ELECTRONICS & TELECOMMUNICATION ENGINEERING

PAPER-II

1. In which unit is the performance of cache memory measured?
   a. Hz
   b. Bits/s
   c. Cache constant
   d. Hit ratio

2. Match List - I with List-II and select the correct answer using the code given below the lists :
   List - I (Program Required in System Software)
   A. Linker
   B. Loader
   C. Interpreter
   D. Compiler
   List - II (Definition)
   1. It is a program which combines smaller programs to form a single program; and. also links subroutines with the main program
   2. It is a program which loads machine codes of a program into the system memory
   3. It is a program which translates a high level program into machine code, executes it and reads one statement at a time, executes and then goes to the next statements of the program
   4. It is a program which translates a high-level program into a machine language, reads the entire program and then executes it

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

3. Which one of the following is the most suitable definition of ARRAY?
   a. It is a collection of items which share a common name
   b. It is a collection of items which share a common name and occupy consecutive memory locations
   c. It is a collection of items of the same type and storage class which share a common name and occupy consecutive memory locations
   d. It is just a collection of unordered items

4. In a microcomputer, why are wait states used?
   a. To make the processor wait during a DMA operation
   b. To make the processor wait during an interrupt processing
   c. To make the processor wait during a power shutdown
   d. To interface slow peripherals to the processor

5. Consider the following C statements :
   1. $X = 1, x++;$
   2. # define max = 40;
   3. $x = 1; x--;$
   4. For $(i=0; i<=1; i++)$
   5. { printf ("I = %d\n");}
   Which of the C statements given above are not correct?
   a. 1 and 2 only
   b. 1, 2 and 3 only
   c. 2 and 3 only
   d. 3 and 4 only

6. What does the minimizing of the memory requirement of a program mean?
   a. Maximizing number of macro calls
   b. Minimizing number of macro calls
   c. Maximizing depth of recursion
   d. Both (a) and (c) above

7. Which one of the following is the correct sequence of the numbers represented in the series given below?
   $(2)_3, (10)_4, (11)_5, (14)_6, (22)_7, ...$
   a. 2. 3. 4. 5. 6. ...
   b. 2, 4, 6, 8, 10, ...
   c. 2, 4, 6, 10, 12, ...
   d. 2, 4, 6, 10, 16, ...

8. Assume that only x and y logic inputs are available, and their complements $\bar{x}$ and $\bar{y}$ are not available. What is the minimum number of 2-input NAND gates required to implement $x \oplus y$?
   a. 2

b. 3
c. 4
d. 5

9. The product of which of the following gives the figure of merit of a logic family?
   a. Gain and bandwidth
   b. Propagation delay time and power dissipation
   c. Fan-out and propagation delay time
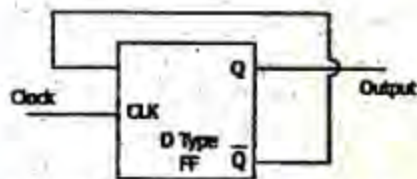   d. Noise margin and power dissipation

10.
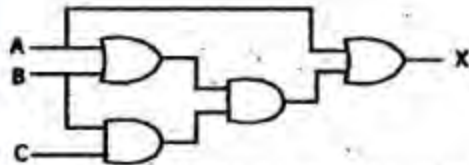
For the logic circuit given above, what is the simplified Boolean function?
   a. $X = AB + C$
   b. $X = BC + A$
   c. $X = AB + AC$
   d. $X = AC + B$

11.

For the circuit (shown in the above figure, what is the frequency of the output Q?
   a. Twice the input clock frequency
   b. Half the input clock frequency
   c. Same as the input clock frequency
   d. Inverse of the propagation delay of the FF

12. A 1 ms pulse can be converted into a 10 ms pulse by using which one of the following?
   a. An astable multivibrator
   b. A monostable multivibrator
   c. A bistable multivibrator
   d. A 3-K flip-flop

13. The characteristic equation of a flip-flop gives the next state Q_{N+1} in terms of the present state Q_N and the inputs. Which one of the following is the characteristic equation of J-K flip- flop?
   a. $Q_{N+1} = J\overline{Q}_N + K\overline{Q}_N$
   b. $Q_{N+1} = J + K\overline{Q}_N$
   c. $Q_{N+1} = K\overline{Q}_N + \overline{J}Q_N$
   d. $Q_{N+1} = K + \overline{J}Q_N$

