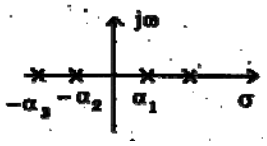
ELECTRONICS & TELECOMMUNICATION ENGINEERING

PAPER-II

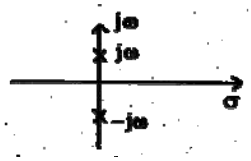
1. Match List I (Pole-zero plot of linear control system) with list II (Responses of the system) and select the correct answer:

List I

A.

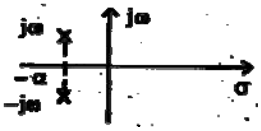


B.



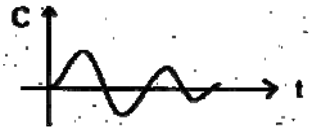
C.

D.



List II

1.



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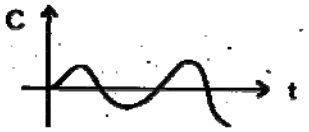
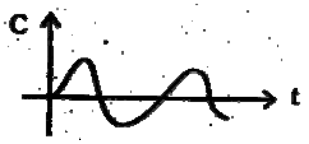
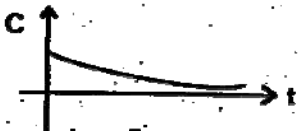


3.



4.



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

2. The Nyquist plot of

$$G(z).H(z) = \frac{10}{s^2(1+0.5s).(1+s)}$$

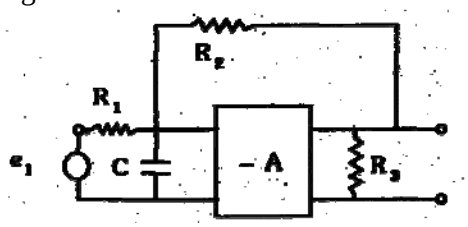
a. will start (ω = ∞) in the first quadrant arid will terminate (ω = 0) in the second quadrant

b. will start (ω = ∞) in the fourth quadrant and will terminate (ω = 0) in the second quadrant.

c. will start (ω = ∞) in the second quadrant and will terminate (ω = 0) in the third quadrant

d. will start (ω = ∞) in the first quadrant and will terminate (ω = 0) in the fourth quadrant

3. The feedback amplifier shown in the figure below



a. is stable for all values of R and C

b. is stable only for $R_1R_2 = R_3$

c. is stable only for $R_1C = R_1R_3$

d. is stable if $R_1 / R_2 = C/ R_3$

4. Consider the following statements :

Nichol's chart gives information about

1. closed loop frequency response
2. the value of the peak magnitude of the closed loop frequency response M_P
3. the frequency at which M_P occurs

Which of the above statements are correct?

a. 2 and 3

b. 1 and 2

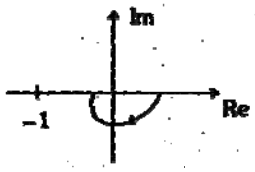
c. 1 and 3

d. 1, 2 and 3

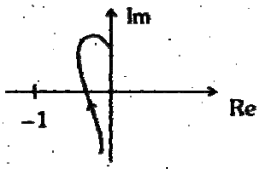
5. Which of following is the Nyquist diagram for the open loop function

$$G(s).H(s) = \frac{5}{s(1+0.1s)(1+0.01s)}?$$

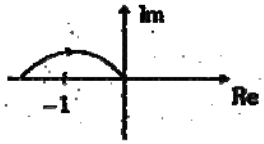
a.



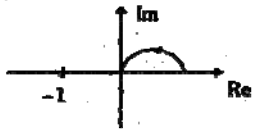
b.



c.



d.



6. Consider the following statements associated with and gain margins :
   1. They are a measure of closeness of the polar plot the – 1 + j0 point
   2. For a non-minimum phase to be stable it must have positive phase and gain margins
   3. For a minimum phase system to be stable, both the margins must be positive

   Which of the above statements is / are correct?
   a. 2 and 3
   b. 1 and 3
   c. 1 and 2
   d. 1 alone

7. Consider the following statements regarding a phase-lead compensator :
   1. It increases the bandwidth of the system
   2. It helps in reducing the steady state error due to ramp input
   3. It reduces the overshoot due to step input

   Which of the above statements is/are correct ?
   a. 1 and 2
   b. 1 and 3
   c. 2 and 3
   d. 1 alone

8. Consider the following performance characteristics:
   1. Reduced velocity constant for a given relative stability
   2. Reduced gain cross-over frequency
   3. Reduced bandwidth
   4. Reduced resonance peak of The system

   Which of these performance characteristics are achieved with the phase-lag compensation?
   a. 1 and 2
   b. 1 and 3
   c. 2, 3 and 4
   d. 1, 2, 3 and 4

9. The constant N loci represented by the equation $x^2 + x + y = 0$ where

   $x = \text{Re} \mid G(j\omega) \mid$ and $y = \text{Im} \mid G(j\omega) \mid$

   is for the value of phase angle equal
   a. – 45°
   b. 0^0
   c. + 45^0
   d. + 90°

