**IES-2013- Paper-II**

1.   The D.C. gain and steady state error for step input for $G(s) = \dfrac{s+1}{s^2+s+1}$ are :

   (A) 1 and 1   (B) 0 and 1   (C) 1 and 0   (D) 0 and 0

2.   A second order system is described by the equation $\dfrac{d^2x}{dt^2} + 5\dfrac{dx}{dt} + 7x = 7y$. The frequency and damping ratio respectively are

   (A) 1 rad / sec and 5   (B) 5 rad / sec and 7

   (C) 1 rad / sec and $\sqrt{7}$ (D) $\sqrt{7}$ rad / sec and 0.94

3.   Derivative feedback is employed in the control system shown in the figure, to improve its damping. If the required damping factor of the system is 0.5, the value of K_d must be adjusted to:
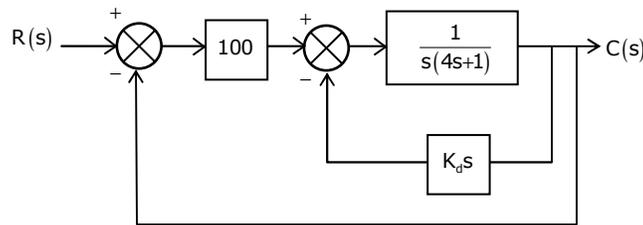
   (A) 4   (B) 19   (C) 0.25   (D) 6

4.   The transfer function, of a system is $G(s) = \dfrac{100}{s^2 + 10s + 100}$. The unit step response of the system will settle in approximately

   (A) 2 sec   (B) 1 sec   (C) 0.8 sec   (D) 1.5 sec

5.   A feedback system with characteristic equation $s^4 + 20Ks^3 + 5s^2 + 10s + 15 = 0$ is :

   (A) Stable for all values of K

   (B) Stable only for $K \geq 0$

   (C) Stable for $\infty > K \geq 70$

   (D) Unstable for all values of K

6.   The system having the characteristic equation $s^3 + 4s^2 + s - 6 + K = 0$ will be stable for

   (A) $K > 6$ (B) $0 < K < 6$ (C) $6 < K < 10$ (D) $0 < K < 10$

7. Consider the transfer function $K\,G(s)\,H(s) = \dfrac{K}{s^3 + 4s^2 + s - 6}$. The root-locus plot of the system passes through s=0. The value of K at this point will be:
   (A) 10 (B) 0 (C) 6 (D) 8

8. A system has its open-loop transfer function of $\dfrac{K}{s\left(s^2 + 6s + 10\right)}$. The break points are $s = -1.18$ and $s = -2.82$, the centroid is at $s = -2$, while the asymptotic angles are $\pm 60°$ and $\pm 180°$. The value of K for the closed loop system to be oscillatory and the frequency of oscillations are respectively :
   (A) 600 and 10 rad/sec
   (B) 120 and 5 rad/sec
   (C) 60 and 3.16 rad/sec
   (D) 30 and 3.16 rad/sec

9. The open-loop transfer function of a unity feedback control system is $G(s) = \dfrac{1}{(s+2)^2}$. The closed loop transfer function poles are located at:
   (A) $-2, -2$ (B) $-2, -1$ (C) $-2, +2$ (D) $-2, \pm jl$

10. In control systems, excessive bandwidth is NOT employed because:
    (A) Noise is proportional to bandwidth
    (B) It leads to low relative stability
    (C) It leads to slower response
    (D) Noise is proportional to the square of the bandwidth

11. Which has one of the following transfer functions the greatest overshoot ?
    (A) $\dfrac{9}{s^2 + 2s + 9}$ (B) $\dfrac{16}{s^2 + 2s + 16}$ (C) $\dfrac{25}{s^2 + 2s + 25}$ (D) $\dfrac{36}{s^2 + 2s + 36}$

12. The transfer function of a system is $\dfrac{10}{1+s}$. At a frequency of 0.1 rad/sec, the straight line bode plot will have a magnitude of:
    (A) 10 dB (B) 20 dB (C) 0 dB (D) 40 dB

