1. For a PN junction diode, the current in reverse bias may be

(1) Few amperes

(2) Between 0·5 A and 1 A

(3) Few milli amperes

(4) Few micro or nano amperes

2. Avalanche breakdown in a semiconductor diode occurs when

(1) The potential barrier is reduced to zero

(2) Forward bias exceeds a certain value

(3) Reverse bias exceeds a certain value

(4) Forward current exceeds a certain value

3. A Zener diode

(1) Has a high forward voltage rating

(2) Has a sharp breakdown at low reverse voltage

(3) Can be used as an amplifier

(4) None of the above

4. A tunnel diode is used for

(1) Very low frequencies

(2) 50 Hz

(3) High frequencies

(4) Microwave frequencies

5. The current I_{CBO}

(1) Increases with increase in temperature

(2) Is normally greater for silicon transistor

(3) Mainly depends on the emitter base junction bias

(4) Depends largely on the emitter doping

6. The time taken for the output signal to rise from 10% to 90% of the input signal is called

(1) Transit time

(2) Rise time

(3) Tilt time

(4) Storage time

7. The decimal equivalent of the Hexadecimal number B6C7 is

(1) 49761

(2) 46791

(3) 25772

(4) 25777

8. At a PN junction, the potential barrier is due to the charges on either side of the junction, which consists of

(1) Fixed donor and acceptor ions

(2) Majority carriers only

(3) Minority carriers only

(4) Both majority and minority carriers

9. A certain transistor has α_{dc} of 0·98 and collector leakage current of 5 μA. If the I_E = 1 mA, the collector current will be

(1) 1·005 mA

(2) 0·985 mA

(3) 0·975 mA

(4) 0·995 mA

10. The steady state error of a stable type 0 unity feedback system for a unit step function is

(1) 0

(2) $\frac{1}{1+K_p}$

(3) ∞

(4) $\frac{1}{K_p}$

11. A network contains linear resistors and ideal voltage sources. If values of all the resistors are doubled, then the voltage across each resistor is

(1) Halved

(2) Doubled

(3) Increased by four times

(4) Not changed

12. In a multistage R – C coupled amplifier the coupling capacitor

(1) Limits the low frequency response

(2) Limits the high frequency response

(3) Does not affect the frequency response

(4) Blocks the DC component without affecting the DC response

13. Boolean expression for the output of XNOR logic gate with input A and B is

(1) AB′ + A′B

(2) (AB)′ + AB

(3) (A′ + B) (A + B′)

(4) (A′ + B′).(A + B)

14. The Laplace transform of a unit ramp function starting at t = a, is

(1) $\frac{1}{(s+a)^2}$

(2) $\frac{e^{-as}}{(s+a)^2}$

(3) $\frac{e^{-as}}{s^2}$

(4) $\frac{a}{s^2}$

15. The Fourier series of a odd periodic function, contains only

(1) Odd harmonics

(2) Even harmonics

(3) Cosine terms

(4) Sine terms

16. A Series LCR circuit consisting of R = 10 Ω, $|X_L|$ = 20 Ω, and $|X_c|$ = 20 Ω, is connected across an AC supply of 200 V rms. The rms voltage across the capacitor is

(1) 200 ∠ – 90° V

(2) 200 ∠ + 90° V

(3) 400 ∠ + 90° V

(4) 400 ∠ – 90° V

17. A ramp voltage, v(t) = 100 volts, is applied to an RC differentiating circuit with R = 5 kΩ and C = 4 μF. The maximum output voltage is

(1) 0·2 volts

(2) 2 volts

(3) 10 volts

(4) 50 volts

18. The final value theorem is used to find the

(1) Steady state value of the system output

(2) Initial value of the system output

(3) Transient behaviour of the system output

(4) None of the above

19. A Zener diode works on the principle

(1) Tunneling of charge carriers across the junction

(2) Thermionic emission

(3) Diffusion of charge carriers across the junction

(4) Hopping of charge carriers across the junction

20. A BJT is said to be operating in the saturation region if

(1) both the junctions are reverse biased

(2) base-emitter junction is reverse biased and base-collector junction is forward biased

(3) base-emitter junction is forward biased and base-collector junction is reverse biased