10. Match List I with list II and select the correct answer :

    List I (Type of controller)
    A. Pneumatic controller
    B. Hydraulic controller
    C. Electronic controller

    List II (Operation)
    1. Flexible operation
    2. High torque high-speed operation
    3. Fire and explosion proof operation

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

11. Which of the following are the advantages of FM over AM
    1. Better noise immunity is provided
    2. Lower bandwidth is required
    3. The transmitted power is more useful
    4. Less modulating power is required

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

12. Match list with list II and select the correct answer :

List I
A. Television
B. Radio
C. Radar
D. Data communication
List II
1. Either AM or FM used
2. Both AM and FM are used
3. PCM is used
4. Digital system

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

13. Which of the following pulse modulations is analog?
a. PCM
b. Differential PCM
c. PWM
d. Delta

14. In asymchronous TDM, for n signal sources, each frame contains in slots, where m is usually
a. less than n
b. 2n
c. n
d. greater than 2n

15. In free space line of sight propagation case, the transmission losses between transmitter and receiver increase with frequency (f) as
a. f
b. f^2
c. f^4
d. $f^{1/2}$

16. In a cellular communications system, path loss between transmitter and receiver is due to
a. scattering from buildings, trees, vehicles and other structures only
b. reason at (a) above and due to reflections from ground only
c. reasons at (a) and (b) above along with reflectional from ionosphere only
d. reasons at (a), (b) and (c) above along with loss due to surface wave phenomenon

17. Match List I with list II and select the correct answer :
List I
A. Surface waves
B. Duct formation
C. Ionospheric propagation
D. VLF propagation
List II
1. Super refraction
2. Wave guide mode
3. Vertical polarization
4. Reflection

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

18. Consider the following types of modulation:
1. Amplitude modulation
2. Pulse modulation
3. Frequency modulation
4. Phase modulation
Which of the above modulations are used for telecasting TV programmes?
a. 3 and 4
b. 2 and 3
c. 1 and 2
d. 1 and 4

19. Match list I with list II and select the correct answer :
List I (Functions)
A. Height of raster
B. Width of raster
C. Picture contrast
D. Picture brightness
List II (TV circuits)
1. Video amplifier
2. Vertical amplifier
3. Horizontal amplifier
4. d.c. bias on picture tube

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

20. If the average power of radar transmitter is 2 kW and the peak power of the transmitter is 1000 kW, what will be the duty cycle ?
a. 0.002
b. 0.02
c. 0.001
d. 0.01

21. A radar receives an echo from a target 20 micro seconds after sending the signal. The approximate range of the target is
    a. 300 m
    b. 3000 m
    c. 600 m
    d. 6000 m
22. Dopper effect is employed in which of the following?
    1. Moving target plotting on ppI
    2. The MTI system
    3. FM radar
    4. CW radar

    Select the correct answer using the codes given below:
    a. 2, 3 and 4
    b. 1, 2 and 3
    c. 1, 2 and 4
    d. 1, 3 and 4
23. Match list 1 with list II and select the correct answer:

    List I
    A. Pulsed radar system
    B. Moving target radar
    C. CW radar
    D. Phase shifter

    List II
    1. Phased array radar
    2. Doppler radar
    3. Magnetrons are in use
    4. Search radar

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

24. Which of the following can be used to improve range resolution in a Radar?
    a. Short duration pulse
    b. Long duration pulse
    c. High frequency of operating signal
    d. Increasing pulse width
25. Fading is
    a. change in polarization only at receiver end
    b. change in frequency only at receiver end
    c. fluctuation in signal strength at receiver
    d. change in phase only at receiver end
26. Consider the following:
    1. Sign Flag
    2. Zero Flag
    3. Carry Flag
    4. Parity Rag

    Which of the above flags of 8085 get affected by the instruction SUB B?
    a. 1 and 2
    b. 1 and 3
    c. 3 and4
    d. 1, 2, 3 and 4
27. The correct sequence. of subsystems of Klystron amplifier as they appear in the direction of flow of the electron beam is
    a. Buncher cavity, Cathode, Collector, Catcher cavity
    b. Buncher cavity, Cathode, Catcher cavity, Collector
    c. Cathode, Buncher cavity, Catcher cavity, Collector
    d. Cathode, Buncher cavity, Collector, Catcher cavity
28. The use of a cache in a computer system increases the
    a. available memory space for the program
    b. available memory space for data
    c. average speed of memory access
    d. addressing range of CPU
29. Consider the following :
    1. Input device
    2. Arithmetic and logic unit
    3. Control unit
    4. Auxiliary memory
    5. Main memory
    6. Active hub

    Which of these form part of CPU ?
    a. 1, 4 and 6
    b. 2, 3 and 6
    c. 2, 4 and 5
    d. 2, 3 and 5
30. Which one of the following is not a characteristic of RISC processor design?
    a. One instruction per cycle
    b. Register- to -register operations only
    c. Simple address modes
    d. Register- to - memory operations only
31. The following micro operations are part of interrupt cycle of a control unit :
    1. MAR ← save-address
    2. PC ← routine-address
    3. MBR ← (PC)

4. Memory ← (MBR)

Which of the following is the ordered order of their occurrence?