13. If the overshoot of the unit-step response of a second order system is 30%, then the time at which peak overshoot occurs (assuming $\omega_n = 10\,\text{rad}/\sec$):
    (A) 0.36 sec (B) 0.363 sec (C) 0.336 sec (D) 0.633 sec

14. A second order system has $\dfrac{C(s)}{R(s)} = \dfrac{\omega_n^2}{s^2 + 2\xi\omega_n s + \omega_n^2}$. Its frequency response will have maximum value at the frequency:
    (A) $\omega_n \sqrt{1 - \xi^2}$ (B) $\omega_n \xi$ (C) $\omega_n \sqrt{1 - 2\xi^2}$ (D) zero

15. The critical value of gain for a system is 40. The system is operating at a gain of 20. The gain margin of the system is:

    (A) 2 dB   (B) 3 dB   (C) 6 dB   (D) 4 dB

16. In a feedback control system, phase margin (PM) is:

    1. Directly proportional to ξ

    2. Inversely proportional to ξ

    3. Independent of ξ

    4   Zero when $\xi = 0$

    Which of the above statements are correct?

    (A) 1 and 2   (B) 2 and 3   (C) 3 and 4   (D) 1 and 4

17. The gain margin in dB's of a unity feedback control system whose open-loop transfer function, $G(s)\,H(s) = \dfrac{1}{s(s+1)}$ is:

    (A) 0   (B) 1   (C) -1   (D) ∞

18. By adding zero to the system transfer function, the improvement to transient response is called as:

    (A) Phase lead compensation

    (B) Phase lag compensation

    (C) Phase lag and phase lead compensation

    (D) Phase lead and phase lag compensation

19. The network having transfer function $G(s) = \dfrac{1+\dfrac{s}{4}}{1+\dfrac{s}{25}}$ will provide maximum phase lead at a frequency of:

    (A) 4 rad/sec   (B) 25 rad/sec   (C) 10 rad/sec   (D) 100 rad/sec

Directions:-

Each of next twenty items consists of two statements, one labeled as the statement(I) and other as Statement (II). You are to examine these two statements carefully and select the answers to these items using the codes given below

Codes

(A) Both Statement (I) and Statement (II) are individually true and Statement (II) is the correct explanation of Statement (I)

(B) Both Statement (I) and Statement (II) are individually true but Statement (II) is NOT the correct explanation of Statement (I)

(C) Statement (I) is true but Statement (II) is false

(D) Statement (I) is false but Statement (II) is true

20. Statement (I):   An ideal OP AMP when used to make an inverting amplifier has both input terminals at the same potential.

Statement (II):   CMRR of the OP AMP is low.

21. Statement (I):   A monostable multi-vibrator, when switched on remains in a quasi stable state.

Statement (II):   Quasi stable state duration is decided by charging time of capacitor.

22. Statement (I):   Emitter-Coupled Logic (ECL) family is designed for high speed.

Statement (II):   In this logic family, transistor does not operate fully in saturation or cut-off zones.

23. Statement (I):   Switching speed of ECL logic family is very high.

Statement (II):   The transistor used in the family remains unsaturated.

24. Statement (I):   In a bipolar junction transistor increase in the collector voltage increases the base width.

Statement (II):   Increase in the collector voltage increases the space-charge-width at the output junction diode.

25. Statement (I):   A flip-flop is a bistable multivibrator.

Statement (II):   A flip-flop remains in one stable state indefinitely until it is directed by an input signal to switch over to the other stable state.

26. Statement (I):   Associative memory is fast memory.

Statement (II):   Associative memory searches by content and not by accessing of address.

27. Statement (I):   PIN photodiodes are preferred to PN photo-diodes.

Statement (II):   PIN photodiode is a constant voltage generator at a given light level.

28. Statement (I):   A derivative controller produces a control action for constant error only.

Statement (II):   The PD controller increases the damping ratio and reduces the peak overshoot.