(4) both the junctions are forward biased

21. The minimum number of NAND gates required to implement the Boolean function A + AB′ + AB′ C is equal to

(1) Zero

(2) 1

(3) 4

(4) 7

22. The signal to quantization ratio in an n-bit PCM system

(1) depends upon the sampling frequency employed

(2) is independent of the value of n

(3) increases with increasing value of n

(4) decreases with increasing value of n

23. The intrinsic impedance of a lossy dielectric medium

(1) $j\omega\mu / \sigma$

(2) $j\omega\varepsilon / \sigma$

(3) $\sqrt{(j\omega\mu / (\sigma + j\omega\mu))}$

(4) $\sqrt{(\mu / \varepsilon)}$

24. The trigonometric Fourier series of an even function of time does not have the

(1) DC term

(2) Cosine terms

(3) Sine terms

(4) Odd harmonic terms

25. The trigonometric Fourier series of a periodic time function can have only

(1) Cosine terms

(2) Sine terms

(3) Cosine and Sine terms

(4) DC and Cosine terms

26. Two isotropic antennas are separated by a distance of two wavelengths. If both the antennas are fed with current of equal phase and magnitude, the number of lobes in the radiation pattern in the horizontal plane are

(1) 2

(2) 4

(3) 6

(4) 8

27. The input impedance of a short-circuited lossless transmission line quarter wave length is

(1) Purely reactive

(2) Purely resistive

(3) Infinite

(4) Dependent on the characteristic impedance of the line

28. The maximum power efficiency of an AM modulator is

(1) 25%

(2) 50%

(3) 75%

(4) 100%

29. In energy band diagram of n type semi conductor, the donor energy level is

(1) In valence band

(2) In conduction band

(3) Slightly above valence band

(4) Slightly below conduction band

30. The depletion layer in a reverse biased p-n junction is due to the presence of

(1) Electrons

(2) Holes

(3) Both electrons and holes

(4) Immobile ions

31. Which of these has highly doped p and n region ?
(1) PIN diode
(2) Tunnel Diode
(3) Schottky diode
(4) Photo diode

32. Which of these has semi conductor – metal junction ?
(1) PIN diode
(2) Photo diode
(3) Tunnel diode
(4) Schottky diode

33. Kirchhoff's law is applicable to
(1) AC circuits only
(2) DC circuits only
(3) AC as well as DC circuits
(4) Passive Networks only

34. For a two port network to be reciprocal
(1) $Z_{11} = Z_{22}$
(2) $y_{12} = y_{21}$
(3) $h_{21} = -H_{12}$
(4) $AD - BC = 0$

35. The network function $F(s) = \frac{(s+2)}{(s+1)(s+3)}$ represents
(1) RC Impedance
(2) RL Impedance
(3) RC Impedance and RL Admittance
(4) RC Admittance and RL Impedance

36. For the binary number 101101110 the equivalent octal number is
(1) 556
(2) 555
(3) 554
(4) 559

37. Indicate which one of the following types of noise does ***not*** occur in transistors ?
(1) Shot noise
(2) Partition Noise
(3) Resistance noise
(4) Flicker noise

38. A broadcast radio transmitter radiates 20 kW when the modulation percentage is 60. The carrier power will be
(1) 1·2 kW
(2) 1·45 kW
(3) 16·94 kW
(4) 20 kW

39. Indicate the ***false*** statement. In case of FM, with an increase of modulation index
(1) The total power remains unaffected
(2) The higher order side bands achieve significant amplitudes
(3) The total power increases
(4) The bandwidth requirements increase

40. In PCM system, if we increase the quantization levels from 2 to 8, the relative bandwidth requirements will
(1) be doubled
(2) remain same
(3) be tripled
(4) become eight times

41. The main disadvantage of differential PCM is
(1) Its incompatibility with TDM
(2) The complex circuitry it requires
(3) The larger bandwidths that are required for it
(4) The complications encountered in the encoding and decoding process