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

32. Which of the following is not a characteristic of transparent DMA mode of I/O operation?

a. The external logic steals cycles from the CPU
b. The normal rate of execution is slowed down
c. Only one word can be transferred at a time
d. Data is transferred to/from memory directly

33. A typical cell, for a dynamic RAM can be implemented by using how many MOS transistors?

a. Six
b. Five
c. One
d. Two

34. The contents of accumulator in an 8085 microprocessor are altered after the execution of the instruction?

a. CMPC
b. CPI3A
c. ANISC
d. ORAA

35. In an 8085 microprocessor after the execution of XRAA instruction

a. the carry flag is set
b. the accumulator contains FF_H
c. the content of accumulator is shifted by one
d. the zero flag is set

36. A microprocessor has 24 address lines and 32 data lines. If it uses 10 bits of op code, the size of its Memory Buffer Register is

a. 22 bits
b. 24 bits
c. 32 bits
d. 14 bits

37. In the 8086 instruction ADD DX, [BX] [CI], the addressing mode of source operand is

a. Register
b. Register Indirect
c. Based Indexed
d. Direct

38. The MODEM is used with a personal computer to do which of the following?

a. Convert from serial to parallel and vice versa
b. Convert signals between TTL ad RS 232 C standard and. vice versa
c. Convert from digital to analog signals and vice versa
d. To convert the computer to a long distance communication link

39. The technology used for display in PC note-books (laptop computers) is

a. Light Emitting Diodes display
b. Liquid Crystal display
c. CRT display
d. Plasma display

40. Assertion (A) : Operational amplifiers should have a high slew rate for good transient response.

Reason (R) : Slew rate is the maximum rate of change of the output voltage of the operational amplifier when a large amplitude step is applied to its input.

a. Both A and R are true and R is the correct explanation of A
b. Both A and R are 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) : An operational amplifier should have, a low input offset current.

Reason (R) : Input impedance of op-amp should be very high.

a. Both A and R are true and R is the correct explanation of A
b. Both A and R are 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) : An operational amplifier can amplify very low frequency including d.c. signals.

Reason (R) : op-amp uses very large coupling capacitor for cascading the various stages.

a. Both A and R are true and R is the correct explanation of A
b. Both A and R are 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. Assertion (A) : Odd number of lines per frame are used in all TV systems.
Reason (R) : Odd number of lines per frame assist interlacing.
a. Both A and R are true and R is the correct explanation of A
b. Both A and R are 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

44. Assertion (A) : To obtain high switching speed in BJT based logic circuits, transistors are operated in active region.
Reason (R) : In active region transistor works as a linear element.
a. Both A and R are true and R is the correct explanation of A
b. Both A and R are 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

45. Assertion (A) : Master-slave JK flip-flop is preferred to an edge-triggered J K flip - flop in high speed circuits.
Reason (R) : Master-slave JK flip-flop is free from race -around problem.
a. Both A and R are true and R is the correct explanation of A
b. Both A and R are 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

46. Assertion (A) : The bandwidth of a control system indicates the noise filtering characteristic of the system.
Reason (R) : The bandwidth is a measure of ability of a control system to reproduce the input signal.
a. Both A and R are true and R is the correct explanation of A
b. Both A and R are 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

47. Assertion (A) : $G(s) = \dfrac{10(s-25)}{s(s+1)(s+5)}$ represents a non-minimum phase transfer function.
Reason (R) : A minimum phase transfer function has the property that its magnitude and phase are uniquely related.
a. Both A and R are true and R is the correct explanation of A
b. Both A and R are 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

48. Assertion (A) : Addition of a pole to the open loop transfer function of a system increases the rise time of the closed loop step-response.
Reason (R) : Additional pole has the effect of reducing the bandwidth of the system.
a. Both A and R are true and R is the correct explanation of A
b. Both A and R are 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

49. Assertion (A) : The noise generated by a resistor depends upon its operating temperature.
Reason (R) : Average noise power generated in a resistor is given by Pn = kT Δf, where
k = Boltzmann's constant,
T = Temperature in degree Kelvin,
Δf = Bandwidth of interest.
a. Both A and R are true and R is the correct explanation of A
b. Both A and R are 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

50. Assertion (A) : The demodulated output power spectral density is parabolic over the range | f | < w for FM where w is the signal bandwidth.
Reason (R) : FM demodulation is essentially a differentiation process.
a. Both A and R are true and R is the correct explanation of A
b. Both A and R are 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

51. Assertion (A) : if the index of modulation (m_f) of an FM signal gradually increases beyond 0.25, it will contribute to the generation of a progressively larger number of side bands separated by the modulation frequency (f_m).

