ELECTRONICS & TELECOMMUNICATION ENGINEERING

PAPER-II

1. If the mantissa in the floating point representation of a number is 37 bits long, then what is the accuracy of the digital computer?
   a. 37 decimal places
   b. 23 decimal places
   c. 11 decimal places
   d. 10 decimal places

2. Which one of the following is correct?
   The convention is that the number 0 has the normal form representation as
   a. 0
   b. .0
   c. 0.0
   d. 0.10°

3. Match List I with List II and select the correct. Answer using the code given below the lists:
   List-I
   (Pascal Operator)
   A. : =
   B. < >
   C. =
   List-II
   (C Operator)
   1. ! =
   2. = =
   3. =
   Code:

	A	B	C
a.	1	2	3
b.	3	1	2
c.	2	1	3
d.	2	3	1

4. For interfacing of assembly language routines with some high level language, one must address which of the following?
   1. How is the subroutine invoked?
   2. How are parameters passed?
   3. How are values returned?
   4. How many parameters are passed?
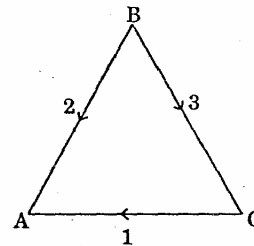   Select the correct answer using the code given below:
   a. 1, and 3 only
   b. 2 and 4 only
   c. 1, 2 and 3 only
   d. 1, 2, 3 and 4

5.

   Consider the directed graph shown above:
   What is its incidence matrix?

   a. $\begin{bmatrix} -1 & -1 & 0 \\ 0 & -1 & 1 \\ -1 & 0 & -1 \end{bmatrix}$

   b. $\begin{bmatrix} 1 & 0 & -1 \\ 1 & 1 & 0 \\ 0 & -1 & 1 \end{bmatrix}$

   c. $\begin{bmatrix} -1 & -1 & 0 \\ 0 & 1 & 1 \\ 1 & 0 & -1 \end{bmatrix}$

   d. $\begin{bmatrix} 1 & 0 & 1 \\ -1 & -1 & 0 \\ 0 & -1 & 1 \end{bmatrix}$

6. The parallel computers are divided into which of the following architectural configuration?
   1. Array processors
   2. Data processors
   3. Multi processor systems
   4. Pipeline computers
   Select the correct answer using the code given below:
   a. 1, 2 and 3 only
   b. 2, 3 and 4 only
   c. 1, 3 and 4 only
   d. 1, 2 and 4 only

7. In order to build a 3 bit simultaneous A/D converter, what is the number of comparator circuits required?
   a. 7
   b. 8
   c. 15
   d. 16

8. Which one of the following is correct? A Micro program is
   a. Any source program run on micro computers
   b. Any set of instructions for primitive operations in a system
   c. A general name for 'macros' used in assembly language programming
   d. Any program of a very small size

9. Which are the characteristics of vertical micro instructions?
   1. Considerable encoding of control information
   2. Limited ability to express parallel micro operation
   3. Long format
   Select the correct answer using the code given below:
   a. 1 and 2 only
   b. 2 and 3 only
   c. 1 and 3 only
   d. 1, 2 and 3

10. A magnetic drum of 8 inch diameter has 100 tracks and storage density of 200 bits/inch. What is its storage capacity?
    a. 8402 bits
    b. 202400 bits
    c. 502400 bits
    d. 1004800 bits

11. Match List-I and select the correct answer using the code given below the lists:
    List – I
    (Type of Memory)
    A. DRAM
    B. SRAM
    C. Hard Disk
    D. Magnetic Tape
    List- II
    (Relative Access Time)
    1. 1
    2. 10
    3. 100000
    4. 10000000
    Code:

	A	B	C	D
a.	1	2	3	4
b.	1	2	4	3
c.	2	1	3	4
d.	2	1	4	3

12. Consider the following statements:
    Bias stabilization in a BJT circuit is very important, because it
    1. Provides high voltage and current gain.
    2. Ensures large bandwidth of the amplifier.
    3. Keep the operating point unchanged with change of temperature.
    Which of the above statements is/are correct?
    a. 1 and 2
    b. 2 and 3
    c. 3 only
    d. 1 and 3

13. Source S_1 produces 4 discrete symbols with equal probability.
    Source S_2 produces 6 discrete symbols with equal probability.
    If H_1 and H_2 are the entropies of sources S_1 and S_2 respectively, than which one of the following is correct?
    a. H_1 is always less than H_2
    b. H_1 is always greater than H_2
    c. H_1 is always equal to H_2
    d. H_2 is 1-5 times H_1 only