42. Which one of the following is also called 'rat-race' ?

(1) E-Plane Tee

(2) H-Plane Tee

(3) Magic Tee

(4) Hybrid Ring

43. Which one of the following circuits can be used as a high pass filter ?

(1) Differentiator

(2) Integrator

(3) Astable

(4) Bistable

44. The signal to noise ratio of DSB-SC is

(1) 3

(2) 2

(3) 1

(4) Zero

45. The following is ***not*** the drawback of TRF receiver

(1) Instability

(2) Poor selectivity

(3) Bandwidth variation

(4) Poor image signal rejection

46. Which of the following frequencies is likely to be associated with AM radio broadcast ?

(1) 1000 kHz

(2) 100 MHz

(3) 500 MHz

(4) 10 GHz

47. Which of the following circuits ***cannot*** be used to demodulate SSB ?

(1) BFO

(2) Product detector

(3) Phase discriminator

(4) Balanced demodulator

48. The noise figure of DSB-SC is 1 and for SSB-SC is

(1) 2

(2) 1

(3) $\frac{1}{2}$

(4) None of the above

49. Amplitude limiting is *not* explicitly needed in

(1) Slope detector

(2) Balanced slope detector

(3) Foster Seeley discriminator

(4) Ratio detector

50. A Varactor diode is used for

(1) Tuning

(2) Rectification

(3) Amplification

(4) Rectification and Amplification

51. The emission of light in LED is due to

(1) Emission of holes

(2) Emission of electrons

(3) Generation of electromagnetic radiations

(4) Conversion of heat energy into illumination

52. The inverse Fourier transform of the function $F(\omega) = \frac{2}{j\omega}$ is

(1) Sin ωt

(2) Cos ωt

(3) Sgn (t)

(4) U (t)

53. If f (t) and F (jω) form a transform pair, then as per symmetry in Fourier transforms

(1) $F(jt) \leftrightarrow 2\pi f(-\omega)$

(2) $F(jt) \leftrightarrow \pi f(-\omega)$

(3) $F(jt) \leftrightarrow \pi/2\, f(\omega)$

(4) $F(jt) \leftrightarrow \pi/2\, f(-\omega)$

54. In terms of ABCD parameters, the image parameter Z_{11} is equal to

(1) $\sqrt{\frac{AC}{BD}}$

(2) $\sqrt{\frac{BD}{AC}}$

(3) $\sqrt{\frac{AB}{CD}}$

(4) $\sqrt{\frac{AD}{BC}}$

55. Two phasors having rms values V_1 and V_2 are added to give a phasor having rms value V_3. V_3 is maximum if phase angle between V_1 and V_2 is

(1) 90°

(2) 180°

(3) 270°

(4) 360°

56. The values of reflection coefficient, and VSWR, for an open circuited line, respectively are

(1) 1 and 0

(2) 1 and 1

(3) 1 and Infinity

(4) 0 and 0

57. When signed numbers are used in binary arithmetic, which of the following has unique representation for zero ?

(1) Sign magnitude

(2) 1's Complement

(3) 2's Complement

(4) 9's Complement

58. The average power of Unit step is _____ Watt(s).

(1) One

(2) $\frac{1}{2}$

(3) Two

(4) Four

59. For a type 1 system and unit step input, the steady state error is

(1) 0

(2) 1

(3) $\frac{1}{1+K_p}$

(4) ∞

60. A lead compensator

(1) Speeds up the transient response

(2) Increases the stability margin

(3) Increases the stability margin and speeds up the transient response

(4) None of the above

61. A lead compensator is basically a
(1) High pass filter
(2) Low pass filter
(3) Band stop filter
(4) None of the above

62. Principle of superposition is applicable to
(1) linear systems only
(2) non-linear systems only
(3) both linear and non-linear systems
(4) linear systems and some non-linear systems

63. A wire has resistance R ohms. If another wire of the same material and same weight has double the diameter (as compared to the first wire), the resistance of the second wire will be
(1) 0·5 R
(2) 0·25 R
(3) 0·125 R
(4) $\frac{R}{16}$

64. In a purely inductive circuit the current _____ the voltage by _____.
(1) lags, 0°
(2) leads, 90°
(3) lags, 90°
(4) lags, 45°

65. A source is delivering maximum power to a resistance through a network. The ratio of power delivered to the source power
(1) is always 0·5
(2) may be 0·5 or less
(3) may be 0·5 or less or more
(4) may be 0·5 or more

