ELECTRONICS & TELECOMMUNICATION ENGINEERING

PAPER–II

1. A source generates four messages with probability 1/8, 1/8, 1/4 and 1/2. What is the entropy of the source (bits! message)?
   a. 1
   b. 175
   c. 2
   d. 4

2. Match List I (Modulation) with List II (power input to Antenna in Watts) and select the correct answer using the code given below the lists:
   List-I
   A. 100% AM
   B. 50% AM
   C. 1.0% AM
   D. FM
   List-II
   1. 1.5
   2. 1.125
   3. 1.005
   4. 1.00
   Codes;

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

3. Which one of the following blocks is not common in both AM and FM receivers?
   a. RF amplifier
   b. Mixer
   c. IF amplifier
   d. Slope detector

4. Match List-I (Communication Service) with List-II (Bandwidth) and select the correct answer using the code given below
   List-I
   A. AM Broadcast
   B. Telephone
   C. Wideband FM
   D. TV
   List-II
   1. 10 kHz
   2. 4 kHz
   3. 200 kHz
   4. 7 MHz
   Codes:

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

5. A signal contains components at 400 Hz and 2400 Hz. This signal modulates a carrier of frequency 100 MHz. However, after demodulation it is found that the 400 Hz signal component is present. The channel BW is 15 kHz. What is the reason for the higher frequency signal not to be detected properly?
   a. Modulation used is FM and BW is insufficient
   b. Modulation used is AM and BW is insufficient
   c. Modulation used is FM but pre-emphasis is not used
   d. Modulation used is AM but detector is for FM

6. Quantization process used in analog to digital conversion process is a
   a. One-to-many mapping which causes loss of information
   b. Many-to-one mapping. It causes a loss of information at the transmission which can be recovered at the receiver
   c. One-to-one mapping
   d. Many-to-one mapping. The loss of information at the transmitter can not be recovered at the receiver

7. How much is contributed by each bit in the code word of a PCM system under uniform and symmetric quantization to the signal to noise ratio?
   a. 3dB
   b. 4dB
   c. 5dB
   d. 6 dB

8. In FDM systems used for telephone, which modulation scheme is adopted?
   a. AM
   b. DSB-Sc
   c. SSB-Sc
   d. FM

9. Which is the most important sub-system for recovering and reconstructing signals in a TDM system?
   a. Envelop detector followed by a low-pass filter
   b. Synchronization circuit for proper timing
   c. Band pass filters to segregate channels
   d. Coherent detector to ensure frequency and phase connection

10. Equalizers used in telephone systems to correct frequency distortion must have
    a. Flat-frequency response
    b. Similar frequency response as the medium to which they are connected V
    c. Complementary response to that of the medium
    d. A band pass filter type of response

11. A source produces 26 symbols with equal probability. What is the average information produced by this source?
    a. < 4 bits/symbol
    b. 6 bits/symbol
    c. 8 bits/symbol
    d. Between 4 and 6 bits/symbol

12. Light travels along the optical fibres by which mechanism?
    a. Refraction
    b. Reflection
    c. Scattering
    d. Total internal reflection

13. What is the reason for using frequencies of the order of a few GHz in satellite communication?
    a. Antenna sizes are small and ionosphere does not reflect frequencies
    b. Helical antennas can be used at these frequencies
    c. Frequencies can pass through ionosphere without attenuation
    d. Easy availability of components at these frequencies

14. Which ionosphere layer is responsible for return of a radiation at frequency 30 MHz?
    a. D
    b. E
    c. F
    d. All the above three

15. What are the characteristic impedance and the phase velocity on radio frequency lines?
    a. $Z = \sqrt{1/LC}\,\Omega$ and $v = \sqrt{L/C}\ m/s$
    b. $Z = R + \left(1/\sqrt{LC}\right)\Omega\ and\ v = 1/\left(\sqrt{LC}\right)m/s$
    c. $Z = \left(\sqrt{LC}\right)\Omega\ and\ v = \left(1/\sqrt{LC}\right)m/s$
    d. $Z = R + \left(\sqrt{L/C}\right)\Omega\ and\ v = 1/\left(\sqrt{LC}\right)m/s$

16. For a unity feedback control system the damping ratio is 0.421. What is the resonance magnitude?
    a. $M_r = 1$
    b. $M_r = 0.707$
    c. $M_r = 1.30$
    d. $M_r = 1.95$