14. For taking antenna far field pattern, what must be the distance R, between transmitting and receiving antennas?
   a. $R > \dfrac{2D^2}{\lambda}$
   b. $R > \dfrac{4D^2\lambda^2}{3}$
   c. $R > \dfrac{D^2}{2\lambda^2}$
   d. $R > \dfrac{2D^2}{\lambda^2}$

15. A transmitting antenna has a gain of 10. It is fed with a signal power of 1 W. Assuming free-space propagation, what power would be captured by a receiving antenna of effective area $1m^2$ in the bore sight direction at a distance of 1 m?
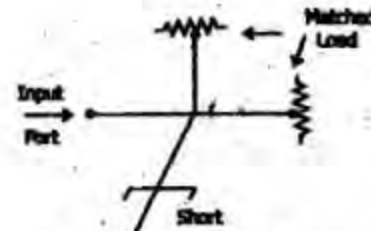   a. 10 W
   b. 1 W
   c. 2 W
   d. 0.8 W

16.
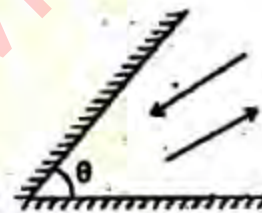
What must be the angle θ of a corner reflector, such that an incident wave is reflected in the same direction?
   a. 30^0
   b. 45^0
   c. 60^0
   d. 90^0

17.

The hybrid T is ideal, perfectly matched on all ports. The VSWR at the input is
   a. 2.0
   b. 3.0
   c. 2.5
   d. 3.5

18. The Fraunhofer region where the pattern measurement of transmitting antenna has

to be taken is from a distance of $\frac{2D^2}{\lambda}$ where D is the maximum aperture dimension and λ is the free-space wavelength. What is this region generally known as?

a. The near field
b. The far field
c. Quiet zone
d. Induction field

19. Two microwave signals, travelling in the free space have a path length difference of 3 cm when operating at 10 GHz. What is the relative phase difference of the signals?

a. 2π
b. π
c. 3π
d. 4π

20. In a dielectric medium of ε_r, (given n $=\sqrt{\varepsilon_r}$) what is the expression for the wavelength (λ) of a microwave signal ?

a. $\frac{c}{n^2 f}$
b. $\frac{nc}{f}$
c. $\frac{c}{nf}$
d. None of the above

21. Poynting vector is a measure of which one of the following?

a. Maximum power flow through a surface surrounding the source
b. Average power flow through the surface
c. Instantaneous power flow through the surface
d. Power dissipated by the surface

22. In the terrestrial paths of a microwave communication system, which technique is usually adopted to overcome signal loss due to earth's curvature?

a. Link repeaters are arranged with 50 km apart
b. Link repeaters are arranged with 500 km apart
c. Signal amplifiers are arranged in every 5 km apart
d. Phase correctors are located in every 2 km apart

23. What is the addition of $(-64)_{10}$ and $(80)_{16}$?

a. $(-16)_{10}$

b. $(16)_{16}$
c. $(1100000)_2$
d. $(0100000)_2$

24. For which one of the, following problems, recursive solution exists but non-recursive solution does not?

a. Tower of Hanoi
b. Factorial computation
c. Tree traversal
d. No such problem exists

25. In a class-B push-pull operation, the d.c. power drawn is 28 W, What is the power delivered by the amplifier at the ideal maximum efficiency of power conversion?

a. 28 W
b. 14W
c. 22 W
d. 7 W

26.
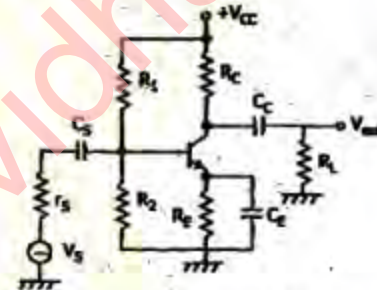
For the amplifier shown in the figure given above, the lower cut-off frequency depends on which of the following ?

a. C, CE, internal junction capacitances of transistor
b. Strong wiring capacitance (C_W), C_C
c. C_S, C_E, C_C
d. C_S, C_E only

27. The 3-dB cut-off frequency of a d.c. amplifier is 5 MHz. What is its rise time?

a. 350 ns
b. 200 ns
c. 70 ns
d. 35 ns

28. Which one of the following statements is correct?
The rise time of an amplifier is

a. directly proportional to the upper 3-dB frequency
b. inversely proportional to the upper 3-dB frequency
c. directly proportional to the lower 3-dB frequency
d. inversely proportional to the lower 3-dB frequency