29. Statement (I):   Nyquist plot is the locus of $GH(j\omega)$ indicating the magnitude and phase angle on the $GH(j\omega)$ plane.

Statement (II):   Given the values of $\left|GH(j\omega)\right|$ and $\angle GH(j\omega)$ using the Nichols chart M_m, ω_m and bandwidth can be determined.

30.   Statement (I):   Feedback compensation is preferred to series compensation

      Statement (II):   No amplification is required as the energy flows from higher level to lower level.

31.   Statement (I):   A PI controller increases the order of a system by units but reduces the steady state error.

      Statement (II):   A PI controller introduces a pole at either the origin or at a desired point on negative real axis.

32.   Statement (I):   Many of the linear control system transfer functions do not have poles or zeros in the right-half of s-plane.

      Statement (II):   These are called minimum-phase transfer functions.

33.   Statement (I):   Baud Rate and symbols per second are often used interchangeably.

      Statement (II):   Baud Rate refers to the rate of change of a signal on the transmission medium after encoding and modulation have occurred.

34.   Statement (I):   Most TDM systems use PCM to transmit analog signals.

      Statement (II):   PCM uses A/D conversion technique to translate analog signals into binary form for serial transmission.

35.   Statement (I):   Single mode step indexed fibers are widely used for wide band communications.

      Statement (II):   With only path of light along the axis, minimum refraction and no pulse spreading permits high pulse repetition rates.

36.   Statement (I):   In a conventional transmission line impedance matching can be accomplished by stub matching of adjustable lengths.

      Statement (II):   In practice impedance matching in wave-guides is obtained by tuning screws inserted into the waveguide.

37.   Statement (I):   Slot antenna is essentially a wave-guide with a slot length of one half lengths with a radiation pattern similar to that of a dipole with plane reflection.

      Statement (II):   Slot antenna has a gain much higher than that of a horn antenna.

38.   Statement (I):   The data path contains all the circuits to process data within the CPU with the help of which data is suitably transformed.

      Statement (II):   It is the responsibility of the control path to generate control and timing signals as required by the opcode.

39.   Statement (I):   External fragmentation is NOT possible in paging.

      Statement (II):   Pages of any program are fixed sized and can be located anywhere in memory.

40. An event has two possible outcomes with probability $P_1 = \dfrac{1}{2}$, and $P_2 = \dfrac{1}{64}$. The rate of information with 16 outcomes per second is:

    (A) $\dfrac{38}{4}$ bits / sec   (B) $\dfrac{38}{64}$ bits / sec   (C) $\dfrac{38}{2}$ bits / sec   (D) $\dfrac{38}{32}$ bits / sec

41. A radio channel has a bandwidth of 10 kHz and an S/N ratio of 15 dB. The maximum data rate that can be transmitted is:

    (A) 16.1 kb/sec   (B) 24.2 kb/sec   (C) 32.3 kb/sec   (D) 50.3 kb/sec

42. Conveniently information I(x) is expressed as

    (A) $(-) \log_{10} p(x)$ Hartleys

    (B) $\log_{10} p(x)$ Hartleys

    (C) $\log_2 p(x)$ Hartleys

    (D) $2\log_{10} \dfrac{1}{p(x)}$ Hartleys

43. A source produces 4 symbols with probabilities $\dfrac{1}{2}, \dfrac{1}{4}, \dfrac{1}{8}$ and $\dfrac{1}{8}$. For this source, a practical coding scheme has an average code word length of 2 bits/symbol. The efficiency of the code is

    (A) 1   (B) $\dfrac{7}{8}$ (C) $\dfrac{1}{2}$ (D) $\dfrac{1}{4}$

44. An analog signal is band limited to 4 kHz. It is sampled at a the Nyquist rate and samples are quantized into 4 levels. The quantization levels have probabilities $\dfrac{1}{8}, \dfrac{1}{8}, \dfrac{3}{8}$ and $\dfrac{3}{8}$. The information rate of the source is