66. An RLC series circuit has R = 8 Ω, X_L = 8 Ω and X_C = 8 Ω. Its impedance is
(1) 8 + j16 Ω
(2) 8 + j8 Ω
(3) 8 Ω
(4) 24 Ω

67. An RC series circuit has R = 20 Ω and X_C = 20 Ω, then Z is
(1) 40 Ω
(2) 28·28 Ω
(3) 20 Ω
(4) 1 Ω

68. An inductance having X_L = 5 Ω, and a capacitance having X_C = 5 Ω, are connected in parallel across 100 V, 50 Hz supply. The current drawn from source is
(1) Zero
(2) 20 A
(3) 40 A
(4) 28·28 A

69. A series RLC circuit has a resonant frequency of 1000 Hz. The maximum voltage across C is likely to occur at a frequency of about
(1) 1000 Hz
(2) 2000 Hz
(3) 1025 Hz
(4) 975 Hz

70. A series RLC circuit has R = 7·07 Ω, L = 0·707 H, and C = 7·07 μF. At half power frequencies the circuit impedance is likely to be
(1) 7·07 Ω
(2) 10 Ω
(3) 14·14 Ω
(4) 20 Ω

71. The internal impedance of a source is 3 + j7 Ω. For maximum power transfer, load impedance should be

(1) 3 + j7 Ω

(2) 3 – j7 Ω

(3) 7 + j3 Ω

(4) 7 – j3 Ω

72. The parameter A of a two port network is equal to

(1) $\frac{V_2}{V_1}$ with $I_1 = 0$

(2) $\frac{V_1}{I_2}$ with $V_2 = 0$

(3) $\frac{I_2}{I_1}$ with $V_2 = 0$

(4) $\frac{V_1}{V_2}$ with $I_2 = 0$

73. In terms of Z-parameters, the condition for the network to be passive is

(1) $Z_{11} = Z_{22}$

(2) $Z_{12} = Z_{21}$

(3) $Z_{12} = 0$

(4) $Z_{22} = 0$

74. The relation between electric flux density D and electric field intensity E is

(1) $D = \varepsilon E$

(2) $E = \varepsilon D$

(3) $\varepsilon = DE$

(4) $D = \varepsilon E^2$

75. Decimal 46 in excess-3 code =

(1) 1000 1001

(2) 0111 1001

(3) 0111 1111

(4) 1000 1111

76. Using 2's complement, the largest positive and negative numbers which can be stored with 8 bits are

(1) + 128 and – 127

(2) + 128 and – 128

(3) + 127 and – 128

(4) + 127 and – 127

77. The autocorrelation of a sampling function is a

(1) Triangular function

(2) Gate function

(3) Signum function

(4) None of the above

78. A generator of 50 Ω internal impedance and operating at 1 GHz feeds a 75 Ω load through a coaxial line of $Z_0 = 50$ Ω. The VSWR on the line is

(1) 0·2

(2) 1·5

(3) 2·4

(4) 1·75

79. In which of the following circuits is Op-Amp used in open loop configuration ?

(1) Comparator

(2) Summing Amplifier

(3) Integrating Amplifier

(4) Logarithmic Amplifier

80. Which of the following is correct for a BJT ?

(1) $\beta = \frac{\alpha}{1-\alpha}$

(2) $\alpha = \frac{\beta}{1-\beta}$

(3) $\beta = \frac{\alpha}{1+\alpha}$

(4) $\alpha = \frac{\beta}{1+\beta}$

81. For a BJT, $\alpha = 0{\cdot}98$, then $\beta =$

(1) 0·02

(2) 0·5

(3) 4·9

(4) 49

82. In JK flip-flop, toggle means

(1) set Q = 1 and Q′ = 0

(2) set Q = 0 and Q′ = 1

(3) change the output to the opposite state

(4) no change in output

83. In a R-S latch, race condition occurs when

(1) R is low and S is high

(2) R and S are high

(3) R and S are low

(4) R is high and S is low

84. In level clocking, the output can change

(1) on rising edge of clock cycle

(2) on falling edge of clock cycle

(3) during entire half cycle of the clock

(4) None of the above

85. Noise figure of a receiver is given by

(1) The ratio of input to output signal power.