29. In an amplifier, the power output is 2 W at 5kHz, and 05 W at 50 Hz. If the input power is constant at 10 mW, what is the variation (approximate) of power gain in dB at two frequencies? ($\log_{10}2 \approx 0.30$)
    a. 6 dB
    b. 8 dB
    c. 3 dB
    d. 10 dB

30. A power supply has a full-load voltage of 24 V. What is its no-load voltage for 5% regulation (rounded to the nearest integer)?
    a. 12 V
    b. 23 V
    c. 25 V
    d. 6 V

31. In a negative feedback amplifier, when is the input impedance increased?
    a. If the signal sampled is a voltage
    b. If the signal sampled is a current
    c. If the feedback signal is a voltage
   d. If the feedback signal is a current

32. A tuned amplifier has peak output at 2 MHz and quality factor 50. The bandwidth and 3-dB frequencies shall be at what values respectively ?
    a. 40 kHz, 2.02 MHz, 1.98 MHz
    b. 40 kHz, 2.04 MHz, 1.96 MHz
    c. 80 kHz, 2.04 MHz, 1.96 MHz
    d. 80 kHz, 2.08 MHz, 1.92 MHz

33. The pinch-off voltage V = +6 V for a P-channel WET. If $V_{GS} = +2$ V, what is the value of V_{DS} at which it will enter into saturation region?
    a. −6 V
    b. −4V
    c. +8V
    d. +4V
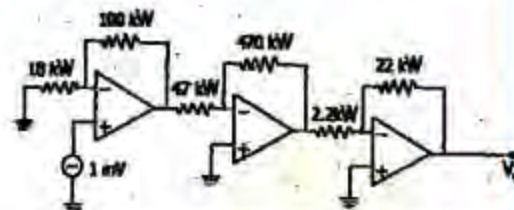
34.
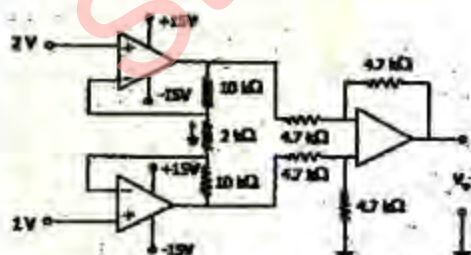
What is the output voltage V_0 of the above circuit?
    a. −11 V
    b. 6 V
    c. 11 V
    d. −6 V

35.

What is he output voltage V0 of the above circuit?
    a. −1.1V
    b. +1.1 V
    c. 1.0 V
    d. 10 V

36. Assertion (A) : When a transistor is taken from hard saturation state to OFF, the storage time plays a significant role in deciding the turn OFF time of the transistor.
    Reason (R) : The excess minority carrier concentration in the base region should die down by recombination process which mostly contributes to the storage time during the turn OFF process of the transistor.
    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

37. Assertion (A) : DMA is faster than either Interrupt initiated I/O or Polling based I/O for very large data transfers.
    Reason (R) : DMA takes control of the system buses and needs no processor intervention during the data transfer.
    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

38. Assertion (A) : Neumann machines are called Control Flow Computers.
    Reason (R) : Instructions are executed sequentially as controlled by a program counter.
    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

39. Assertion (A) : Data-flow computers exploit maximum parallelism.
    Reason (R) : Data-flow computers require no program counter.
    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

40. Assertion (A) : Many power devices utilize the case itself as one of the principal current-carrying terminals.
    Reason (R) : Such a connection maximizes the thermal resistance between the working semiconductors and the transistor case.
    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

41. Assertion (A) : The three electrodes, Source, Drain and Gate of a FET correspond to Emitter, Base and Collector of a junction transistor respectively. Input signal is generally applied to the gate and gate voltage V_G controls the electric field in the channel.
    Reason (R) : In the input circuit, the gate and the channel act like two plates of a capacitor. A charge of one polarity on the gate induces an equal and opposite charge in the channel. As a result the conductivity of the channel can be increased or decreased by V_G.
    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

42. Assertion (A) : In a micro-programmed CPU, each machine instruction is executed by a real-time interpreter.
    Reason (R) : Real-time interpreter helps to achieve high degree parallelism in micro-programmed control.
    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

43. Division by zero in a program gives rise to which one of the following?
    a. Syntax error
    b. Run-time error
    c. Logical error
    d. Semantic error

44. Consider the following statements on binary tree:
    1. A tree with n nodes has (n – 1) edges.
    2. A labelled and rooted binary tree can be uniquely constructed given its post-order and pre-order traversal results.
    3. The maximum number of nodes in a binary tree of height (depth) h is $(2^{h+1} - 1)$.
    4. A complete binary tree with n internal nodes has (n + 1) leaves.
    Which of the statements given above are correct?
    a. 1, 2, 3 and 4
    b. 1, 2 and 3 only
    c. 1 and 3 only
    d. 2 and 4 only