17. Consider the following statements for a minimum phase system:
    1. All the poles of the transfer function should lie in the left of s-plane.
    2. The zeros of the transfer function can lie anywhere in the s-plane.
    3. Given the magnitude characteristic over the entire frequency range, the phase angle characteristic can be uniquely determined.
    Which of the statements give above are correct?
    a. 1, 2 and 3
    b. Only 1 and 2
    c. Only 2 and 3
    d. Only 1 and 3

18. Consider the following statements regarding the asymptotic Bode plots used for frequency response analysis
    1. The deviation of the actual magnitude response for a zero on real axis is 3 dB at the corner frequency.
    2. The phase angle for a pair of complex conjugate poles at undamped frequency depends upon the value of damping ratio.
    Which of the statements given above is/are correct?
    a. Only 1
    b. Only 2
    c. Both 1 and 2

d. Neither 1 nor 2

19.
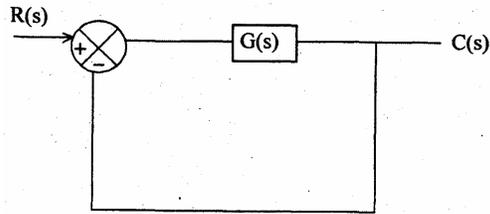
Consider the unity feedback system with $G(s) = \dfrac{2}{s(s+1)(2s+1)}$. What is the gain margin of the system?

a. 3/4
b. 4/3
c. 1/2
d. 3/5

20. Which one of the following statements is correct?

Nichol's chart is useful for detailed study and analysis of

a. closed loop frequency response
b. open loop frequency response
c. close loop and open loop frequency response
d. None of the above

21. What is the value of k for a unity feedback system with $G(s) = \dfrac{k}{s(1+s)}$ to have a peak overshoot of 50%?

a. 0.53
b. 5.3
c. 0.6
d. 0.047

22. A phase lead compensating network consists of only capacitors and resistors. The locations of its pole and zero in s-plane are at p_c and Z_c respectively. Which of the following conditions must be satisfied?

a. Both p_c and Z_c in LHS and $P_c < Z_c$
b. Both p_c and Z_c in LHS and $p_c > Z_c$
c. p_c is in LHS and Z_c can be in RHS
d. Z_c is in LHS and p_c can be in RHS

23. A composite R-C network yielded the following transfer function when calculated from its components

$$T(s) = \frac{C(s)}{R(s)} = \frac{1 + 21s + 20s^2}{1 + 11s + 10s^2}$$

This network can be used as which one of the following?

a. Phase lead compensator
b. Phase lag compensator
c. Lag lead compensator
d. None of the above

24. Which one of the following is a disadvantage of proportional controller?

a. It destabilizes the system
b. It produces offset
c. It makes response faster
d. It has very simple implementation

25. A communication channel has a bandwidth of 100 MHz. The channel is extremely noisy such that the signal power is very much below the noise power. What is the capacity of this channel?

a. 100 Mbps
b. 50 Mbps
c. 2400 bps
d. Nearly 0 bps

26. What is the phase shift between the input and output voltage in a common-base small signal amplifier (assuming ideal coupling and bypass capacitors)?

a. 180°
b. -180°
c. 0°
d. None of the above

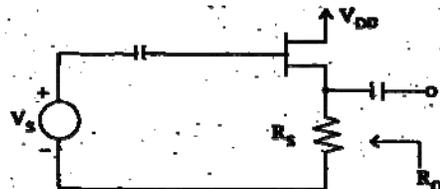27.
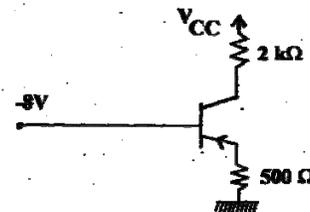
The transistor circuit shown in the figure given above is to function as an amplifier. If $I_{CQ} = 3$ mA, what is the value of V_{CC} (approximate)?

a. 15 V
b. – 15 V
c. – 10 V
d. – 13.5 V

28.

For the circuit shown above if $g_m = 3 \times 10^{-3}$ and $R_S = 3000\Omega$, then what is the value of R_0?

a. 3000 Ω
b. 1000/3 Ω
c. 300 Ω
d. 100 Ω

29. Consider the following parameters of a hybrid-it equivalent circuit of BJT:
1. Transconductance (g_m)
2. h_{fe}
3. h_{ie}

Which of the above parameters vary with temperature in similar manner (all of them decrease or all of them increase)?