(2) The ratio of input to output noise powers.

(3) The ratio of input to output, signal to noise ratio.

(4) The ratio of output to input, signal to noise ratio.

86. Which of the following can be accessed only sequentially ?

(1) Floppy disk

(2) Hard disk

(3) Magnetic tape

(4) ROM

87. Which of the following amplifiers has a voltage gain of less than 1 ?

(1) CE

(2) CC

(3) CB

(4) CE (or) CB

88. Which of the following amplifiers can be used for impedance matching ?

(1) CE

(2) CC

(3) CB

(4) Push Pull

89. Costas receiver is used for

(1) coherent detection of AM-SC signal

(2) asynchronous detection of AM-SC signal

(3) amplitude modulation of signal

(4) frequency modulation of signal

90. When modulation index of AM wave is increased from 0·5 to 1, the transmitted power

(1) remains the same

(2) increases by 25%

(3) increases by 33·3%

(4) increases by 50%

91. In a AM wave, the carrier and one of the side bands is suppressed. If m = 0·5, the percentage saving power is

(1) 50%

(2) 83·3%

(3) 94·4%

(4) 100%

92. The use of SSB

(1) halves the bandwidth required for transmission

(2) does not affect the bandwidth for transmission

(3) decreases the bandwidth required for transmission by 25%

(4) decreases the bandwidth required for transmission by 66·6%

93. An FM wave is made to pass through a frequency tripler. If original modulation index is m_f, the output of a tripler has a modulation index equal to

(1) m_f

(2) $\frac{1}{3} m_f$

(3) $3 m_f$

(4) $\frac{1}{9} m_f$

94. An FM signal with deviation δ is passed through mixer. Its frequency is reduced five fold. The deviation in output of mixer is

(1) $0{\cdot}2\,\delta$

(2) δ

(3) $5\,\delta$

(4) very very high

95. A paraboloid reflector has mouth diameter D meters, wavelength λ meters. Its beam width ϕ is equal to

(1) $\frac{70\,\lambda}{D}$

(2) $\frac{70\,D}{\lambda}$

(3) $\frac{\lambda}{70\,D}$

(4) $\frac{D}{70\,\lambda}$

96. In a superheterodyne receiver having no RF amplifier, the IF is 455 kHz, the image frequency at 1000 kHz is

(1) 1455 kHz

(2) 545 kHz

(3) 1910 kHz

(4) 90 kHz

97. In a radio receiver with a simple AGC

(1) the highest AGC voltage is produced between stations

(2) an increase in signal strength produces more AGC

(3) the audio stage gain is normally controlled by AGC

(4) the faster the time constant of AGC more accurate the output

98. A communication receiver is

(1) TRF receiver

(2) a superheterodyne receiver

(3) either (1) or (2)

(4) neither (1) nor (2)

99. To prevent overloading in the last IF amplifier one should use

(1) Variable sensitivity

(2) Squelch

(3) Double conversion

(4) Variable selectivity

100. Three point tracking is achieved with

(1) Double conversion

(2) Padder capacitor

(3) Double spotting

(4) Variable selectivity

101. A 100 + j100 Ω is to be matched to a line with Z_0 = 300 Ω to give SWR = 1. The reactance of stub is

(1) j 200 Ω

(2) – j 200 Ω

(3) j 100 Ω

(4) – j 100 Ω

102. A directional coupler is used

(1) to transmit microwave signals

(2) to transmit RF signals

(3) to measure amplitude and phase of a travelling wave

(4) Both (1) and (2)