    (A) 15400 bps   (B) 4000 bps   (C) 14400 bps   (D) 16000 bps

45. What is the ratio of modulating power to the total power at 100% AM modulation?

    (A) 1:3   (B) 1:2   (C) 2:3   (D) 1:4

46. A bandwidth of 10 kHz is required for AM system. If the lowest frequency component in the modulated signal is 555 kHz, carrier frequency in kHz is:

    (A) 525   (B) 550   (C) 560   (D) 565

47. Determine the bandwidth occupied by a sinusoidal frequency modulated carrier for which the modulation index is 2.4

    (A) 4.8 f_m (B) 6.8 f_m (C) 2.4 f_m (D) 3.8 f_m

48. An AM signal with a carrier of 1 kW has 200 W in each side band. The percentage of modulation is

    (A) 20%   (B) 89.4%   (C) 49.7%   (D) 40%

49. An audio signal, $15\sin(2\pi 1500t)$ amplitude modulates $60\sin(2\pi 10^3 t)$. The modulation index will be:

    (A) 20%   (B) 50%   (C) 25%   (D) 100%

50. In a PCM system, the amplitude levels are transmitted as 7 bit code-words. The sampling is done at 10 kHz. The bandwidth of the system is:

    (A) 10 kHz   (B) 20 kHz   (C) 35 kHz   (D) 70 kHz

51. What multiplexing method do the CODECs use to transmit two PCM signals in opposite directions over the same transmission line ?

    (A) TDM

    (B) FDM

    (C) Amplitude-separation Multiplexing

    (D) Code Division Multiplexing

52. A radio cab company with its antenna at a height of 15 m communicates with a cab having its antenna 1.5 m. The maximum communication distance without obstacles is roughly:

    (A) 10 km   (B) 20 km   (C) 28 km   (D) 36 km

53. Assuming that packet transmissions and retransmission can both the described as a Poisson process, calculate the probability that a data packet transmission in an S-ALOHA system will experience a collision with another user. Assume the total traffic rate $\lambda_t = 10$ packets/sec and the packet duration $\tau = 10$ msec.

    (A) 0.9   (B) 0.09   (C) 0.009   (D) 9.0

54. In a satellite communication, the uplink power level is generally high and power level of the received down link signal is low because

    1.   High signal attenuation due to free-space loss

    2.   Limited available down link power

    3.   Finite satellite down link antenna gain, which is dictated by the required coverage are.

    (A) 1 and 2 only   (B) 1 and 3 only   (C) 2 and 3 only   (D) 1, 2 and 3

55. A CE amplifier has a resistor R_F connected between collector and base $R_F = 40k\Omega$, $R_c = 4 K\Omega$. Given $h_{fe} = 50$, $r_\pi = 1K\Omega$, the output resistance is:

    (A) 40 KΩ (B) 20 KΩ (C) 4 KΩ (D) 0.66 KΩ

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56.   If $I_{CEO} = 410\mu A$, $I_{CBO} = 5\mu A$ and $I_B = 30\mu A$, then the collector current is

   (A) $415\mu A$ (B) $440\mu A$ (C) $445\mu A$ (D) $2.84\mu A$

57.   With the increase of reverse bias in a p-n diode, the reverse current
   (A) Decreases
   (B) Increases
   (C) Remains constant
   (D) May increase or decrease depending upon doping

58.   The transistor as shown in the circuit is operating in:
   (A) Cut-off region

   (B) Saturation region

   (C) Active region

   (D) Either in active or saturation region
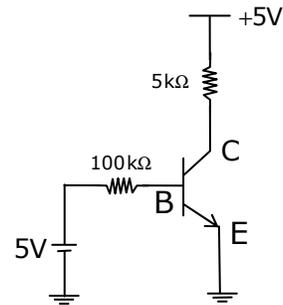
59.   A monostable multivibrator is frequently used:
   (A) In memory and timing circuits
   (B) For regeneration of distorted waves
   (C) In counting circuits
   (D) For producing triangular waves