45. Which of the following are included in the architecture of computer?
    1. Addressing modes, design of CPU.
    2. Instruction set, data formats.
    3. Secondary memory, operating system.
    Select the correct answer using the code given below:
    4. 1 and 2 only
    5. 2 and 3 only
    6. 1 and 3 only
    7. 1, 2 and 3

46. When the Boolean function $F(x_1 x_2 x_3) = \Sigma(0, 1, 2, 3) + \Sigma_\phi(4, 5, 6, 7)$ is minimized, what does one get?
    a. 1
    b. 0
    c. x_1
    d. x_3

47. Consider the following statements:
    For 3 input variables a, b, c; a Boolean function $y = ab + bc + ca$ represents
    1. a 3-input majority gate
    2. a 3-input minority gate
    3. carry output of a full adder
    4. product circuit for a, b and c
    Which of the above statements are correct?
    a. 1 and 4 only
    b. 2 and 3 only
    c. 1 and 3 only
    d. 3 and 4 only

48. By inspecting the Karnaugh map plot of the switching function
$F(x_1 x_2 x_3) = \Sigma(1, 3, 6, 7)$
one can say that the redundant prime implicant is

   a. $\overline{x_1} x_3$

   b. $x_2 x_3$

   c. $x_1 x_2$

   d. x_3

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

List - I (Boolean Logic Function)

   A. $ab + bc + ca + abc$

   B. $ab + \overline{ab} + \overline{c}$

   C. $a + bc$

   D. $(\overline{a} + \overline{b} + c)(a + \overline{b} + \overline{c})(\overline{a} + \overline{b} + c)$

List - II (Inverse of Function)

   1. $\overline{a}(\overline{b} + \overline{c})$

   2. $\overline{ab} + \overline{bc} + \overline{ca}$

   3. $(a \oplus b)c$

   4. $abc + a\overline{bc} + \overline{a}b\overline{c}$

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

50. Why does an I^2L (Integrated Injection Logic) have higher density of integration than TTL ?

   a. It does not require transistors with high current gain and hence they have smaller geometry

   b. It uses multicollector transistors

   c. It does, not require isolation diffusion

   d. It uses dynamic logic instead of static logic

51. Consider the following statements:

   1. 1. Minimization using Karnaugh map may not provide unique solution.

   2. 2. Redundant grouping in Karnaugh map may result in non- minimized solution.

   3. 3. Don't care states if used in Karnaugh map for minimization, the minimal solution is not obtained.

Which of the statements given above are correct?

   a. 1, 2 and 3

   b. 2 and 3 only

   c. 1 and 3 only

   d. 1 and 2 only

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

List - I (Logic Gates)

   A. HTL

   B. CMOS

   C. I^2L

   D. ECL

List - II (Characteristics)

   1. High fan-out

   2. Highest speed of operation

   3. High noise immunity

   4. Lowest product of power and delay

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

53. Why does an increase of the RAM of a computer typically improve performance?

   a. Virtual memory increases

   b. Larger RAMs are faster

   c. Fewer page faults occur

   d. Fewer segmentation faults occur

54. Consider the following statements:

   1. CMOS gates require very little power when they are not hanging states.

   2. Transmission gates are widely used in CMOS designs.

   3. CMOS circuits have considerable resistance to noise.

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

55.

The black box in the above figure consists of a minimum complexity circuit that used only AND, OR and NOT gates.

The function $f(x, y, z) = 1$ whenever x, y are different and 0 otherwise. In addition the 3 inputs x, y, z are never all the same value. Which one of the following equations leads to the correct design for the minimum complexity circuit?

   a. $x'y + xy'$

   b. $x + y'z$

c. $x'y'z' = xy'z$

d. $xy + y'z + z'$

56.
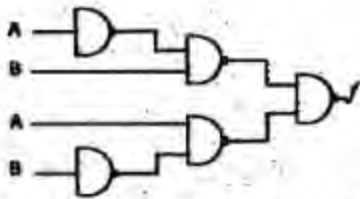
The is circuit, shown above functionally equivalent to which one of the following?