103. A pin diode can be used

(1) as a shunt mounted switch

(2) as a series mounted switch

(3) both as series or shunt mounted switch

(4) None of the above

104. Following distortion occurs in Flat sampling.

(1) Aliasing effect distortion

(2) Cross over distortion

(3) Aperture effect distortion

(4) ISI

105. S Meter is used to measure

(1) Gain of IF amplifier

(2) Gain of RF amplifier

(3) Gain of Audio amplifier

(4) Received signal strength

106. Impedance inversion may be obtained with

(1) A short-circuited stub

(2) An open-circuited stub

(3) A quarter wave line

(4) A half wave line

107. Electric field lines and equipotential lines

(1) are always parallel

(2) are always orthogonal

(3) may be parallel or orthogonal

(4) may be inclined at any angle

108. If H is magnetic field intensity, I is curr and J is current density,

(1) $\nabla.H = J$

(2) $\nabla \times H = J$

(3) $\nabla \times H = I$

(4) None of the above

109. Which of the following antennas is b excited from a waveguide ?

(1) Helical

(2) Discone

(3) Turnstile

(4) Horn

110. Top loading is sometimes used with an antenna in order to increase its

(1) bandwidth

(2) beam width

(3) effective height

(4) input capacitance

111. A folded dipole normally has an impedance of

(1) 72 ohms

(2) 50 ohms

(3) 288 ohms

(4) 600 ohms

112. For which one of the following modes, the circular waveguide has the highest cutoff wavelength ?

(1) TE_{10}

(2) TM_{10}

(3) TE_{11}

(4) TM_{11}

113. Gunn effect

(1) is a junction effect

(2) occurs only in p-type materials

(3) is affected by magnetic fields

(4) occurs only in n-type materials

114. The hot-electron diode is the same as

(1) Gunn diode

(2) Schottky-Barrier diode

(3) PIN diode

(4) IMPATT diode

115. Insertion of a dielectric material between the plates of an air capacitor

(1) Increases the capacitance

(2) Decreases the capacitance

(3) Has no effect on capacitance

(4) Increases breakdown voltage

116. A lead compensator

(1) Speeds up the transient response

(2) Increases the stability margin

(3) Increases the stability margin and speeds up the transient response

(4) None of the above

117. If zeros at infinity are included in the count, the number of zeros of G(s) H(s) is

(1) equal to number of poles

(2) one more than the number of poles

(3) one less than the number of poles

(4) None of the above

118. Which mode is called dominant mode in rectangular waveguide ?

(1) TE_{01}

(2) TE_{11}

(3) TE_{10}

(4) TE_{20}

119. In a rectangular waveguide, cutoff wavelength for TE_{10} mode is 8 cm. Then cutoff wavelength for TE_{20} mode is

(1) 8 cm

(2) 6 cm

(3) 4 cm

(4) 2 cm

120. In a circular waveguide, the dominant mode is

(1) TE_{01}

(2) TE_{11}

(3) TE_{20}

(4) TE_{21}

121. A duplexer is used to

(1) couple two antennas to a transmitter without interference

(2) isolate the antenna from the local oscillator

(3) prevent interference between two antennas connected to receiver

(4) use an antenna for reception or transmission without interference

122. A reflex klystron oscillator uses

(1) one cavity resonator

(2) two cavity resonators

(3) three cavity resonators

(4) None of the above

123. An electromechanical closed loop control system has the following characteristic equation $s^3 + 6\,Ks^2\,(K + 2)\,s + 8 = 0$, where K is the forward gain of the system. The condition for closed loop stability is

(1) K = 0·528

(2) K = 2

(3) K = 0

(4) K = 2528

124. In a uniformly doped abrupt p-n junction, the doping level of the n-side is four 4 times the doping level of the p-side. The ratio of the depletion layer widths is

(1) 0·25

(2) 0·5

(3) 1·0

(4) 2·0

125. Two isotropic antennas are separated by a distance of two wavelengths. If both the antennas are fed with currents of equal phase and magnitude, the number of lobes in the radiation pattern in the horizontal plane are

(1) 2

(2) 4

(3) 6

(4) 8

126. The open-loop transfer function of a feedback control system is $G(s)\,H(s) = 1/(s + 1)^3$. The gain margin of the system is

(1) 2

(2) 4

(3) 8

(4) 16

127. A unity – feedback control system has the open-loop transfer function. $G(s) = 4\,(1 + 2s)\,/\,s^2\,(s + 2)$. If the input to the system is a unit ramp, the steady-state error will be

(1) 0

(2) 0·5

(3) 2

(4) Infinity

128. In a broad side array of 20 isotropic radiators, equally spaced at a distance of $\lambda/2$, the beam width between first nulls is