60.   When two identical stages with upper cutoff frequency ω_H are cascaded, overall cutoff frequency is at:

   (A) $1\,\omega_H$ (B) $2\,\omega_H$ (C) $0.5\omega_H$ (D) $0.64\,\omega_H$

61.   Low frequency response of RC coupled amplifier can be improved by:
   (A) Increasing the value of the coupling capacitor only
   (B) Increasing the value of the bypass capacitor and coupling capacitor
   (C) Increasing the value of the bypass capacitor only
   (D) Decreasing the value of the coupling capacitor

62.   In order to increase the bandwidth of tuned amplifiers, one can use
   1.   Tuned circuit with inductance having high Q factor
   2.   Double tuned amplifier with two tuned circuits coupled by mutual inductance
   3.   Staggered tuned amplifiers in which different tuned circuits which are cascaded are tuned to slightly different frequencies

   (A) 1, 2 and 3   (B) 1 and 2 only   (C) 2 and 3 only   (D) 1 and 3 only

63. The amplifier A shown in the figure has open loop gain of 100, input impedance Z_i of $1K\Omega$ and output impedance Z_o of 100Ω. If a negative feedback factor $\beta = 0.99$ is used, the new values of Z_i and Z_o are respectively

(A) $10\ \Omega$. and $1\ \Omega$

(B) $10\ \Omega$. and $10\,k\Omega$

(C) $100\ K\Omega$. and $1\ \Omega$

(D) $100\ k\Omega$. and $10\,\Omega$
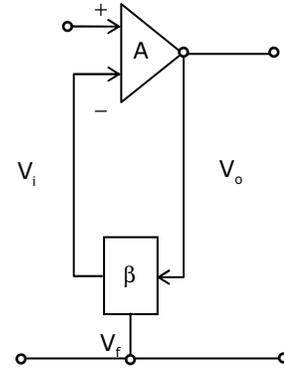
64. A 5 mV, 1 KHz sinusoidal signal is applied to the input of an OP-AMP integrator for which of $R = 100\,k\Omega$ and $C = 1\mu F$. The output voltage is

(A) $\dfrac{1}{40\,\pi}\cos(2000\pi t - 1)$ (B) $\cos(2000\pi t - 1)$

(C) $-\dfrac{1}{40\,\pi}\cos(2000\pi t - 1)$ (D) $-\cos(2000\pi t - 1)$

65. A series RLC circuit has $\omega_0 = 10^5$, $Q = 50$, $R = 400\,\Omega$. The value of C is

(A) 250 pF   (B) 1000 pF   (C) 500 pF   (D) 1.25 pF

66. The voltage gain of an amplifier is 100. A negative feedback is applied with $\beta = 0.03$. The overall gain of the amplifier is

(A) 70   (B) 25   (C) 99.97   (D) 3

67. The open loop transfer function of an amplifier with resistive negative feedback has two poles in the left half s-plane. Then the amplifier

(A) Will always be unstable at high frequencies

(B) Will be stable at all frequencies

(C) May become unstable depending upon feedback factor

(D) Will oscillate at low frequencies

68. The ripple factor in case of a full-wave rectifier is

(A) 1.21   (B) 0.50   (C) 0.48   (D) 1.0

69. Consider the following statements:

1. A differential amplifier is used at the input stage of an operational amplifier

2. Differential amplifiers have very high CMRR

Which of these statements are correct?