14. The entropy of a digital source is 2.7 bits/symbol. It is producing 100 symbols per second. The source is likely to be which one of the following?
    a. A binary source
    b. A quaternary source
    c. An octal source
    d. A hexadecimal source

15. Match List-I and List-II and select the correct answer using the code given below the lists:
    List-I
    (Type of Noise)
    A. Shot noise
    B. Thermal noise
    C. White noise
    D. Narrow band noise
    List-II
    (Its Property)
    1. Noise generated in a resistor

2. Power spectral density is independent of frequency
3. Temperature limited diode
4. Noise at the output of a filter

Code:

	A	B	C	D
a.	2	4	3	1
b.	3	1	2	4
c.	2	1	3	4
d.	3	4	2	1

16. Which one of the following is the correct statement?

If the value of a resistor creating thermal noise is doubled, the noise generated is
a. Halved
b. Doubled
c. Unchanged
d. Slightly changed

17. The outputs of tow noise sources each producing uniformly distributed noise over the range -a to + a are added. What is the p.d.f of the added noise?
a. Uniformly distributed over the range -2a to +2a
b. Triangular over the range-2a to 2a
c. Gaussian over the range - ∞ to ∞
d. None of the above

18. Which of the following pulse modulations are digital?
1. PCM
2. Differential PCM
3. PWM

Select the correct answer using the code given below:
a. 1 and 2 only
b. 2 and 3 only
c. 1 and 3 only
d. 1,2 and 3

19. Which one of the following is an indirect way of generating FM?
a. Reactance FET Modulator
b. Varacter diode Modulator
c. Armstrong Modulator
d. Reactance tube Modulator

20. A good line code should have which of the following?
1. Favorable psd
2. Low inter symbol interference
3. Adequate timing content
4. Transparency

Select the correct answer using the code given below:
a. 1, 3 and 4
b. 1, 2 and 4
c. 2, 3 and 4
d. 1, 2 and 3

21. Multiplexing is possible if signals are sampled. Two signals have bandwidths A = 0 to 4 kHz and B = 0 to 8 kHz respectively. The sampling frequency chosen is 12 kHz.

Which one of the following is correct?
This choice of the sampling frequency
a. is correct since A and B have an integral relationship of 2
b. will not lead to aliasing
c. does not obey sampling theorem
d. can never lead to multiplexing

22. Which one of the following is correct?
In a TDM system each signal is allotted in a frame a unique and fixed
a. frequency slot
b. time slot
c. amplitude slot
d. phase slot

23. Match List-I with List-II and select the correct answer using the code given below the lists:

List-I
(Medium Type)
A. Open wire
B. Twisted pair
C. Coaxial-cable
D. Waveguide

List-II
(Frequency Range)
1. 100 kHz
2. 100 kHz
3. 100 GHz
4. 5.0 kHz

Code:

	A	B	C	D
a.	4	3	2	1
b.	2	1	4	3
c.	2	3	4	1
d.	4	1	2	3

24. Match List-I with List-II and select the correct answer using the code given below the lists:

List-I
(Section)

A. IF amplifier
B. Mixer
C. Detector
D. Automatic gain control

List-II
(Function)
1. Demodulator
2. Narrow band tuned amplifier
3. Variable gain amplifier
4. Frequency conversion

Code:

	A	B	C	D
a.	1	4	2	3
b.	2	3	1	4
c.	1	3	2	4
d.	2	4	1	3

25. The Boolean functions can be expressed in canonical SOP (sum of products) and POS (product of sums) form. For the function, $Y = A + \bar{B} \cdot C$, which are such two forms?
   a. $Y = \Sigma (1, 2, 6, 7)$ and $Y = \Pi (0, 2, 4)$
   b. $Y = \Sigma (1, 4, 5, 6, 7)$ and $Y = \Pi (0, 2, 3)$
   c. $Y = \Sigma (1, 2, 5, 6, 7)$ and $Y = \Pi (0, 1, 3)$
   d. $Y = \Sigma (1, 2, 4, 5, 6, 7)$ and $Y = \Pi (0, 2, 3, 4)$

26. The Boolean function A+BC is a reduced form of which one of the following?
   a. $AB + BC$
   b. $\bar{A}B + AB C$
   c. $(A + B) . (A + C)$
   d. None of the above

27. Which one of the following statements is not correct?
   a. $X + \bar{X} Y = X$
   b. $X(\bar{X} + Y) = XY$
   c. $XY + X\bar{Y} = X$
   d. $ZX + Z \bar{X} Y = ZX + ZY$