(1) 51·3 degrees

(2) 11·46 degrees

(3) 22·9 degrees

(4) 102·6 degrees

29. In a different amplifier, CMRR can be improved by using an increased

(1) Emitter resistance

(2) Collector resistance

(3) Power supply voltages

(4) Source resistance

30. The logical expression $y = A + AB$ is equivalent to

(1) $y = A$

(2) $y = AB$

(3) $y = A + B$

(4) $y = A / B$

31. MOSFET can be used as a

(1) current controlled capacitor

(2) voltage controlled capacitor

(3) current controlled inductor

(4) voltage controlled inductor

132. The ideal OP-AMP has the following characteristics :

(1) $R_i = \infty, A = \infty, R_o = 0$

(2) $R_i = 0, A = \infty, R_o = 0$

(3) $R_i = \infty, A = \infty, R_o = \infty$

(4) $R_i = 0, A = \infty, R_o = \infty$

133. Consider a system with the transfer function $G(s) = s + 6/ks^2 + s + 6$. Its damping ratio will be 0·5 when the value of k is

(1) 2/6

(2) 3

(3) 1/6

(4) 6

134. Which of the following points is ***not*** on the root locus of a system with the open loop transfer function $G(s) = k / (s)(s + 1)(s + 3)$?

(1) $s = -j\sqrt{3}$

(2) $s = -1{\cdot}5$

(3) $s = -3$

(4) $s = -\infty$

135. The margin of system with the open-loop transfer function

$G(s)\,H(s) = (1 - s) / (1 + s) \times (2 + s)$

is

(1) 0°

(2) 63·4°

(3) 90°

(4) ∞

136. If the differential voltage gain and the common mode voltage gain of a differential amplifier are 48 dB and 2 dB respectively, then its common mode rejection ratio is

(1) 23 dB

(2) 25 dB

(3) 46 dB

(4) 50 dB

137. The cascode amplifier is a multistage configuration of

(1) CC – CB

(2) CE – CB

(3) CB – CC

(4) CE – CC

138. The actual gain of a parabolic antenna of diameter D = 10 meters can be approximated by $G = 2\pi\,(d / \lambda)^2$. What is the effective aperture area of the antenna ?

(1) 100 m^2

(2) 75 m^2

(3) 50 m^2

(4) 25 m^2

139. The Poynting vector is associated with
(1) Flux in magnetic field
(2) Power flow in electro-static field
(3) Current in electro-static field
(4) Charge in electro-static field

140. The construction of synchro-transmitter is
(1) Similar to three phase transformer
(2) Similar to that of a three phase induction motor
(3) Similar to that of a three phase alternator
(4) None of the above

141. The root loci of a system has three asymptotes. The system can have
(1) Three poles
(2) Four poles and one zero
(3) Five poles and two zeros
(4) All of the above

142. In FM sound broadcasting system, the maximum frequency deviation is usually
(1) 15 kHz
(2) 75 kHz
(3) 200 kHz
(4) 5·2 MHz

143. 2's complement of binary number 0101 is
(1) 1011
(2) 1111
(3) 1101
(4) 1110

144. In a multi-cavity magnetron, strapping is employed primarily
(1) to prevent mode jumping
(2) to decrease the separation between the resonant frequencies in the π mode and in the adjacent modes
(3) to reduce the back heating of the cathode
(4) to increase the output of the magnetron

145. VSWR is defined as the ratio of
(1) V_{min} / V_{max}
(2) V_{max} / V_{min}
(3) $(V_{max} + V_{min}) / 2$
(4) $V_{max} \cdot V_{min}$

146. The PWM needs
(1) more power than PPM
(2) more samples per second than PPM
(3) more bandwidth than PPM
(4) None of the above

147. The PAM signal can be detected by
(1) band pass filter
(2) band stop filter
(3) high pass filter
(4) low pass filter

148. Quantization error occurs in
(1) PCM
(2) PPM
(3) DM
(4) None of the above

149. Companding is used in PCM to
(1) reduce bandwidth
(2) reduce power
(3) increase S/N ratio
(4) get almost uniform S/N ratio

150. Which of the following gives minim probability of error ?
(1) ASK
(2) FSK
(3) PSK
(4) DPSK