(A) Both 1 and 2   (B) Neither 1 nor 2   (C) 1 only   (D) 2 only

70. The maximum efficiency of a half-wave rectifier is

    (A) 33.33%   (B) 40.60%   (C) 50.00%   (D) 68.00%

71. If a differential amplifier has a gain of 20,000 and CMRR = 80 dB, its common mode gain is

    (A) 2   (B) 1   (C) $\dfrac{1}{2}$ (D) 0

72. One of the reasons why vacuum tubes eventually fail at microwave frequencies is that their

    (A) Transmit time becomes too short

    (B) Noise figure increases

    (C) Shunt capacitive reactance becomes too large

    (D) Series inductive reactance becomes too small

73. The seek time of a disk is 30 msec. It rotates at the rate of 30 rotations per second. Each track has a capacity of 300 words. The access time is

    (A) 47 msec   (B) 50 msec   (C) 60 msec   (D) 62 msec

74. A parametric amplifier is to be cooled

    (A) To improve noise performance

    (B) To increase bandwidth

    (C) To make it suitable to pulses

    (D) As it cannot be used at room temperature

75. A wave guide section in microwave circuits will act as a

    (A) Low-pass filter   (B) Band-pass filter

    (C) Band-stop filter   (D) High-pass filter

76. The waveguide modes are usually excited from a signal source through:

    (A) An antenna   (B) An aperture

    (C) A Coaxial cable   (D) Free-space coupling

77. The minimum cut-off frequencies for a rectangular waveguide are obtained when:

    (A) $a > b$, $m = 0$ and $n = 1$ (B) $a > b$, $m = 1$ and $n = 0$

    (C) $a < b$, $m = 0$ and $n = 1$ (D) $a < b$, $m = 1$ and $n = 0$

78. For any lossless, reciprocal three port network, one port can be terminated in a reactance so that the other two ports are

    (A) Shorted   (B) Decoupled   (C) Matched   (D) Opened

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79. A micro-strip line consists of a single ground plane and a thin strip conductor on a
(A) Conducting plane   (B) Semi conductor slab
(C) Low-loss dielectric substrate   (D) High-loss dielectric substrate

80. Parabolic reflectors use Cassegrain feed to
(A) Increase the gain of the system
(B) Increase the beam width of the system
(C) Reduce the size of the main reflector
(D) Allow the feed to be placed at a convenient point

81. A Ruby Maser is preferred to Ammonia Maser for microwave amplification because it has:
(A)   Much greater bandwidth
(B) Lower noise figure
(C) Better frequency stability
(D) No need for a circulator

82. Laser is based on the principle of
(A Stimulated emission   (B) Spontaneous emission
(C) Radiation   (D) Polarization

83. Magnetron is a
(A) High power microwave amplifier
(B) Low power microwave amplifier
(C) Low power microwave oscillator
(D) High power microwave oscillator

84. Optical fibers are preferred as communication links for Lasers because they
(A) Prevent interference by other Lasers
(B) Ensure that the beam does not spread
(C) Prevent atmospheric interference
(D) Ensure amplification of the signal

85. Microwave links are used for TV transmission because
(A) They have small S/N ratio
(B) They produce less phase distortion
(C) They are relatively cheaper
(D) They are free from impulse noise

86. The switching speed of ECL is very high, because the transistors
    A) Are switched between cut-off and saturation region
    (B) Are switched between active and saturation region
    (C) Are switched between active and cut-off region
    (D) May operate in any of the three regions

87. The rise time of a transistor switch is the time for the current to rise from
    A) Zero value to peak value
    (B) 10% of peak value to peak value
    (C) 10% of peak value to 90% peak value
    (D) 10% of peak value to 80% peak value

88. The frequency of oscillation of a stable multivibrator with component values $R_1 = 2k\Omega$, $R_2 = 20k\Omega$, $C_1 = 0.01\mu F$ and $C_2 = 0.05\ \mu F$ is
    (A) 1428.5 Hz   (B) 142.85 Hz   (C) 14.285 Hz   (D) 1.4285 Hz

89. Which of the following regions of operation are mainly responsible for heating of the transistor under switching operation?
    1. Saturation operation
    2   Cut-off region
    3. Transition from saturation to cut-off
    4. Transition from cut-off to saturation
    (A) 1, 2 and 4   (B) 1, 3and 4   (C) 2 and 3 only   (D) 1 and 3 only

90. The BCD code for a decimal number is
    (A) $(100001110100)_{BCD}$ (B) $(010001111000)_{BCD}$
    (C) $(100001000111)_{BCD}$ (D) $(011110000100)_{BCD}$