28. Consider the following statements:
   Dominant-pole frequency compensation in an OP-AMP
   1. increases the slew-rate of the OP-AMP.
   2. increases the stability of the OP-AMP.
   3. reduces the bandwidth of the OP-AMP
   4. reduces the CMRR of the OP-AMP.
   Which of the statements given above are correct?
   a. 1 and 3 only
   b. 1, 2 and 4

   c. 1 and 2 only
   d. 2 and 3 only

29. In a practical oscillator circuit, which one of the following limits the amplitude of the oscillations?
   a. Onset of non-linearity
   b. Power supply voltage
   c. Oscillation frequencies
   d. Temperature of the active device

30. Consider the following statements:
   1. Are wide band amplifiers.
   2. Are used in radio transmitters and receivers.
   3. Performance is determined by Q of the circuit.
   Which of the statements given above are correct?
   a. 1 and 2 only
   b. 2 and 3 only
   c. 1 and 3 only
   d. 1, 2 and 3

31. A feedback amplifier has an open loop gain of -100. If 4% of the output is fed back in a degenerative loop, what is the closed loop gain of the amplifier?
   a. -33.3
   b. -25
   c. -20
   d. $+25$

32. Match List-I with List-II and select the correct answer using the code given below the lists:

   List-I
   (Type of Feedback)
   A. Voltage series
   B. Voltage shunt
   C. Current series
   D. Current shunt

   List-II
   (Effect on R_{in} and R_{out})
   1. R_{in} increases and R_{out} decreases
   2. R_{in} and R_{out} decrease
   3. R_{in} and R_{out} increase
   4. R_{in} decreases and R_{out} increases

   Code:

	A	B	C	D
a.	1	4	3	2
b.	3	2	1	4
c.	3	4	1	2
d.	1	2	3	4

33. An amplifier has gain A $=100 \angle 180°$, upper cut off frequency of 100 kHz and lower cut off frequency of 1 kHz. A negative feed back of $\beta = 0.1$ is added. Which one of the following is not correct?
   a. Gain becomes 100/11
   b. Lower cut off frequency becomes (1000/11)Hz
   c. Upper cut off frequency becomes 1.1 MHz
   d. dB of feed back is $20\log_{10} 11$

34. What is the collector circuit efficiency of a class B push-pull amplifier if
   V_m = peak load voltage, and
   $V \propto$ = collector supply voltage?

   a. $\eta = \dfrac{\pi}{4} \dfrac{V_m}{V_{cc}} \times 100\%$

   b. $\eta = \dfrac{\pi}{2} \dfrac{V_m}{cc} \times 100\%$

   c. $\eta = \dfrac{\pi}{2} \dfrac{V_{cc}}{V_m} \times 100\%$

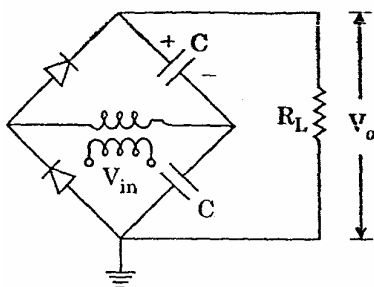   d. $\eta = \dfrac{\pi}{4} \dfrac{V_{cc} - V_m}{V_m} \times 100\%$

35. Which of the following components are chosen to construct a d.c power supply to supply to supply 6 V d.c. voltage form 230 V a.c to operate a tape recorder?
   1. Step down transformer
   2. Diodes
   3. Resistors and capacitors
   4. Three-pin voltage stabilizer
   Select the correct answer using the code given below:
   a. 1, 2 and 3 only
   b. 1 and 4 only
   c. 3 and 4 only
   d. 1, 2, 3 and 4

36.

The figure shown above is a circuit of which one of the following?
   a. Bridge rectifier
   b. Voltage doublers
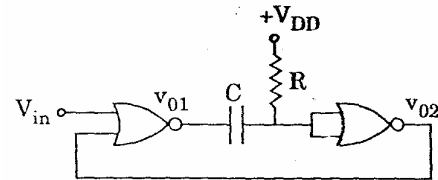   c. Rectifier with filter
   d. Comparator

37. Which of the following components control the high frequency response of the R-C coupled amplifier?
   1. Parasitic capacitances of the transistor
   2. Coupling capacitance
   3. Stray capacitances
   4. Wiring capacitance
   Select the correct answer using the code given below:
   a. 1 and 2 only
   b. 2 and 3 only
   c. 3 and 4 only
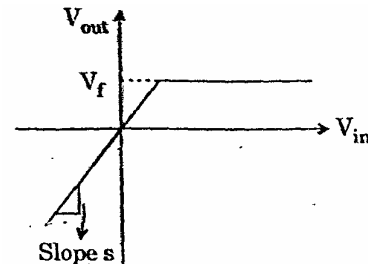   d. 1,3 and 4

38.