a. NOR gate

b. OR gate

c. EX-OR gate

d. NAND gate

57. Which one of the following statements is correct?

a. Static 1 hazard may occur in a 2-level AND-OR gate network

b. Static 0 hazard may occur in a 2-level AND-OR gate network

c. Dynamic hazards may occur in a 2-level OR-AND gate network

d. Essential hazards may occur in a combinational logic circuit

58. When two 16-input multiplexers drive a 2-input MUX, what is the result?

a. 2-input MUX

b. 4-input MUX

c. 16-input MUX

d. 32-input MUX

59. Consider the following statements with reference to relative stability of a system :

1. Phase margin is related to effective damping of the system.

2. Gain margin gives better estimate of damping ratio than phase margin.

3. When expressed in dB, gain margin is negative of a stable system.

Which of the statements given above are correct?

a. 1 and 2 only

b. 1 and 3 only

c. 2 and 3 only

d. 1, 2 and 3

60. Which one of the following statements is correct for gain margin and phase margin of two closed-loop systems having loop functions G(s) H(s) and exp(-s)G(s)H(s) ?

a. Both gain and phase margins of the two systems will be identical

b. Both gain and phase margins of G(s)H(s) will be more

c. Gain margins of the two systems are the same but phase margin of G(s)H(s) will be more

d. Phase margins of the two systems are the same but gain margin of G(s)H(s) will be less

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

List - I (Plot/Diagram Chart)

A. Constant M loci

B. Constant N loci

C. Nichol's chart

D. Nyquist plot

List -II (Characteristic)

1. Constant gain and phase shift loci of the closed-loop system

2. Plot of loop gain with variation of ω

3. Circles of constant gain for closed-loop transfer function

4. Circles of constant phase shift of closed-loop transfer function

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

62. A controller transfer function is given by $C(s) = (2s + 1)/(0.2s + 1)$. What is its nature and parameter?

a. Lag controller, $\alpha = 10$

b. Lag controller, $\alpha = 2$

c. Lead controller, $\beta = 0.1$

d. Lead controller, $\beta = 0.2$

63. Consider the following statements for a PI compensator for a control system:

1. It is equivalent to adding a zero at origin.

2. It reduces overshoot.

3. It improves order of the system by 1.

4. It improves steady-state error of the system.

Which of the statements given above are correct?

a. 1, 2, 3 and 4

b. 1, 2 and 3 only

c. 2, 3 and 4 only

d. 1 and 4 only

64. A process is controlled by a PID controller. The sensor has high measurement noise. How can this effect be reduced?

a. By use of a bandwidth limited derivative term

b. By use of proportional and derivative terms in the forward path
c. By use of high proportional band
d. By use of low integral gain

65. Match List - I with List –II and select the correct answer using the code given below the lists :
List - I (Components)
A. Servomotor
B. Amplidyne
C. Potentiometer
D. Flapper valve
List-II (Functions)
1. Error detector
2. Transducer
3. Actuator
4. Power amplifier

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

66. In order to permit the selection of 1 out of 16 equiprobable events, what is the number of bits required?
a. 8
b. 4
c. $\log_{10}16$
d. 2

67. Why does an FM radio station perform better than an AM station radiating the same total power?
a. FM is immune to noise
b. AM has only two sidebands while FM has more
c. FM uses larger bandwidth for large modulation. depth
d. Capture effect appears in FM

68. What is the typical bandwidth of a 2-wire telephone line?
a. 300 Hz to 3.4 kHz
b. 20 Hz to 4 kHz
c. d.c. to 4 kHz
d. 20 Hz to 20 kHz

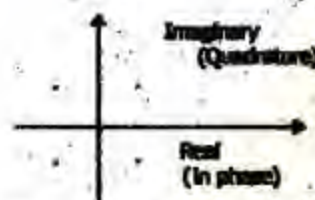69. On modulating a carrier of frequency f_c by an audio signal f_s, the following components have resulted:
$f_c, f_c + f_s$ and $f_c - f_s$
What is this type of modulation likely to be?
a. Amplitude modulation dsb
b. Single sideband modulation
c. Frequency modulation only
d. Amplitude modulation or frequency modulation

70.

The constellation diagram of a modem has four states as shown in the figure given above. What is the bit rate of this modem ?
a. Two times its band rate
b. Four times its band rate
c. Same as band rate
d. Sufficient information is not given to give the answer

71. A carrier signal at frequency 100 MHz its frequency modulated with modulation index 2 by a signal at 2 kHz. At what frequencies are the sidebands produced?
a. 102 MHz and 98 MHz
b. 100 MHz + 2kHz, and 100 MHz – 2kHz
c. 100 MHz $\pm \Delta f_d$, where f_d is frequency deviation
d. 100 MHz $\pm$ n2 kHz, where n is 1, 2, ..., 5 integer