Reason (R) : A large modulation index will generate a finite number of side bands.

a. Both A and R are true and R is the correct explanation of A
b. Both A and R are 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

52. Assertion (A) : SSB transmission is not appropriate for rectangular pulse transmission.

Reason (R) : Whenever SSB modulating signal has abrupt transitions, the resulting envelope A(t) gives rise to envelope horns.

a. Both A and R are true and R is the correct explanation of A
b. Both A and R are 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

53. Assertion (A) : GaAs is preferred to silicon for fabrication of Gunn diode.

Reason (R) : GaAs has better frequency stability than silicon.

a. Both A and R are true and R is the correct explanation of A
b. Both A and R are 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

54. Assertion (A) : In a Helix TWTA, an attenuator is used.

Reason (R) : The attenuator helps proper bunching of electrons in the TWT.

a. Both A and R are true and R is the correct explanation of A
b. Both A and R are 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

55. Assertion (A) : TE_{10} mode is the dominant mode ma rectangular wave guide.

Reason (R) : TE_{10} mode has the lowest cut-off frequency for which the wavelength is double the broadwall dimension.

a. Both A and R are true and R is the correct explanation of A
b. Both A and R are 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) : Masers and lasers are suitable for radio astronomy and other extra-terrestrial communications.

Reason (R) : These devices are highly directional, coherent power devices with extremely low noise figure.

a. Both A and R are true and R is the correct explanation of A
b. Both A and R are 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

57. An IMPATT diode has a drift length of 4μm. The drift velocity of Si is 10^5 m/s. The operating frequency of the IMPATT diode is

a. 25 GHz
b. 20 GHz
c. 12.5 GHz
d. 125 GHz

58. Match List I (Microwave II (Interaction device) with List process involved) and select the correct answer:

List I

A. Reflex Klystron
B. Gyrotron
C. Backward wave oscillator
D. Fixed-frequency
E. magnetron
1. List II
2. Spiralling beam
3. Velocity modulation with travelling wave structure
4. Velocity modulation with resonant cavities Crossed field

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

59. For using as a local oscillator for frequency measurements, the most suitable microwave source would be

a. Travelling wave tube
b. Double cavity klystron
c. Reflex klystron
d. Magnetron

60. Electromagnetic oscillations are sustained in a two-cavity kylstron due to

a. feedback of output power to the input cavity in proper phase

b. feedback of output power to the input cavity with phase difference of 180°
c. feedback of power from external load to input cavity in proper phase
d. feedback of power from thermal noise of load circuit with phase lag of 90^0.

61. A certain optical fibre has refractive index of clad (n_1) = 1.40 be and that of core (n_2) = 1.05. Its numerical aperture will be
a. 0.8575
b. 0.9260
c. 0.3500
d. 0.1585

62. Match list I (Circuit name) with list II (S-parameter) and select the correct answer :
List I
A. Circulator (3-port)
B. Directional Coupler
C. Magic Tee
D. Rate Race Junction
List II

1. $\begin{bmatrix} 0 & S_{12} & 0 & S_{14} \\ S_{12} & 0 & S_{23} & 0 \\ 0 & S_{23} & 0 & S_{34} \\ S_{14} & 0 & S_{34} & 0 \end{bmatrix}$

2. $\begin{bmatrix} 0 & S_{12} & S_{13} & S_{14} \\ S_{12} & 0 & S_{23} & S_{24} \\ S_{31} & S_{32} & 0 & S_{34} \\ S_{41} & S_{42} & S_{43} & 0 \end{bmatrix}$

3. $\begin{bmatrix} 0 & S_{12} & S_{13} \\ S_{12} & 0 & S_{23} \\ S_{13} & S_{23} & S_{33} \end{bmatrix}$

4. $\begin{bmatrix} 0 & 0 & 1/\sqrt{2} & 1/\sqrt{2} \\ 0 & 0 & 1/\sqrt{2} & -1/\sqrt{2} \\ 1/\sqrt{2} & 1/\sqrt{2} & 0 & 0 \\ 1/\sqrt{2} & -1/\sqrt{2} & & 0 \end{bmatrix}$

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

63. A rectangular wave guide measure 3 × 4.5 cm internally and has a 9 GHz signal propagated in it. The cut off wavelength for TE_{10} mode is
a. 5 cm
b. 10 cm
c. 15 cm
d. 9 cm

64. Which of the following is not possible in a circular wave guide?
a. TE_{10}
b. TE_{01}
c. TE_{11}
d. TE_{12}

65. In general, the reflection coefficient on a transmission line depends
a. only upon the distance from the source and attenuation of the line
b. only upon the level of voltage impressed upon the line, and load impedance
c. only upon the level of power flowing in the line and attenuation in the line
d. upon the distance from the source, attenuation in the line and also upon the load impedance

66. Consider the following features :
1. Wider bandwidth due to higher frequencies.
2. Smaller component size leading to smaller systems.
3. Existence of low signal losses.
4. Lower interference due to lower signal crowding.