The figure given above shows the circuit of which one of the following?
   a. Bi- stable multi-vibrator
   b. Schmitt trigger
   c. Mono-stable multi-vibrator
   d. As table multi vibrator

39.

The figure given above shows the transfer characteristics of which one of the following?
   a. Peak clipper
   b. Bottom clipper
   c. Clamper
   d. Two level clipper

40. Match List-I with List-II and select the correct answer using the code given below the lists:
   List-I
   (Name of the circuit)
   A. Pre-amplifier
   B. Power amplifier
   C. Rectifier circuit
   D. Purely resistive circuit

List-II
(Property of the circuit)
1. Non-liner circuit
2. Lumped, linear passive, bilateral, finite circuit
3. Large signal amplifier
4. Small signal amplifier
Code:

	A	B	C	D
a.	4	2	1	3
b.	1	3	4	2
c.	4	3	1	2
d.	1	2	4	3

41. A discrete source produces 8 symbols and is memory-less. Its entropy is
    a. 1 bit/symbol only
    b. 2 bits/symbol only
    c. 3 bits/symbol only
    d. ≤ 3 bits/symbol

42. As practical signals are time limited, they have infinite frequency bandwidth. Sampling aliasing, an anti-aliasing filer is used
    a. before the signal is reconstructed
    b. after the signal is reconstructed
    c. before the signal is sampled
    d. after the signal is sampled

43. In optical communication, wavelength 1550 nm is used nowadays. What is/are the possible reason(s)?
    1. Dispersion is very low
    2. WDM and optical amplification are feasible
    Select the correct answer using the code given below:
    a. 1, 2 and 3
    b. 2 only
    c. 1 only
    d. 1 and 3 only

44. Communication satellites are allotted bandwidth of 500 MHz. This can be increased by using
    a. frequency and polarization re-use
    b. time division multiplexing
    c. frequency division multiplexing
    d. triple modular redundancy

45. In reflex klystrons, the adjustment of volume of the anode cavity will result in change of
    a. output power
    b. output pulse-width
    c. output frequency of operation
    d. out signal to noise ratio

46. The main purpose of inserting a microwave isolator in a microwave circuit is for
    a. offering minimum forward impedance
    b. offering maximum power out put from the source
    c. maintaining frequency stability of the source
    d. maintaining amplitude stability of output power

47. The underlying principle of working of a cavity wave meter, used to measure frequency of microwaves in a system, is
    a. Selective absorption of microwave energy in solids
    b. Selective scattering of microwave energy by a cavity
    c. Resonance of microwaves around a cavity resonance of a cavity with incoming microwave energy

48. A ruby maser is considered to be superior to an Ammonia Maser because of
    a. higher power output
    b. low signal to noise ratio
    c. greater band width
    d. low amplification factor and low noise levels

49. $(24)_8$ is expressed in gray code as which one of the following?
    a. 11000
    b. 10100
    c. 11110
    d. 11111

50. The number of possible ordered trees with 3 nodes A, B, C is
    a. 6
    b. 8
    c. 10
    d. 12

51. If 8085 adds 87 H 79 H, then
    a. both CARRY and ZERO flags will be set to 0
    b. CARRY flag will set to 0, Zero flag to 1
    c. CARRY flag will be set to 1, ZERO flag to 0
    d. Both CARRY and ZERO flags will be set to 1

52. 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
    Select the correct answer using the code given below:
    a. 2 only
    b. 1 and 4
    c. 2, 3 and 4
    d. None of the above

53. In 8085, if the clock frequency is 5 MHz, the time required to execute an instruction of 18 T states is
    a. 3.0 μs
    b. 3.6 μs
    c. 4.0 μs
    d. 6.0 μs

54. Which one of the following interrupts is both level and edge sensitive?
    a. RDT 7.5
    b. RST 5.5
    c. TRAP
    d. INTR

55. A group personal computers are configured to work together for speeding up the execution of a single program in
    a. simulated evaluation
    b. cluster computing
    c. network computing
    d. client server computing

Directions: Each of the following seven (7) items consists of two statements, one labeled as the 'Assertion (A) and the other as 'Reason (R)'. you area to examine these two statements carefully and select the answers to these items using the codes given below:

Codes :
(a) Both A and R are individually true and R is the correct explanation of A
(b) Both A and R are individually true but R is not the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true

56. Assertion (A): A high value of resistor is connected across the diode in a clamper circuit for better performance.
    Reason (R): If this resistor is not present, the circuit will respond to sudden decrease in the magnitude of the input pulse train, but the response to sudden increase in the amplitude will cause improper response.