Select the correct answer using the codes given below:

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

30. What is the main advantage of a JFET cascade amplifier?
a. High voltage gain
b. Low output impedance
c. Very low input capacitance
d. High input impedance

31. When used for amplification, the output port side of a BJT behaves as controlled current source. According to the above, the variation of which one of the following does not change the output current of an ideal BLT? (The BJT is being used in a common emitter amplifier circuit)
a. Load resistance
b. Collector to base bias voltage
c. Both load resistance and collector to base bias voltage
d. Base-emitter bias voltage

32. Where does the operating point of a class-B power amplifier lie?
a. At the middle of a.c. load line
b. Approximately at collector cut-off on both the d.c. and a.c. load lines
c. Inside the collector cut & off region on a.c. load line
d. At the middle point of d.c. load line

33. Consider the following statements in respect of a CC amplifier:

1. It performs a resistance transformation from low to high resistance.
2. Its current gain is close to unity.
3. Its voltage gain is close to unity.
4. Its frequency range is higher than that of a CE-stage.

Which of the statements given above are correct?

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

34. A CE-amplifier has $R_L = 10$ kΩ. Given $h_{ie} = 1$kΩ, $h_{fe} = 50$, $h_{re} = 0$ and $1/h_{oe} = 40$ kΩ. What is the voltage gain?
a. - 500
b. - 400
c. - 50
d. - 40

35. In an FET common-source high frequency amplifier, which one of the following is the correct expression for input capacitance C_i?
a. $C_i = C_{gs} + (1 - A_v)C_{gd}$
b. $C_i = C_{gs} + (1 - 1/A_v)C_{gd}$
c. $C_i = C_{gd} + (1 - A_v)C_{gs}$
d. $C_i = C_{gd} + (1 - 1/A_v)C_{gs}$

36. The drain gate capacitance of a junction FET is 2 pF. Assuming a common source voltage gain of 20, what is the input capacitance due to Miller effect?
a. 21 pF
b. 40 pF
c. 42 pF
d. 10 pF

37. Consider the following statements:

We would be able to achieve broad banding in a common source FET amplifier, by
1. resonance between the shunt capacitance and a compensating inductance.
2. RC compensating network between source and drain.
3. connecting compensating network in series with the coupling capacitors.

Which of the statements given above is/are correct?

a. Only 1
b. 1 and 2
c. 1 and 3

d. 2 and 3

38. An amplifier has an open loop gain of 1000 ± 10. Negative feedback is provided such that the gain variation remains within 0.1%. What is the amount of feedback PF?
   a. 1/10
   b. 1/9
   c. 9/100
   d. 9/1000

39. The two stages of a cascade amplifier have individual upper cut-off frequencies $f_1 = 5$ MHz and $f_2 = 333$ MHz. What is the best approximation for the upper cut-off frequency of the cascade combination?
   a. 4.16 MHz
   b. 3.33 MHz
   c. 2.5 MHz
   d. 5.00 MHz

40.
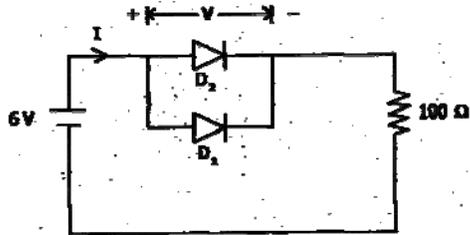
In the given circuit, D_1 is an ideal germanium diode and D_2 is a silicon diode. having its cut-in voltage s 0.7V, forward resistance as 20Ω and reverse saturation current ('s) as 10 nA. What are the values of I and V for this circuit, respectively?
   a. 60 mA and 0 V
   b. 50 mA and 0V
   c. 53 mA and 0.7 V
   d. 44 mA and 1.58 V

41. Consider the following statements:
   1. Stray capacitance at the input terminal of an op-amp effectively introduces an additional phase lag network in feedback loop.
   2. Stray capacitance depends upon the value of resistor used in feedback.
   3. Low value of resistances has higher effects on stray capacitance.
   4. High value of resistances has higher effects on stray capacitance.