91. Logic function $(\overline{A} + B)(A + B)$ can be reduced to
    (A) B   (B) $\overline{B}$ (C) A   (D) $\overline{A}$

92. Logic function $A\overline{B}D + A\overline{B}\overline{D}$ can be reduced to
    (A) $\overline{A}\overline{B}$ (B) $A\overline{B}$ (C) $\overline{B}\overline{D}$ (D) $A\overline{D}$

93. The minimum number of NAND gates required to implement $A + \overline{\overline{A}B} + A\overline{B}C$ is
    (A) 0   (B) 1   (C) 4   (D) 7

94. The logic function $f(A,B,C,D) = (\bar{A} + BC)(B + CD)$ can be expressed to:

   (A) $\bar{A}B + BC + \bar{A}CD + BCD$

   (B) $AB + A\bar{B} + A\bar{C}D + BCD$

   (C) $AB + \overline{\overline{AB}} + \bar{A}CD + B\bar{C}D$

   (D) $A\bar{B} + \bar{A}B + \bar{A}CD + BCD$

95. The logic function (A+B) can be expressed in terms of min terms as:

   (A) $A\bar{B} + B\bar{A}$ (B) $\bar{A}B + \bar{B}A + \bar{A}B$ (C) $A\bar{B} + \bar{A}B$ (D) $AB + \bar{B}A$

96. A 3-variable truth table has a high output for the inputs: 010, 011 and 110. The Boolean expression for sum of products (SOP) can be written as

   (A) $\bar{A}\,B + B\bar{C}$ (B) $A\bar{B} + \bar{B}C$ (C) $\overline{AB} + BC$ (D) $AB + \overline{BC}$

97. Which of the following are the characteristics of a Junction Field Effect Transistor?
   1. High input resistance
   2. Good thermal stability
   3. High current gain
   4. More noisy than bipolar junction transistor

   (A) 1and 3   (B) 1 and 2   (C) 2 and 3   (D) 3 and 4

98. The minterms for AB +ACD are:

   (A) $\overline{\overline{AB}}CD + AB\bar{C}D + A\bar{B}C\bar{D} + A\bar{B}CD + \bar{A}BCD$

   (B) $AB\bar{\bar{C}}\bar{D} + AB\bar{C}D + ABC\bar{D} + ABCD + A\bar{B}CD$

   (C) $A\bar{B}CD + AB\bar{C}D + ABC\bar{D} + \bar{A}BCD + A\bar{B}C\bar{D}$

   (D) $AB\bar{C}D + A\bar{B}CD + \bar{A}BCD + ABC\bar{D} + \bar{A}BCD$

99. A binary full-subtractor
   (A) Consists of two cascaded half-subtractors
   (B) Contains two half-substractors and one OR gate
   (C) Can subtract any binary number
   (D) Can be made out of a full-adder

100. A digital multiplexer can be used for
   1. Parallel to serial conversion
   2. Many-to-one switch
   3. Generating memory chip select
   4. Code conversion

   (A) 1, 2 and 3   (B) 2 and 3 only   (C) 1 and 2 only   (D) 1 and 3 only

101. Which one of the following statements is correct?
    (A) PROM contains a programmable AND array and a fixed OR array
    (B) PLA contains a fixed AND array and a programmable OR array
    (C) PROM contains a fixed AND array and programmable OR array
    (D) PLA contains a programmable AND array and a programmable OR array

102. The output Q_n of a J-K flip-flop is zero. It changes to 1 when a clock pulse is applied. The input J_n and K_n are respectively (X represents don't care condition)
    (A) 1 and X   (B) 0 and X   (C) X and 0   (D) X and 1

103. In a sequential circuit, the output at any instant of time depends
    (A) Only on the inputs presents at that instant of time
    (B) On past outputs as well as present inputs
    (C) Only on the past inputs
    (D) Only on the present outputs

104. Dual slope integration type Analog-to-Digital converters provide:
    (A) Higher speeds compared to all other types of A/D converters
    (B) Very good accuracy without putting extreme requirements on component stability
    (C) Poor rejection of power supply
    (D) Better resolution compared to all other types of A/D converters for the same number of bits.