57. Assertion (A): Complementary transistors are used for class B push-pull power amplifiers.
    Reason (R): we don't need transformers if we use complementary transistors in class B push-pull power amplifiers.

58. Assertion (A): D-Flip-flops are used as buffer register.
    Reason (R): D-Flip-flops are free from "race-around" condition.

59. Assertion (A): The system having characteristic equation $4s^2 + 6s + 1 = 0$ gives rise to under-damped oscillation for a step input.
    Reason (R): The un-damped natural frequency of oscillation of the system is $\omega_n = 0.5$ rad/s.

60. Assertion (A): Entropy of a binary source is maximum if the probabilities of occurrence of both the events are equal.
    Reason (R): The average amount of information per source symbol is called entropy for a memory less source.

61. Assertion (A): Isolation transformers should always be used when servicing TV receivers without power transformers.
    Reason (R): TV receivers which use semiconductor rectifiers dc not always use a power transformer.

62. Assertion (A): Pulse broadening is a phenomenon associated with multimode fibers.
    Reason (R): Multimode fivers have core diameter much larger compared with single mode fibers.

63. In a class A amplifier, $V_{CE(max)} = 15$ V and $V_{CE(min)} = 1$ V. The conversion efficiency for a series fed load will be equal to
    a. 25%
    b. 23.3%
    c. 12.%
    d. 11.7%

64. Neutralizing capacitors are normally used in
    a. Audio amplifiers
    b. Video amplifiers
    c. RF and IF amplifiers
    d. Operational amplifiers

65. Silicon diodes are less suited for low voltage rectifier operation because
    a. it cannot withstand high temperatures
    b. its reverse saturation current is low
    c. its cut-in voltage is high
    d. its breakdown voltage is high

66. CE configuration is the most preferred transistor configuration when used as a switch, because
    a. it requires only one power supply
    b. it requires low voltage or current for operating the switch
    c. it is easily understood by every one
    d. it has small I_{CEO}

67. The figure of merit of a logic family is given by
    a. gain bandwidth product
    b. (propagation dalay time) x (power dissipation)
    c. (fan-out) x (propagation delay time)
    d. (noise margin) x (power dissipation)

68. The I^2L (Integrated Injection Logic) has higher density of integration than TTL, because it
    a. does not require transistors with high current gain and hence they have smaller geometry
    b. uses compact bipolar transistors
    c. does not require isolation diffusion
    d. uses dynamic logic instead of static logic

69. 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 a programmable OR array
    d. PTA contains a programmable AND array and a fixed OR array

70. How many bits will a D/A converter use so that its full-scale output voltage is 5 V mid is resolution is at the most 10 mV?
    a. 5
    b. 7
    c. 9
    d. 11

71. The impulse response of a linear time invariant system is given as
    $$g(t) = e^{-t}, t > 0.$$
    The transfer function of the system is equal to:
    a. $1/s$
    b. $1/[s(s+1)1$
    c. $1/(s+1)$
    d. $s/(s+1)$

72. In case of d.c. servo-motor the back-emf is equivalent to an "electric friction" which tends to
    a. improve stability of the motor
    b. slowly decrease stability of the motor
    c. very rapidly decrease stability of the motor
    d. have no effect on stability

73. A system with gain margin close to unity or a phase margin close to zero is
    a. relatively stable
    b. oscillatory
    c. stable
    d. highly stable

74. The open-loop transfer function of a unity feedback control system is given by
    $$G(s) = Ke^{-Ts}$$
    where K and T are variables and are greater than zero. The stability of the closed-loop system depends on
    a. K only
    b. Both K and T
    c. T only
    d. Neither K nor T

75. The input to a controller is
    a. sensed signal
    b. error signal
    c. desired variable value
    d. signal of fixed amplitude not dependent on desired variable value

76. The open loop transfer function of a unity feedback control system is
    $$G(s) = \frac{K}{s(s+1)(s+5)}$$
    What is the value of K for its stable operation?
    a. $0 < K < 5$ only
    b. $0 < K < 6$ only

c. $0 < K < 30$

d. $1 < K < 5$ only

77. Consider the unity feedback system with

$$G(s) = \frac{K}{(s^2 + 2s + 2)(s + 2)}$$

The system is marginally stable. What is the radian frequency of oscillation?

a. $\sqrt{2}$

b. $\sqrt{3}$

c. $\sqrt{5}$

d. $\sqrt{6}$

78. The characteristic equation of a control system is given by

$s^5 + s^4 + 2s^3 + 2s^2 + 4s + 6 = 0$

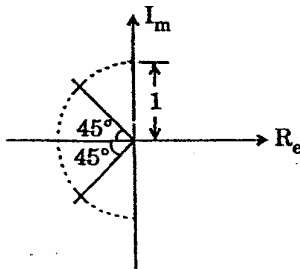What is the number of roots of the equation which lie in the right half of s-plane ?

a. Zero

b. 1

c. 2

d. 3

79.