72. Which one of the following is the code that is very close to 'trellis coded modulation'?
a. Combines analog Wd digital modulations
b. Combines modulation and encoding
c. Encodes following trellis diagram
d. Combines amplitude and frequency modulation

73. The modulation index of an AM is changed from 0 to 1. How does the transmitted power change?
a. Gets halved
b. Gets doubled
c. Gets increased by 50 percent
d. Remains unchanged

74. Which one of the following is correct?
a. Coding reduces the noise in the signal
b. Coding deliberately introduces redundancy into messages
c. Coding increases the information rate
d. Coding increases the channel bandwidth

75. In a PCM system, if we increase the quantization levels from 2 to 8, how do the relative bandwidth requirements vary?
   a. Get doubled
   b. Get tripled
   c. Remain
   d. Become eight times

76. Match List – I with List – II and select the correct answer using the code given below the lists :
   List - I (Type of Memory)
   A. DRAM
   B. DSRAM
   C. Parallel Access Registers
   D. ROM
   List-II (Used as)
   1. Cache memory
   2. Main memory
   3. BIOS memory
   4. CPU registers

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

77. Three memory chips are of size 1 KB, 2 KB and 4KB. Their address bus is 10 bits. What are the data bus sizes of the chips?
   a. 8 bits, 16 bits and 24 bits respectively
   b. 8 bits, 16 bits and 32 bits respectively
   c. 8 bits, 16 bits and 64 bits respectively
   d. 8 bits, 16 bits and 128 bits respectively

78. The following micro-operations are part of interrupt cycle of a control unit :
   1. MAR ← save-address
      PC ← routine address
   2. MBR ← (PC)
   3. Memory ← (MBR)
   Which one of the following is the correct order of their occurrence?
   a. 1 – 2 – 3
   b. 2 – 3 – 1
   c. 2 – 1 – 3
   4. 3 – 1 – 2

79. A memory system of size 16 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. 2
   b. 4
   c. 8
   d. 16

80. Consider the following statements :
   1. In 8085 microprocessor, the pairs of general purpose registers for 16-bit operation are A–B, C–D and H–L.
   2. In 8085 microprocessor, the data and the address multiplexed bus is known as $(AD_7 - AD_0)$.
   3. In 8085 microprocessor, ALE is used to operate multiplexed data address bus.
   Which of the statements given above are correct ?
   a. 1, 2 and 3
   b. 2 and 3 only
   c. 1 and 3 only
   d. 1 and 2 only

81. Match List - I with List - II and select the correct answer using the code given below the lists :
   List - I (Instruction of 8085)
   A. RST 6.5
   B. INTR
   C. TRAP
   D. HLDA
   List-II (Function of Instruction)
   1. Highest priority of interrupts
   2. Vector interrupt
   3. Interrupt request
   4. Hold acknowledge

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

82. Which of the 8085 microprocessor following are features in an system with memory mapped I/O?
   1. I/O devices have 16-bit addresses.
   2. I/O devices are accessed using IN and OUT instructions.
   3. There can be maximum of 256 input devices and 256 output devices.
   Select the correct answer using the code given below :
   a. 1, 2 and 3
   b. 1 and 3 only
   c. 2 and 3 only
   d. 1 and 2 only

83. Match List - I with List -II and select the correct answer using the code given below the lists :
   List-I
   A. 8255 A
   B. 8279

C. 8254/8253

D. 8237/8257

List-II

1. Programmable Peripheral Interface
2. Programmable Interval Timer
3. DMA Controller
4. Programmable Keyboard! Display Interface

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

84. Consider the following statements :
The advantage, of cycle stealing in DMA is that
1. it increases the maximum I/O transfer rate.
2. it reduces the interference by the DMA controller in CPU's memory access.
3. it is beneficially employed for I/O devices with shorter bursts of data transfer.
Which of the statements given above are correct?
a. 1 and 2 only
b. 1 and 3 only
c. 2 and 3 only
d. 1, 2 and 3

85. What are the commands to the assembler itself, called ?
a. Macros
b. Macro-instructions
c. Micro-instructions
d. Pseudo-instructions

86. Match List - I with List -II and select the correct answer using the code given below the lists :
List - I (Electronic Circuit)
A. CE
B. CB
C. CC
D. Darlington Pair
List - II (Characteristic)
1. The circuit introduces a phase inversion of 180^0
2. The circuit is rarely used
3. The name, emitter follower is also used for the circuit
4. The circuit consists of two circuits connected in cascade