105. The decimal equivalent of binary number 10110.11 is
    (A) 16.75   (B) 20.75   (C) 16.50   (D) 22.75

106. Hexadecimal conversion of decimal number 227 will be
    (A) A3   (B) E3   (C) CC   (D) C3

107. A seven-bit Hamming code is received as 1111101. What is the correct code?
    (A) 1101111   (B) 1011111   (C) 1111111   (D) 1111011

108. An analog signal has a bit rate of 8000 bps and a baud rate of 1000 baud. The data elements carried by each signal and signal elements needed are respectively.
    (A) 8 and 256   (B) 4 and 16   (C) 2 and 4   (D) 7 and 128

109. A computer system has a 4 K word cache organized in block-set associative manner with 4 blocks per set, 64 words per block. The numbers of bits in the SET and WORD fields of the main memory address formula are respectively.
    (A) 15 and 4   (B) 6 and 4   (C) 7 and 2   (D) 4 and 6

110. The program counter (PC) in a micro-processor
    (A) Counts the number of programs being executed by the micro processor
    (B) Counts the number of instructions being executed by the microprocessor
    (C) Counts the number of interrupts handled by the microprocessor
    (D) Keeps the address of the next instruction to be fetched

111. An interrupt in which an external device supplies its address and the interrupt request, is called
    (A) Poll interrupt   (B) Maskable interrupt
    (C) Non-maskable interrupt   (D) vectored interrupt

112. Aliasing in the context of programming language refers to multiple variables having the same
    (A) Memory location   (B) Value
    (C) Identifier   (D) None of these

113. In a microprocessor, the register which holds the address of the next instruction to be fetched is
    (A) Accumulator   (B) Program counter
    (C) Stack pointer   (D) Instructor register

114. With reference to 8085 microprocessor, which of the following statements are correct?
    1. The DAD instruction adds the contents of the specified register pair to the contents of the DE register pair.
    2. The program counter is an instruction pointer
    3. Whenever an instruction uses the HL pointer, the addressing is called indirect addressing
    4. HL register pair is also called data pointer.
    (A) 1 and 2 only   (B) 1, 2 and 3   (C) 2, 3 and 4   (D) 2 and 4 only

115. On the 8085, which of the following machine cycles are not used in the CALL instruction?
    1. Instruction fetch
    2. I/O
    3. Memory Read
    4. Memory Write
    (A) 2 only   (B) 1 and 4 only   (C) 2, 3 and 4   (D) 1,2,3 and 4

116. The stack pointer will be affected by instructions:
    1. PUSH PSW   2. CALL ADDR   3. XTHL   4. RST n
    (A) 1,2,3 and 4   (B) 1 and 3 only   (C) 1,2 and 4 only   (D) 2,3 and 4 only

117. TRAP is an interrupt in 8085. Which one of the following statements is true about the TRAP?

 (A) It is level triggered

 (B) It is negative edge triggered

 (C) It is positive edge triggered

 (D) It is both positive and negative edge triggered

118. Which one of the following instruction uses implied addressing mode?

 (A) CMA   (B) JMP   (C) ADC   (D) SBB

119. An array multiplier is used to find the product of a 3 bit number with a 4 bit number. How many 4 bits adders are required to perform multiplication?

 (A) 1   (B) 2   (C) 3   (D) 4

120. During direct memory access (DMA), the INTR and INTA (interrupt and interrupt acknowledge) lines

 (A) Are never used

 (B) Are used by the DMA controller to acquire the data and address bus from the microprocessor

 (C) Are used by the IO device to invoke an error routine if a problem occurs during DMA transfer

 (D) Are used by the DMA controller to signal the microprocessor about the end of the current data transfer