A diaphragm type pressure sensor has two poles as shown in the figure above. The zeros are at infinity. What is its steady state deformation for a unit step input pressure?

a. 0.25

b. 0.5

c. 0.707

d. 1

80. A second order control system has a transfer function $\dfrac{16}{s^2 + 4s + 16}$

What is the time for the first overshoot ?

a. $\dfrac{2\pi}{\sqrt{3}} s$

b. $\dfrac{\pi}{\sqrt{3}} s$

c. $\dfrac{\pi}{2\sqrt{3}} s$

d. $\dfrac{\pi}{4\sqrt{3}} s$

81.
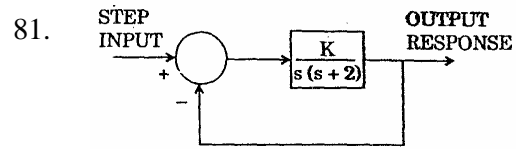
A closed loop system is shown in the above figure.

What is the ratio of output frequencies $\dfrac{\omega\left(for\ K = 32\right)}{\omega\left(for\ K = 16\right)}$?

a. 1.40

b. 1.42

c. 1.44

d. 1.46

82. Match List I with List II and select the correct answer using the code given below the lists:

List I

(Shape of Nyqaist Plot)

A. The plot does not intersect negative real axis

B. The plot intersects negative real axis between 0 and (-1, j 0)

C. The plot passes through the point (-1, j 0)

D. The plot encloses the point (-1, j 0)
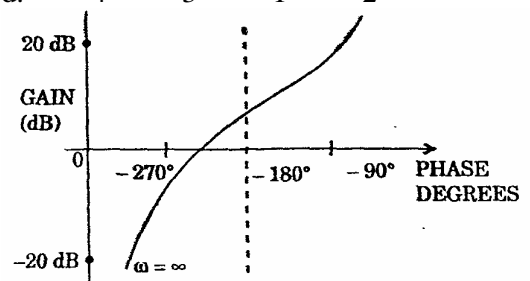
List II

(Gain Margin)

1. < 0 dB

2. 0 dB

3. > 0 dB

4. ∞ dB

Code:

	A	B	C	D
a.	3	4	1	2
b.	4	3	2	1
c.	3	4	2	1
d.	4	3	1	2

83.

The gain-phase plot of a linear control system is shown in the above figure.

What are the gain-margin (GM) and the phase-margin (PM) of the system?

a. GM > 0 dB and PM > 0 degree
b. GM > 0 dB and PM < 0 degree
c. GM < 0 dB and PM > 0 degree
d. GM < 0 dB and PM < 0 degree

84. What is the gain margin of a system when the magnitude of the polar plot at phase cross over is 'a'?

a. $1/a$
b. $-a$
c. Zero
d. a

85. What is the value of the damping ratio of a second order system when the value of the resonant peak is unity?

a. $\sqrt{2}$
b. Unity
c. $1/\sqrt{2}$
d. Zero

86. The closed loop transfer function of a control system is
$$\frac{K}{s(s+1)(s+5)+K}.$$

What is the frequency of the sustained oscillations for marginally stable condition?

a. $\sqrt{5}$ rad/s
b. $\sqrt{6}$ rad/s
c. 5 rad/s
d. 6 rad/s

87. The closed loop transfer function of a control system has the following poles and zeros

Poles	Zeros
$p_1 = -0.5$	$z_1 = -6$
$P_2 = 1.0$	$z_2 = -8$
$p_3 = -5$	
$p_4 = -10$	

The closed loop response can he closely approximated by considering which of the following ?

a. p_1 and p_2
b. p_3 and p_4
c. p_3 and z_1
d. p_4 and z_2

88. Consider the following statements for pneumatic and hydraulic control systems

1. The normal operating pressure of pneumatic control is very much higher than that of hydraulic control.
2. In pneumatic control, external leakage is permissible to a certain extent, but there should be no leakage in a hydraulic control.

