186. Which of the following is not a FET amplifier configuration?
   A. Common base amplifier
   B. Common drain amplifier
   C. Common source amplifier
   D. Common gate amplifier

187. The number of transistor in a single stage amplifier is
   A. Two
   B. Three
   C. One
   D. Four

188. Series current negative feedback occurs when the feedback voltage is
   proportional to the output
   A. Voltage
   B. Impedance
   C. Current
   D. Power

189. Which of the following is NOT an oscillator requirement?
   A. Attenuator
   B. Amplifier
   C. Tank circuit
   D. Feedback
190. An amplifier with efficiency of 85% is likely to be
   A. Class A
   B. Class B
   C. Class AB
   D. Class C

191. What is the phase difference between the output and the input voltage of a CE amplifier?
   A. 180°
   B. 270°
   C. 0°
   D. 90°

192. Class C operation is preferred in oscillators because it
   A. Is more efficient
   B. Gives larger outputs
   C. Produces square waves
   D. Increases stability

193. What type of oscillator which is composed of one or more amplifying devices with some frequency determining networks introducing positive feedback at a particular frequency so that oscillation is sustained at that frequency?
   A. Sine wave oscillator
   B. Square-wave generator
   C. Relaxation oscillator
   D. Limiter

194. What is the desired input impedance of a transistor?
   A. Low
   B. Very low
   C. High
   D. Very high

195. What is the maximum collector efficiency of class B?
   A. 50%
   B. 90%
   C. 60.5%
   D. 78.5%

196. When a transistor is cut off
   A. Maximum current flows
   B. Maximum voltage appears across load
   C. Maximum voltage appears across transistor
   D. Minimum current flows
197. In an LC circuit, when the capacitor energy is maximum, the inductor energy is
A. Maximum
B. Minimum
C. Half-way between maximum and minimum
D. Zero

198. What is the approximate gain of an amplifier with negative feedback?
A. The feedback factor
B. The reciprocal of feedback factor plus one
C. The reciprocal of feedback factor
D. The feedback factor plus one

199. The operating point in a transistor amplifier moves along ________ when an ac
signal is applied
A. dc load line
B. ac load line
C. both dc and ac load lines
D. cut-off

200. An oscillator converts
A. ac power into dc power
B. de power into ac power
C. mechanical power into ac power
D. electrical power into mechanical power

201. What is the device in a transistor oscillator?
A. LC tank circuit
B. Biasing circuit
C. Transistor
D. Feedback circuit

202. When the collector supply is 5V, then collector cut off voltage under dc condition
is
A. 20V
B. 10V
C. 2.5V
D. 5V
203. The common base (CB) amplifier has a ______ compared to CE and CC amplifier.
   A. Lower input resistance
   B. Larger current gain
   C. Larger voltage gain
   D. Higher input resistance

204. When a FET with a lower transconductance is substituted into a FET amplifier circuit, what happens?
   A. The current gain does not change
   B. The voltage gain decreases
   C. The circuit disamplifies
   D. The input resistance decreases

205. At zero signal condition, a transistor sees ______ load.
   A. dc
   B. ac
   C. both dc and ac
   D. resistive

206. What is the gain of an amplifier with negative feedback if the feedback factor is 0.01?
   A. 10
   B. 1,000
   C. 100
   D. 500

207. The current gain of an emitter follower is
   A. Equal to 1
   B. Greater than 1
   C. Less than 1
   D. Zero

208. The current in any branch of a transistor amplifier that is operating is
   A. ac only
   B. the sum of ac and dc
   C. the difference of ac and dc
   D. dc only
209. An ideal differential amplifiers common mode rejection ratio is
   A. Infinite
   B. Zero
   C. Unity
   D. Undetermined

210. An open fuse circuit has a resistance equal to
   A. Zero
   B. Unity
   C. At least 100Ω at standard
   D. Infinity

211. What is the purpose of dc conditions in a transistor?
   A. To reverse bias the emitter
   B. To forward bias the emitter
   C. To set up operating point
   D. To turn on the transistor

212. The ac variations at the output side of power supply circuits are called ________.
   A. Ripples
   B. Pulses
   C. Waves
   D. Filters

213. What is the purpose of the emitter capacitor?
   A. To forward bias the emitter
   B. To reduce noise in the amplifier
   C. To avoid drop in gain
   D. To stabilize emitter voltage

214. A common emitter circuit is also called ________ circuit.
   A. Grounded emitter
   B. Grounded collector
   C. Grounded base
   D. Emitter follower
215. The output signal of a common-collector amplifier is always
   A. Larger than the input signal
   B. In phase with the input signal
   C. Out of phase with the input signal
   D. Exactly equal to the input signal

216. Calculate the ripples of the filter output if a dc and ac voltmeter is used and
measures the output signal from a filter circuit of 25 VDC and 1.5 Vrms
   A. 5%
   B. 10%
   C. 50%
   D. 6%

217. What is the ideal maximum voltage gain of a common collector amplifier?
   A. Unity
   B. Infinite
   C. Indeterminate
   D. Zero

218. The output power of a transistor amplifier is more than the input power due to
   additional power supplied by
   A. Transistor
   B. Collector supply
   C. Emitter supply
   D. Base supply