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

42. A differential amplifier has inputs, $V_1 = 1050$ μV and $V_2 = 950$ μV with CMRR = 1000. What is the error in the differential output?
   a. 10%
   b. 1%
   c. 0.1 %
   d. 0.01 %

43. Narrow pulses with adjustable mark to space ratio can be obtained from square wave input signal by using which of the following?
   1. Schmitt trigger.
   2. Monostable multivibrator
   3. Clippers.

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

44. Assertion (A): The development of a microprocessor based product requires the design of program and the hardware.

   Reason (R): The design effort for an electronic product follows the same basic steps used in the development, of software.
   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

45. Assertion (A): Processor-level design is very much a heuristic process.

   Reason (R): At this level of abstraction, components are very complex.
   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

46. Assertion (A): Binary search function can be easily implemented using recursion.

   Reason (R): Recursion is based on number of elements in array to be searched.
   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

47. Assertion (A): In microwave communication links, rain causes fading and this is a great concern in communication systems.
Reason (R): Water droplets in the path of an electromagnetic wave will scatter the energy in the waves and this collecting scattering will weaken the incident wave in the forward direction.
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

48. Assertion (A): TDM can be employed to transmit channels having unequal bandwidths.
Reason (R): If sampling theorem is strictly followed, any analog signal can be reconstructed from its samples.
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

49. Assertion (A): An eight-bit PCM system performs better than a six-bit PCM system.
Reason (R): Eight-bit system produces smaller quantization noise than a six-bit system.
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

50. Assertion (A): The closed loop stability can be determined from the poles of an open loop system and the polar plot of frequency response.
Reason (R): Unstable system has right half-poles.
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

51. Assertion (A): To obtain high switching speed in BJT based logic circuits, transistors, are operated in active region.
Reason (R): In active region, a transistor works as a linear element.
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

52. Assertion (A): The capture range of a PLL is always less than or equal to the lock range and is related to the cut-off frequency of the low-pass filter in the loop.
Reason (R): The capture range is range of frequencies, the VCO can produce.
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

53. Assertion (A): All practical R-C phase shift oscillators generate sinusoidal oscillation with some amount of amplitude distortion, which cannot be avoided.
Reason (R): The amplitude oscillation of a sinusoidal oscillator is controlled by the onset of non linearity of the amplifying device.
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

54. Consider the following statements:
Intel Pentium-IV processor is designed to give
1. DVD authoring and MPEG 4 video.
2. 3-D gaming and digital imaging.
3. Superior performance for analog music.
Which of the statements given above are correct?
a. Only 1 and 2
b. Only 2 and 3

c. Only 1 and 3

d. 1, 2 and 3

55. Match items in the List-I (Type of Assembly Language Directives) with those in the List-II (opcode) and select the correct answer using the code given below the lists

List - I

A. Macro definition

B. Memory assignment

C. Miscellaneous

D. Symbol definition

List -II

1. ENDM

2. DC

3. TITLE

4. EQU

Codes;

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

56. Match List-I (Characters used in Assembly Language) with List-II (Assembly Language Programming-ALP) and select the correct answer using the code given below the lists

List-I

A. Blank

B. Colon

C. Semicolon

D. Comma

List-II

1. Beginning of comment field

2. End of label field

3. Separator for operand

4. Separator for op field and operand

Codes;

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

57. Select the signal which is not a part of the modem port on PC?

a. CTS enabled

b. RI enabled

c. Time-out

d. CD enabled

58. Which vacuum based device is widely used as a power amplifier in satellite communication systems?

a. Amplitron

b. Klystron

c. Magnetron

d. TWT

59. What is the approximate HPBW (Half Power Beam Width) of a parabloid of 1 metre diameter radiating at 01 metre wavelength?

a. 70°

b. 7°

c. 35°

d. 78°

60. The two-valley model of the Ridley-Watkins Hilsum theory is best suited to explain the working of which one of the, following?

a. Quartz crystal oscillator

b. Gunn Diode oscillator

c. Klystron oscillator

d. R-C oscillator

61. The working of a travelling wave tube is based on the interaction between.

a. Moving electrons and the transverse component of a progressive e.m. wave

b. Moving electrons and the axial component of a progressive e.m. wave

c. Moving electrons and the transverse component of a rotating magnetic field

d. Moving electrons and the axial component of a steady magnetic field

62. Which of the following are microwave sources?

a. Klystron

b. Magnetron

c. IMPATT

d. TWTA

63. To prevent oscillations in the TWT which one of the following is resorted to?

a. Bunching defocusing mechanism is used

b. Attenuator is used

c. External magnetic field is provided

d. Helix is used

64. Which of the following microwave components has got the combined characteristics of dielectric, ohmic and radiation losses?