Which of the statements given above is/are correct ?

a. 1 only
b. 2 only
c. Both 1 and 2
d. Neither 1 nor 2

89. Which one of the following is correct? In satellite communication links, generally

a. the uplink carrier frequencies are greater than downlink carrier frequencies
b. the uplink carrier frequencies are lesser than downlink carrier frequencies
c. both uplink and downlink carrier frequencies are same
d. it is not necessary to use carrier at all

90. Why are semiconductor lasers important for communication engineering?

1. They possess large bandwidth
2. They operate at low voltage
3. They are suitable for coupling to fibers at wavelengths, where the attenuation is very small
4. Their integration with other components is easy

Select the correct answer using the code given below:

a. 1 on1y
b. 1 and 2 only
c. 2 and 3 on1y
d. 1, 2, 3 and 4

91. TEM wave cannot propagate in which one of the following ?

a. Two wire transmission line
b. Coaxial cable
c. Rectangular wave guide
d. Micro-strip line

92. Duct propagation of microwave occurs due to which one of the following?

a. Variation of refractive index with wavelength
b. Variation of refractive index with length

c. Variation of refractive index with height

d. None of the above

93. In microwave communication links, what causes intense fading in the 18 GHz band?
   a. Snow
   b. Rain
   c. Fog
   d. Dust

94. Tropospheric scatter communication is used for which frequency band?
   a. HF
   b. VHF
   c. UHF
   d. VLF

95. During power measurement the out power measured was -90 dBm. What is the measured power in W?
   a. 1 mW
   b. 1 pW
   c. 10 W
   d. 1W

96. In measuring pulsed microwave power, the pulse duration is 15 µs with PRF of 1 kHz. If the CW power sensor reads 15 mW, what is the average signal power during the pulse?
   a. 5 W
   b. 10 W
   c. 15 W
   d. 20 W

97. For obtaining a beam of electromagnetic waves with circular polarization, what is the ideal antenna?
   a. A double conical reflector
   b. A helical antenna
   c. A pyramidal horn antenna
   d. A hog-horn antenna

98. A microwave antenna-characteristics are described as, low weight, low power-handling capacity and low bandwidth. What shall this be?
   a. Helical antenna
   b. Sectoral horn antenna
   c. Micro-strip patch antenna
   d. Microwave dipole antenna

99. What is a waveguide device which is designed with steps in either the magnetic or electric plane known as?
   a. Conductance converter
   b. Impedance transformer
   c. Impedance canceller
   d. Reactance follower

100. Which principle of operation of cavity wave-meters is used in microwave networks?
   a. Phase shift
   b. Resonance
   c. Polarization shift
   d. Gyration

101. In a waveguide network, there is a component which consists of an E-plane Tee combined with an H-plane Tee. What is this component generally known as?
   a. Directional Tee
   b. Phased array Tee
   c. Coupler Tee
   d. Magic Tee

102. Phase focusing, which leads to bunching of electrons takes place in which one of the following?
   a. Double resonator Klystron
   b. Reflex Klystron
   c. TWT
   d. Magnetron

103. In a magnetron oscillator, the improvement of stability and efficiency is achieved by which technique?
   a. Strapping
   b. Cross coupling
   c. Bunching
   d. Bouncing

104. A Gunn diode is a negative resistance device, which is used as a source of microwaves. What is the number of p-n junctions?
   a. 1
   b. 2
   c. 3
   d. 0

105. In a TWT the helix is used as which one of the following?
   a. Slow wave structure
   b. Fast wave structure
   c. Amplitying element
   d. Attenuating element

106. Losses in optical fibres can be caused by which of the following?
   1. Impurities
   2. Microbending
   3. Stepped index operation

Select the correct answer using the code given below:

a. 1 and 3
b. 2 and 3
c. 1 and 2
d. 3 only

107. Consider the root loci plots:

A.

B.

C.

D.
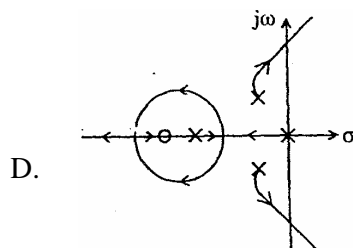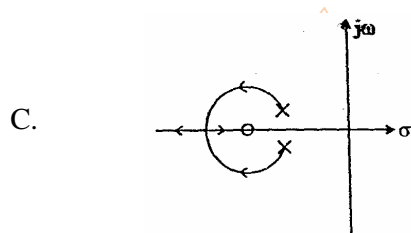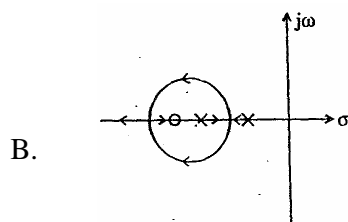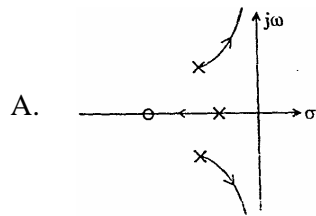
Which one of the above plots is not correct?