Use of RF/microwaves in system application results in which of these advantages?
a. 1, 2 and 4
b. 1, 3 and 4
c. 2, 3 and 4
d. 1, 2 and 3

67. In a VSWR measurement, a square law detector is used to detect the signal level. The voltmeter reads maximum and minimum as 64 mV and 16 mV respectively. The VSWR of the system will be
a. 4
b. 2
c. 8
d. 16

68. Resistive films in MIC's are needed to fabricate resistors and attenuators. The features desirable in resistive films are
a. low-temperature coefficient of resistance (TCR)
b. lower loss

c. good adhesion to the substrate
d. good etchability and solderability

69. The type of antenna to be used for producing circularly polarized beams is
a. pyramidal horn
b. log-periodic array
c. paraboloid
d. helical antenna

70. In a material characterized by a complex permittivity, the imaginary part is a measure of
a. dielectric strength of the material
b. energy stored in the electric field
c. losses in the material
d. energy stores in the magnetic field

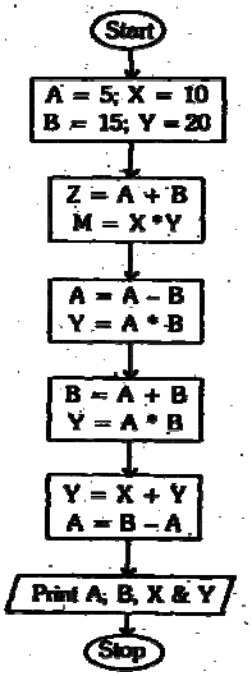
71. Consider the following statements :
For space communications, the carrier frequencies are generally greater than 108 MHz, because it is desirable
1. to avoid interference due to FM band.
2. to penetrate the ionosphere without any reflection.
3. to increase the coverage area.
4. to have less skip distance.
Which of the above statements are correct?
a. 1, 2 and 3
b. 1 and 4
c. 2 and 4
d. 1, 2, 3 and 4

72. In signed magnitude representation, the binary equivalent of 22.5625 is (the bit before comma represents the sign)
a. 0, 10110.1011
b. 0, 10110.1001
c. 1, 10101.1001
d. 1, 10110.1001

73. Which of the following represents '$E3_{16}$'?
a. $(ICE)_{16} + (A2)_{16}$
b. $(IBC)_{16} – (DE)_{16}$
c. $(2BC)_{16} – (1DE)_{16}$
d. $(200)_{16} – (11D)_{16}$

74. The computer program which converts statements written in high level language to object code is known as
a. Assembler
b. Compiler
c. Disassembler
d. Operating system

75.



What will be values of A and B, respectively, when printed for the given flow chart?
a. 10 and 20
b. 5 and 15
c. 20 and 10
d. 15 and 5

76. Consider the following C structure and declaration:

```
Struct date {
int day;
int month;
int year;
};
        Struct data * pd;
```

Which of the following is the correct method to refer to the year number?
a. (* pd) . year
b. (* pd) * year
c. (* pd) → year
d. pd → year

77. The different classes of formal parameters used in PASCAL are
a. value and variable parameters
b. procedure and function parameters
c. value, variable, procedure and function parameters
d. variable, procedure and function parameters

78. Which one of the following is not a linear data structured
a. Array
b. Linked list

c. Stack
d. Tree

79. A data structure in which insertions and deletions are possible at either end, is called a
a. queue
b. deque
c. stack
d. enque

80. A circuit which resonates at 1 MHz has a Q of 100. Bandwidth between half-power points is
a. 10 kHz
b. 100 kHz
c. 10 Hz
d. 100 Hz

81. In a circuit, if the open loop gain is 10^6 and output voltage is 10 volt, the differential voltage should be
a. 10 μV
b. 0.1 μV
c. 100 μV
d. 1 μV

82. An operational amplifier possesses
a. very large input resistance and very large output resistance
b. very large input resistance and very small output resistance
c. very small input resistance and very small output resistance
d. very small input resistance and very large output resistance

83. A BJT is to be used in a high frequency circuit in common emitter amplifier for a higher upper cut - off frequency (c_μ , C_π and r_0 have their usual meanings)
a. C_μ should be as small as possible
b. r_0 and C_μ should be as large as possible
c. C_π and C_μ should be as large as possible
d. r_0, C_π and C_μ should be as large as possible

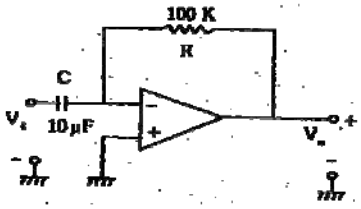
84. Consider the following statements regarding a common emitter amplifier. It can be converted into an oscillator by :
1. providing adequate positive feedback
2. phase shifting the output by 180° and feeding this phase-shifted output to the input
3. using only a series tuned circuit as a load on the amplifier
4. using a negative resistance device as a load on the amplifier

Which of the above statements are correct?
a. 1, 2, 3 and 4
b. 1 and 2
c. 1, 3 and 4
d. 3 and 4

85. Consider the following statements :
In order to generate square wave from a sinusoidal input signal one can use
1. Schmitt trigger circuit.
2. Clippers and amplifiers.
3. Monostable multivibrators.

Which of the above statements is/are correct?
a. 1 alone
b. 1 and 2
c. 2 and 3
d. 1, 2 and 3

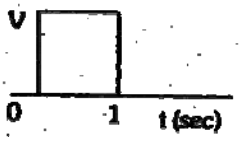
86. An op-amp circuit is shown in the figure given below. Different inputs and output are given under List I and List II. Match List I (Inputs) with List II (Outputs) and select the correct answer:



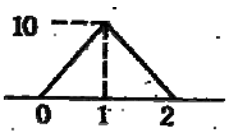
List I

A.

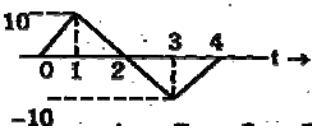
B.