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

c.	2	1	4	3
d.	1	2	4	3

87. Consider the following statements:
The basic purpose of bias stabilization in a transistor circuit is to
1. increase the voltage and current gain of the amplifier.
2. make the operating point of the transistor independent of temperature variation of the transistor
3. make the operating point independent of the replacement of the same type, Ge or Si.
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

88. For a CE amplifier, d.c. load line is which one of the following plots ?
a. I_C versus V_{CE} for a given value of $(R_C + R_E)$ and V_{CC}
b. I_B versus V_{BE} for a given value of $(R_C + R_E)$ and V_{CC}
c. I_B versus V_{CE} for a given value of I_B
d. I_C versus V_{CB} for a given value of I_E

89. Operating point shift can occur in an amplifier due to which one of the following?
a. Input frequency variation
b. Noise at the input
c. Parasitic capacitances
d. Power supply fluctuation

90. Which of the following features are offered by a bipolar junction transistor amplifier in Darlington connection?
1. High voltage gain
2. High input impedance.
3. High current gain
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

91. Cascode amplifiers when compared with a simple common-emitter amplifier provide which of the following?
a. Higher voltage gain and same bandwidth
b. Same. voltage gain but higher bandwidth

c. No change in either voltage gain or bandwidth

d. Voltage gain less than one but bandwidth equal to f_T

92. For the unity feedback system with $G(s) = \dfrac{10}{s^2(s+4)}$ what is the steady-state error resulting from an input 10 t ?
    a. 10
    b. 4
    c. Zero
    d. 1

93. For a second order system, ξ is equal to zero in the transfer function given by
    $$\frac{\omega_n^2}{s^2 + 2\xi\omega_n s + \omega_n^2}$$
    Which one of the following is correct?
    a. Closed-loop poles are complex conjugate with negative real part
    b. Closed-loop poles are purely imaginary
    c. Closed-loop poles are real, equal and negative
    d. Closed-loop poles are real, unequal and negative

94. If the initial conditions for a system are inherently zero, what does it physically mean?
    a. The system is at rest but stores energy
    b. The system is working but does not store energy
    c. The system is at rest or no energy is stored in any of its parts
    d. The system is working with zero reference input

95. For second-order system
    $$2\frac{d^2y}{dt^2} + 4\frac{dy}{dt} + 8y = 8x$$
   What is the damping ratio?
    a. 0.1
    b. 0.25
    c. 0.333
    d. 0.5

96. A control system whose step response is − $0.5(1 + e^{-2t})$ is cascaded to another control block whose impulse response is e^{-t}. What is the transfer function of the cascaded combination?
    a. $\dfrac{1}{(s+1)(s+2)}$
    b. $\dfrac{1}{s(s+1)}$

c. $\dfrac{1}{s(s+2)}$

d. $\dfrac{0.5}{(s+1)(s+2)}$

97. How can the steady-state error in a system be reduced?
    a. By decreasing the type of system
    b. By increasing system gain
    c. By decreasing the static error constant
    d. By increasing the input

98. The characteristic polynomial of a system is
    $q(s) = 2s^5 + s^4 + 4s^3 + 2s^2 + 2s + 1$
    Which one of the following is correct? The system is
    a. stable
    b. marginally stable
    c. unstable
   d. oscillatory

99.
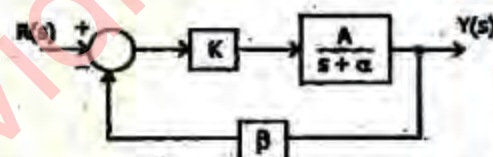
For the system given above, the feedback does not reduce the closed-loop sensitivity due to variation of which one of the following?
    a. K
    b. A
    c. $K\alpha$
    d. β

100. What is the number of root-locus segments which do not terminate on zeros?
    a. The number of poles
    b. The number of zeros
    c. The difference between the number of poles and the number of zeros
    d. The sum of the number of poles and the number of zeros

101. Which one of the following open-loop transfer functions has root locus parallel to imaginary axis?
    a. $K/(s+1)$
    b. $K(s+1)/(s+2)^2$
    c. $K/(s+2)^2$
    d. $K(s+2)/(s+1)^2$

102. Which one of the following polar plots corresponds to
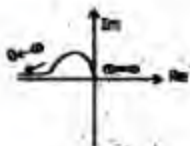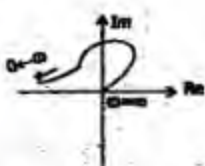 $G(j) = \dfrac{1}{(j\omega)^2 + (1 + j\omega T)}$?

a.
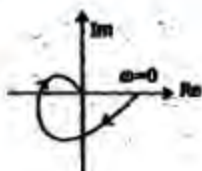
b.

c.

d.