a. A
b. B
c. C
d. D

108. Which one of the following statements is correct fir mot loci?

a. The root loci are asymmetrical with respect to the real axis.
b. The root loci are symmetrical with respect to the real axis.
c. The root locus lies in a section of the real axis to the left of which an odd number of poles and zeros of open loop system are present.
d. The root locus lies in a section of the real axis to the right of which an even number of poles and zeros of open loop system are present.

109. Which one of the following is correct?
The root locus is the path of the roots of the characteristic equation traced out in the s-plane

a. as the input of the system is changed
b. as the output of the system is changed
c. as a system parameter is changed
d. as the sensitivity is changed

110. A memory system of size 32 kbytes is required to be designed using memory chips which have 12 address lines and 4 data lines each. What is the number of such chips required to design the memory system?

a. 4
b. 8
c. 16
d. 32

111.
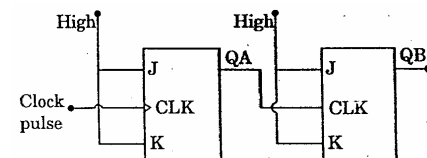
The above circuit illustrates a typical application of the JK flip-flops. What does this represent?

a. A shift register
b. A data storage device
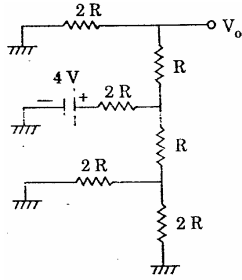c. A frequency divider circuit
d. A decoder circuit

112. A digital multiplexer can be used for which of the following?

1. Parallel to serial conversion
2. Many-to-one switch
3. To generate memory chip select
4. For code conversion

Select the correct answer using the code given below:

a. 1, 3 and 4
b. 2, 3 and 4
c. 1 and 2 only
d. 2 and 3 only

113.

What is the output voltage 'V$_0$' of the R-2R decoder ladder network?

a. 1V
b. 2V
c. 3V
d. 4V

114. What is an interrupt in which the external device supplies its address as well as the interrupt request known as?

a. Vectoral interrupt
b. Maskable interrupt
c. Non-maskable interrupt
d. None of the above

115. Which one of the following is correct?
A micro program

a. is usually written in high level language
b. is a program for micro computers
c. is a program written in assembly language
d. is a sequencing program for the control unit of any processor

116. Match List I with List II and select the correct answer using the code given below the lists:

List I

A. Immediate addressing
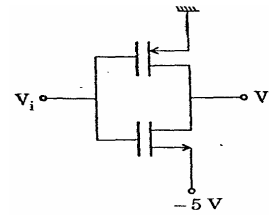B. Implied addressing
C. Register addressing
D. Direct addressing

List II

1. LDA 30 FF
2. MOV A, B
3. LXI H, 2050
4. RRC

Code:

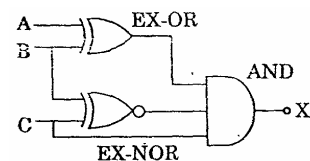|	A	B	C	D
a.	3	4	2	1
	1	2	1	3	4
b.	3	1	2	4
c.	2	4	3	1

117.

The threshold voltage for each transistor in the figure shown above is 20 V. What are the values of V$_i$ for this circuit to work as an inverter 7

a. -5V and 0V
b. -5V and 5V
c. 0V and 5V
d. -3V and 3V

118.

For the logic circuit shown in the above figure, what is the required input condition (A, B, C) to make output X = 1?

a. 1, 0, 1
b. 0, 0, 1
c. 1, 1, 1
d. 0, 1, 1

119. The output of the circuit shown in the figure is equal to

a. 0
b. 1
c. $\overline{A}B + A\overline{B}$
d. $\overline{(A*B)} * \overline{A*B}$

120. Two 2's complement numbers having sign bits x' and 'y' are added and the sign bit of the result is 'z'. Which Boolean function indicates of the overflow?

a. x y z
b. $\overline{x}\ \overline{y}\ \overline{z}$
c. $\overline{x}\ \overline{y}\ z + x\ y\ \overline{z}$
d. $xy + yz + zx$