219. When a transistor amplifier feeds a load of low resistance, its voltage gain will be
   A. Low
   B. Very high
   C. High
   D. Moderate

220. The capacitors are considered _________ in the ac equivalent circuit of a
    transistor amplifier.
    A. Open
    B. Partially open
    C. Short
    D. Partially short
221. For highest power gain, what configuration is used?
   A. CC
   B. CB
   C. CE
   D. CS

222. What is the most important characteristic of a common collector amplifier?
   A. High input voltage
   B. High input resistance
   C. High output resistance
   D. Its being an amplifier circuit

223. Which of the item below does not describe a common emitter amplifier?
   A. High voltage gain
   B. High current gain
   C. Very high power gain
   D. High input resistance

224. CC configuration is used for impedance matching because its
   A. Input impedance is very high
   B. Input impedance is very low
   C. Output impedance is very low
   D. Output impedance is zero

225. Which of the following is the other name of the output stage in an amplifier?
   A. Load stage
   B. Audio stage
   C. Power stage
   D. RF stage

226. When amplifiers are cascaded
   A. The gain of each amplifier is increased
   B. A lower supply voltage is required
   C. The overall gain is increased
   D. Each amplifier has to work less
227. In a common emitter amplifier, the capacitor from emitter to ground is called the
   A. Coupling capacitor
   B. Bypass capacitor
   C. Decoupling capacitor
   D. Tuning capacitor

228. A class A power amplifier uses _______ transistor(s).
   A. Two
   B. One
   C. Three
   D. Four

229. What is the maximum collector efficiency of a resistance loaded class A power
   amplifier?
   A. 50%
   B. 78.5%
   C. 25%
   D. 30%

230. What is the maximum collector efficiency of a transformer coupled class A power
   amplifier?
   A. 30%
   B. 80%
   C. 45%
   D. 50%

231. Class C amplifiers are used as
   A. AF amplifiers
   B. Small signal amplifiers
   C. RF amplifiers
   D. IF amplifiers

232. Find the voltage drop developed across a D’ Arsonval meter movement having an
     internal resistance of 1 kΩ and a full deflection current of 150uA.
     A. 150μV
     B. 150mV
     C. 150V
     D. 200mV
233. If the capacitor from emitter to ground in a common emitter amplifier is removed, the voltage gain
   A. Increases
   **B. Decreases**
   C. Becomes erratic
   D. Remains the same

234. Comparatively, power amplifier has ______ β.
   A. Large
   B. Very large
   **C. Small**
   D. Very small

235. The driver stage usually employs ______ amplifier.
   A. **Class A power**
   B. Class C
   C. Push-pull
   D. Class AB

236. The push-pull circuit must use ______ operation.
   A. Class A
   **B. Class B**
   C. Class C
   D. Class AB

237. A complementary-symmetry amplifier has
   A. **One PNP and one NPN transistor**
   B. Two PNP transistors
   C. Two NPN transistors
   D. Two PNP and two NPN transistors

238. Power amplifiers generally use transformer coupling because transformer coupling provides
   A. Cooling of the circuit
   B. Distortionless output
   **C. Impedance matching**
   D. Good frequency response
239. The output transformer used in a power amplifier is a/an _______ transformer
   A. 1:1 ratio
   B. Step-down
   C. Step-up
   D. Isolation

240. Transformer coupling can be used in _____________ amplifiers
   A. Only power
   B. Only voltage
   C. Either power or voltage
   D. Neither power nor voltage

241. When negative current feedback is applied to an amplifier, its output impedance
   A. increases
   B. remains unchanged
   C. decreases
   D. becomes zero

242. The quiescent current of a FET amplifier is
   A. IDS
   B. id
   C. ID
   D. Id

243. The total decibel voltage gain of two cascaded voltage amplifier where individual voltage gains are 10 and 100 is
   A. 20
   B. 60
   C. 800
   D. 1000

244. The frequency response of the combined amplifier can be compared with
   A. An OR gate
   B. A negative feedback amplifier
   C. A positive filter
   D. An AND gate
245. Minimum interference with frequency response can be given by
   A. Direct coupling
   B. RC coupling
   C. Transformer coupling
   D. Instrumentation and control

246. The impedance of a load must match the impedance of the amplifier so that
   A. Minimum power is transferred to the load
   B. The efficiency can be maintained at low level
   C. The signal-to-noise ratio is maximized
   D. Maximum power is transferred to the load

247. The ratio output rms power in watts to the input dc power in watts in the different amplifier class is called _______.
   A. Gain
   B. Amplification factor
   C. Efficiency
   D. Phase power

248. Consider a zener diode with a slope resistance of 10 Ω in series with a 90 Ω resistor fed from a dc supply containing a ripple voltage of 20mV peak-to-peak. Compute for the ripple voltage in load
   A. 1 mV p-p
   B. 2 mV p-p
   C. 1 V p-p
   D. 6mV p-p

249. The _______ of a common collector configuration is unity
   A. Voltage gain
   B. Current gain
   C. Power gain
   D. Input impedance

250. Transmit time is the time taken by the electrons on holes to pass from
   A. Emitter to collector
   B. Collector to emitter
   C. Base to emitter
   D. Base to collector