103. How can the quantizing noise be reduced?
a. By using de-emphasis circuit
b. By using RF amplifier in the receiver
c. By increasing the number of quantization levels
d. By sending sloping pulses

104. Why is delay distortion in coaxial cables caused?
a. The dielectric constant (ε_r) of the dielectric filling the coaxial cable varies with frequency
b. The amplitude of the signal on the cable varies with frequency
c. The velocity of electromagnetic waves propagating on the cable varies with frequency
d. Because of both the factors given at a. and c. above

105. M amplifier has a power gain of 200. What is its gain in dB? ($\log_{10}2 \approx 0.30$)
a. 14 dB
b. 17 dB
c. 20 dB
d. 23 dB

106. Bandwidth of the order of 12 MHz can be realized easily using carriers in which range?
a. VHF
b. UHF
c. Microwaves only
d. Optical frequency and microwaves

107. Which one of the following is the correct statement?
The graded index optical fibre cable can be considered to have
a. smaller numerical aperture than step index cable
b. several layers of clad and each layer having a smaller index number relative to its distance from the core
c. several layers of clad and each layer having a higher index number relative to its distance from the core
d. larger beam spread

108. A radio frequency signal at a frequency 1000 kHz is to be received by using reflection from ionosphere. When is it possible?
a. At daytime only
b. By using a launch angle > 60° to normal
c. If high power is used
d. When frequency is low for broadcast use

109. If the reflection coefficient is 1/5, what is the corresponding VSWR?
a. 3/2
b. 2/3
c. 5/2
d. 2/5

110. X-band frequencies are in which one of the following ranges?
a. 3.5 to 5.5 GHz
b. 5.5 to 8.0 GHz
c. 8.0 to 12.0 GHz
d. 12.4 to 16.4 GHz

111. Match List - I with List -II and select the correct answer using the code given below the lists :
List - I (Medium)
A. Microstrip line
B. Earth crust
C. Troposphere
D. Ionosphere
List-II (Type of Radio Waves)
1. Surface wave
2. Guided wave
3. Sky wave
4. Space wave

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

d.   2   1   4   3

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

List - I (Device)
A. Gunn diode
B. IMPATT
C. Klystron
D. Parametric amplifier

List -II (Associated Term)
1. Bunching
2. Avalanche breakdown
3. LSA mode
4. Up-converter

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

113. In travelling wave tube microwave amplifiers, the velocity modulation and bunching of electrons are achieved by the electromagnetic wave supported in the slow wave structure.
Which one of the following field components is responsible for the above?
a. The electric field component transverse to the electron beam propagation
b. The electric field component in the direction of the electron beam propagation
c. The magnetic field component transverse to the electron beam propagation
d. The magnetic field component in the direction of the electron beam propagation

114. In a klystron amplifier, the interaction between the electron beam and the radio frequency wave in the re-entrant cavity depends upon the average gap transit angle θ_g. What is this transit angle ?
a. The angle at which the electron beam leaves the central gap of the re-entrant cavity
b. The angle at which the electron beam enters the central gap of the re-entrant cavity
c. The angle at which the electron beam diffracts from the central gap of the re-entrant cavity

d. The phase change due to finite time, the electron beam takes to cross the central gap of the re-entrant cavity

115. Why is a reflex klystron oscillator preferred as an ideal source in microwave measurements?
a. It provides high power output with wide frequency range
b. It provides high power output with single frequency
c. It provides low power output with highly stable single frequency
d. It provides low power output with multiple frequency components

116. To avoid difficulties with strapping at high frequencies, what type of cavity structure is used in the magnetron?
a. Hole and slot
b. Slot
c. Vane
d. Rising sun

117. A duplexer is used for which one of the following?
a. To couple two antennas in a transmitter with interference
b. To isolate the antenna from local oscillator
c. To prevent interference between two antennas connected to a receiver
d. To use same antenna for reception or transmission interference

118. Which one of the following has the combined characteristics of dielectric, ohmic and radiation bases?
a. Coaxial line
b. Twin parallel line
c. Microstrip line
d. Waveguide

119. In a microwave circuit with waveguides, what is a 'waveguide twist' used for?
a. Impedance matching
b. Phase shifting
c. Rotating Poynting vector
d. Rotating plane of polarization

120. The waveguide (a = 1.5 cm, b = 1 cm) is loaded with a dielectric (ε_r = 4). Which one of the following is correct?
The 8 GHz Signal will
a. pass through the waveguide
b. not pass through the waveguide
c. be absorbed in the guide
d. None of the above