C.

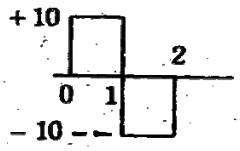


D.

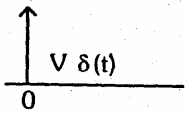


List II

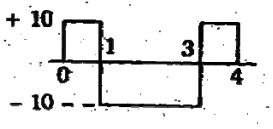
1.



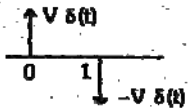
2.



3.



4.

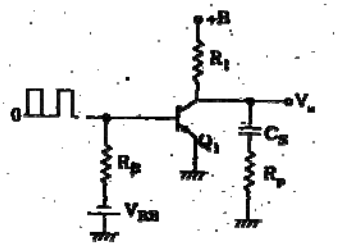


	A	B	C	D
a.	2	4	1	3
b.	1	3	2	4
c.	2	3	1	4
d.	1	4	2	3

87. The PIV rating of the diodes used in power supply circuits are chosen by which one of the following criteria? (V_m is the peak input supply voltage to the rectifier circuit used in the power supply)
   a. The diodes that are to be used in a full wave rectifier should be rate 2 V_m and in bridge rectifier equal to V_m
   b. The diodes that are to be used in a full wave rectifier should be rated V_m and in bridge rectifier equal to 2 V_m
   c. All diodes should be rated for V_m only
   d. All diodes should be rated for 2 V_m

88. An RC amplifier stage has a bandwidth of 500 kHz. What will be the rise time of this amplifier stage ?
   a. 0.35 μs
   b. 0.7 μs
   c. 1.0 μs
   d. 2.0 μs

89.



In the circuit shown above, If $R_1 >> R_p$ and the impulses can completely saturated transistor Q_1, then the output voltage, V_0 will be

a.

b.

c.

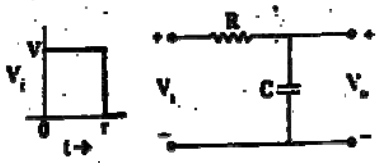
d.

90. The power input to an amplifier is 2 μW. The power gain of the amplifier is 40 dB. The output power of the amplifier is
   a. 80 μW
   b. 200 μW
   c. 20 mW
   d. 80 mW

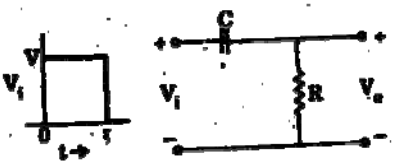
91. Given below are 2 sets of diagram – one set shows 4 circuits with inputs; the other shows the output (V_0). Match List I with List II and select the correct answer :

List I (Inputs)

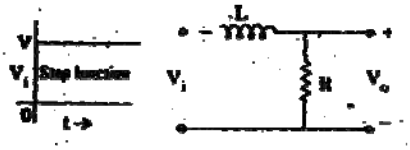
A.



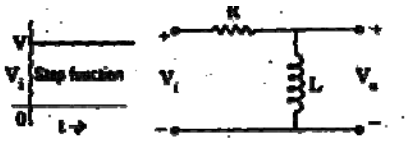
B.



C.

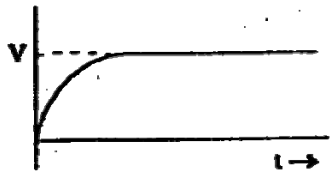


D.

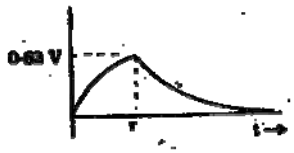


List II (Outputs)

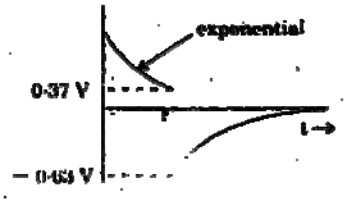
1.



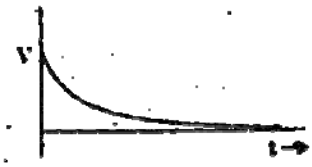
2.



3.



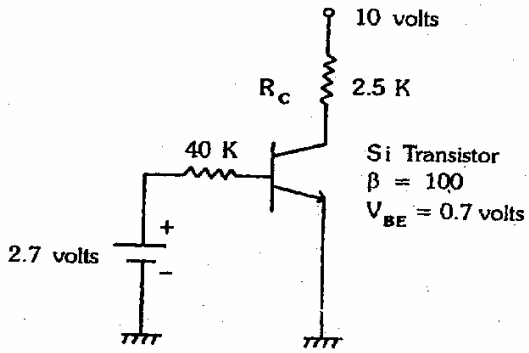
4.