a. Waveguide

b. Microstrip line
c. Co-axial line
d. Parallel twin line

65. By measuring the VSWR values in the main and ancillary waveguides of a directional coupler, we can determine its
   a. Phase co-relation and efficiency
   b. Frequency shift and phase variations
   c. Attenuation and radiation efficiency
   d. Directivity and coupling factor

66.
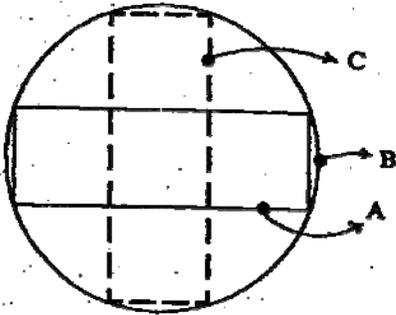
A rectangular waveguide (A) is gradually deformed first into a circular waveguide (B) and back again into a rectangular waveguide (C) which is oriented through 90° with respect to (A). If the input mode is TE_{10}, which mode is excited in the output waveguide (C)?
   a. TE_{10}
   b. TE_{01}
   c. TE_{11}
   d. TM_{11}

67. Which one of the following expresses the phase velocity in microstrip lines?
   (where C = Velocity of light in free space, ε_0 = Effective dielectric constant)
   a. C / ε_e
   b. $C / \sqrt{\varepsilon_e}$
   c. $C.\varepsilon_e$
   d. $\sqrt{\varepsilon_e}.C$

68. Consider the following statements about microstrips:
   1. Microstrips are operated under the condition where the substrate thickness $\gg \lambda_0$.
   2. When the substrate thickness $\gg \lambda_0$, the line is dispersive.
   3. As the frequency of operation increases, the phase velocity on the

line decreases and approaches the velocity in free space.
Which of the statements given above is/are correct?
   a. 1, 2 and 3
   b. Only 1 and 3
   c. Only 2
   d. Only 1 and 2

69. What is the value of directivity of an isotropic antenna?
   a. 1dB
   b. 0
   c. 4π dB
   d. $\pi/2$ dB

70. A pyramidal horn antenna is best suited to excite from a
   a. Microscrip line
   b. Microwave waveguide
   c. Coaxial line feed
   d. Parallel twin line

71. A parabolic of revolution is to have a power gain of 1000 at λ = 10 cm. What is the diameter of the antenna?
   a. 129.1 m
   b. 12.9l m
   c. 1.291 m
   d. 0.1291 m

72. In general, attenuation per unit length in a coaxial cable
   a. increases with frequency
   b. decreases with frequency
   c. remains constant with frequency.
   d. depends upon the type of coaxial cable. It can either increase or decrease.

73. Match List-I (Meter/Theorem) with List-II (Measurement) and select the correct answer using the code given below the lists:
   List - I
   A. Bolometer
   B. Reciprocity Theorem
   C. VSWR meter
   D. Cavity wavemeter
   List –II
   1. Antenna measurements
   2. Microwave power measurements
   3. Reflection coefficient measurements
   4. Microwave frequency measurements
   Codes;

| A | B | C | D |

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

74. A uniform plane electromagnetic wave is normally incident upon a thick magnetic material such that its complex permittivity is equal to its complex permeability i.e., $\mu^* = \varepsilon^*$.

Which one of the following is the correct statement?
a. There will not be any reflection from the material
b. A part of the wave will be reflected such that reflection coefficient would be 0.5
c. Reflection coefficient would be close to 1
d. Transmission coefficient would be 0.9

75. By using a travelling wave structure in a maser, we may
a. Increase the bandwidth of operation
b. Increase the power output
c. Stabilize the frequency of operation
d. Minimize the noise level and distortion

76. In parametric amplifiers used in microwave communication systems, the 'pump energy' is the deciding factor for which one of the following?
a. Frequency stability
b. Maximum output
c. Amplification factor
d. Thermal noise level

77. In root locus, what is the number of separate loci?
a. The number of zeros of the open loop transfer function
b. The number of poles of G(s) H(s)
c. The number of roots of the characteristic equation with positive real part
d. The number of zeros of the characteristic equation with the negative real parts

78. Consider the following statements with respect to feedback control systems:
1. Accuracy cannot be obtained by adjusting loop gain.
2. Feedback decreases overall gain.
3. Introduction of noise due to sensor reduces overall accuracy.