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

92. A class-B push-pull type amplifier with transformer coupled load uses two transistors rated 10 W each. What is the maximum power output one can obtain at the load from this circuit?
   a. 40 W
   b. 50 W
   c. 60 W
   d. 70 W

93. In the circuit shown,

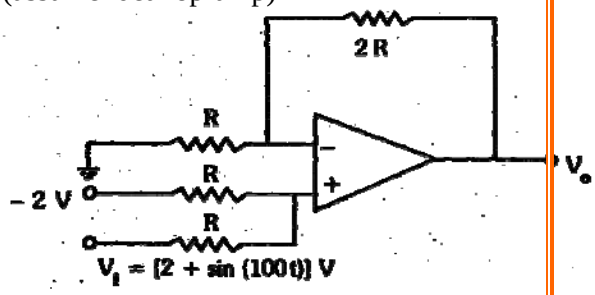


the transistor is biased at
   a. 0 mA
   b. 5 mA
   c. 3.9 mA
   d. ∞

94. The output V_0 will be (assume ideal op-amp)
   a. equal to zero because the input it zero
   b. dependent on element values hence nothing can be predicted without a knowledge of element values
   c. a square wave varying between $+V_{cc}$ and $-V_{cc}$
   d. a sinusoidal wave of amplifier V_{cc}

95. An amplifier will generate stable sinusoidal oscillations if we provide feedback such that
   a. its pole lie close to jω- axis in the right half of s-plane
   b. its poles lie close to jω- axis in the left half of s-plane
   c. its poles lie on the +ve real axis in s-plane
   d. its poles lie anywhere in s-plane

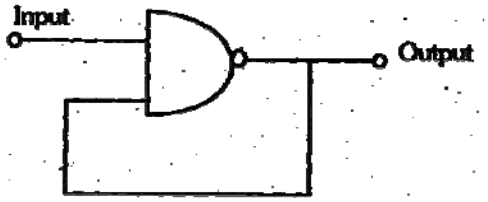
96. A non-inverting op-amp is shown below (assume ideal op-amp)



The output voltage V_0 for an input V_i = [2 + sin (100t)] V is
   a. 3/2 sin (100 t)
   b. 3 sin (100 t)
   c. 2 sin (100 t)
   d. 3 sin (100 t) + 1/2

97. The open collector output of two 2-input NAND gates are connected to a common pull-up resistor. If the inputs of the gates are A, B and C, D respectively, the output is equal to
   a. $A.B.CD$
   b. $A.B + C.D$
   c. $A.B + C.D$
   d. $A.B \,.\, C.D$

98. Consider the following digital circuits:
   1. Multiplexers
   2. Read Only Memories
   3. D -latch
   4. Circuit as shown



   Which of these come under the class of combinational circuits?
   a. 1 and 2
   b. 3 and 4
   c. 1, 2 and 3
   d. 1, 2, 3 and 4

99. With 4 Boolean variables, how many Boolean expressions can be formed ?
   a. 16
   b. 256
   c. 1024(1K)
   d. 64 K(64 × 1024)

100. Match list I with list II and select the correct answer:
   List I (Logic gates)
   A. TTL
   B. ECL
   C. HTL
   D. CMOS
   List II (Operation)
   1. More logical swing
   2. Low power dissipation
   3. Current hogging
   4. NOR / OR output
   5. Totem-pole output

	A	B	C	D
a.	3	2	5	1
b.	3	2	4	5
c.	2	3	4	5
d.	2	3	5	1

101. How is inversion achieved using EX – OR gate?
   a. Giving input signal to the two input lines of the gate tied together
   b. Giving input to one input line and logic zero to the other line
   c. Giving input to one input line and logic one to the other line
   d. Inversion cannot be achieved using EX—OR gate

102. Match list I with list II and select the correct answer :
   List I (Logic type)
   A. DTL
   B. TTL
   C. ECL
   D. MOS
   List II (Power dissipation per gate in mW)
   1. 55
   2. 10
   3. 8
   4. 1
   5. 40

	A	B	C	D
a.	3	5	4	2
b.	1	2	5	4
c.	3	2	5	4
d.	1	5	4	2

103.

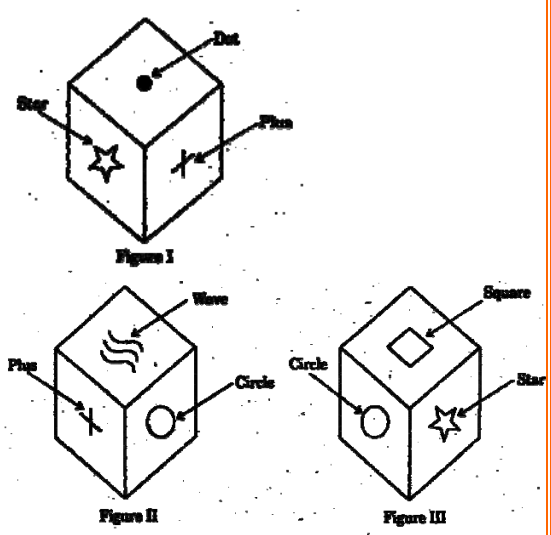
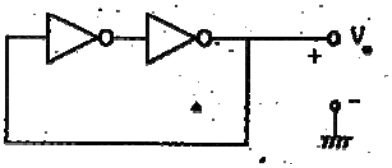


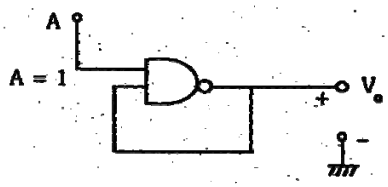
Figure I, II and Ill show different faces of a dice. The symbol at the bottom of Figure III is
   a. plus
   b. dot
   c. wave
   d. square

104. Consider the following circuits (Assume all gates to have a finite propagation delay):

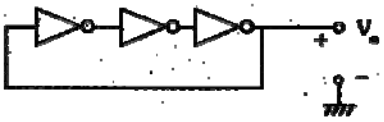
1.



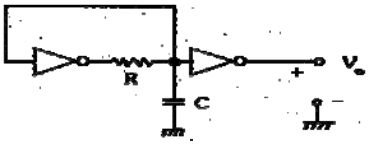
2.



3.



4.



Which of these circuits generate a periodic square wave output?

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

105.

CD \ AB	00	01	11	10
00	0	0	1	1
01	0	x	x	1
11	x	x	1	x
10	1	0	1	1

The minimized expression for the given K map (x :don't care) is

a. A + B C
b. B + AC
c. C + AB
d. A B C

106. Consider the Boolean expression :

X + ABCD + A B CD + A BCD + A C B D

The simplified form of X is

a. C + D
b. BC
c. CD
d. $\overline{B}$ C

107. Which of the following is a self-complementing code?

a. 8421 code
b. Excess 3 code
c. Pure binary code
d. Gray code

108. Match List I with List II and select the correct answer:

List I

A. TTL
B. ECL
C. MOS
D. CMOS

List II

1. Low propagation delay
2. Low power consumption
3. Higher packing density on Si wafer
4. Saturated bipolar logic
5. High fan-out

	A	B	C	D
a.	4	1	3	2
b.	5	3	2	1
c.	4	3	2	1
d.	5	1	3	2

109. A sequence detector is required to give a logical output of 1 whenever the sequence 1011 is detected in the incoming pulse stream. Minimum number of flip-flops needed to build the sequence detector is

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

110. A number is expressed in binary two's complement as 10011. Its decimal equivalent value is

a. 19
b. 13
c. –19
d. –13

111. Consider the following registers :

1. Accumulator and B register
2. B and C registers
3. D and E registers
4. H and L registers

Which of these 8-bit registers of 8085 μP can be paired together to make a 16-bit register?

a. 1, 3 and 4
b. 2, 3 and 4

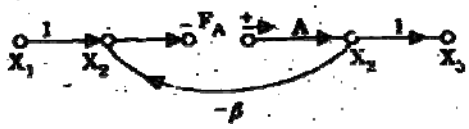
c. 1 and 2
d. 1, 2 and 3

112. Consider the following instructions of 8085 μP:
1. MOV M, A
2. AODC
3. MVI A, FF
4. CMP M

Which of these cause change in the status of flag(s) ?
a. 1 and 2
b. 1, 2 and 3
c. 3 and 4
d. 2 and 4

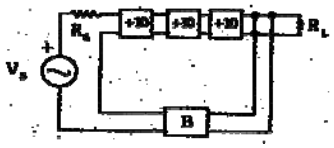
113. A Read/Write memory chip has a capacity of 64 kBytes. Assuming separate data and address lines and availability of chip enable signal, what is the minimum number of pins required in the IC chip?
a. 28
b. 26
c. 24
d. 22

114. Consider the following single-loop feedback structure illustrating the return difference :



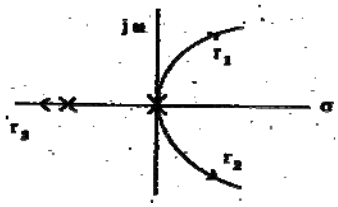
The return difference for A is
a. $1 \quad A\beta$
b. $1 + A\,\beta$
c. $\dfrac{A\beta}{1+A\beta}$
d. $\dfrac{A\beta}{1-A\beta}$

115. Consider the following amplifier with –ve feedback:



If the closed-loop gain of the above amplifier is + 100, the value B will be
a. -9×10^{-3}
b. $+9 \times 10^{-3}$
c. -11×10^{-3}
d. $+11 \times 10^{-3}$

116.



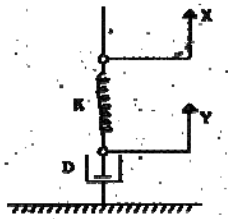
Which of the following is the open loop transfer function of the root loci shown in figure ?
a. $\dfrac{K}{s(s+T_1)^2}$
b. $\dfrac{K}{(s+T_1)(s+T_2)^2}$
c. $\dfrac{K}{(s+T)^3}$
d. $\dfrac{K}{s^2(sT_1+1)}$

117. The instrument used for plotting the root locus is called
a. Slide rule
b. Spirule
c. Synchro
d. Selsyn

118. A control system has
$$G(s)H(s) = \frac{K(s+1)}{s(s+3)(s+4)}$$
Root locus of the system can lie on the real axis
a. between s = – 1 and s = – 3
b. between s = 0 and s = – 4
c. between s = – 3 and s = – 4
d. towards left of s = – 4

119. A system has a single pole at origin. Its impulse response will be
a. constant
b. ramp
c. decaying exponential
d. oscillatory

120. The mechanical system shown below has its pole(s) at:



a. –K/D
b. –D/K
c. –DK
d. O, –K/D