4. Introduction of feedback may lead to the possibility of instability of closed loop system.
Which of the statements given above are correct?
a. 1, 2, 3 and 4
b. Only 1, 2 and 4
c. Only 1 and 3
d. Only 2, 3 and 4

79. The characteristic equation of a control system is:
$s^5 + 15s^4 + 85s^3 + 225s^2 + 274s + 120 = 0$.
What are the numbers of roots of the equation which lie to the left of the line s+1 = 0?
a. 2
b. 3
c. 4
d. 5

80. For a given unity feedback system with $G(s) = \dfrac{k(s+3)}{s(s+1)(s+2)(s+3)}$, what is the real axis intercept for root locus asymptotes?
a. 2/3
b. 1/4
c. -5/3
d. -3/2

81. For a stable system, what are the restrictions on the gain margin and phase margin?
a. Both gain margin and phase margin arc negative
b. Gain margin is negative and phase margin is positive
c. Gain margin is positive and phase margin is negative
d. Both gain margin and phase margin are positive

82. The system having characteristic equation:
$s^4 + 2s^3 + 3s^2 + 2s + k = 0$
is to be used as an oscillator. What are the values of k and frequency of oscillation ω?
a. k = 1 and ω = 1 r/s
b. k = 1 and ω = 2 r/s
c. k = 2 and ω = 1 r/s
d. k = 2 and ω = 2 r/s

83. The unit step response of a system is $1 - e^{-1}(1 + t)$. Which is this system?
a. Unstable

b. Stable
c. Critically stable
d. Oscillatory

84. The open loop transfer function of a unity negative feedback control system is given by

$$G(s) = \frac{k}{(s+2)(s+4)(s^2+6s+25)}$$

What is the value of k which causes sustained oscillations in the closed loop system?
a. 590
b. 790
c. 990
d. 1190

85. The unit step response of a second order system is $= 1 - e^{-5t} - 5t\, e^{-5t}$
Consider the following statements:
1. The undamped natural frequency is 5 rad/s.
2. The damping ratio is 1.
3. The impulse response is $25\, t\, e^{-5t}$
Which of the statements given above are correct?
a. Only 1 and 2
b. Only 2 and 3
c. Only 1 and 3
d. 1, 2 and 3

86. Consider the following statements:
For the first order transient systems, the time constant is
1. a specification of transient response.
2. reciprocal of real-axis pole location.
3. an indication of accuracy of response.
4. an indication of speed of the response.
Which of the statements given above are correct?
a. Only 1 and 2
b. Only 1, 2 and 4
c. Only 3 and 4
d. 1, 2, 3 and 4

87. Given below are three types of converters
1. Successive approximation type
2. Weighted resistor type
3. R-2 R ladder type
Which of these Types are D to A converters?
a. Only 1 and 2
b. Only 2 and 3

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

88. A 10-bit A/D converter is used to digitize an analog signal in the .0 to 5 V range. What is the approximate value of the maximum peak to peak ripple voltage that can be allowed in the d.c. supply voltage?
a. 100 mV
b. 50 mV
c. 25 mV
d. 5.0 mV

89.
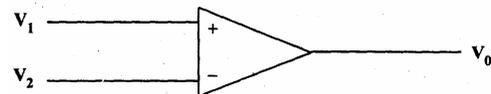
How can the voltage comparator shown in the circuit given above be used in the analog-to-digital conversion?
a. As a 1-bit quantizer
b. As a 2-bit quantizer
c. As a 4-bit quantizer
d. As a 8-bit quantizer

90. Which one of the following D/A converters has the resolution of approximately 04 % of its full scale range?
a. 8-bit
b. 10-bit
c. 12-bit
d. 16-bit

91. Match List-I (Circuit) with List-II (Application) and select the correct answer using the code given below the lists:
List-I
A. Ripple up counter
B. Synchronous down counter
C. Shift left register
D. Shift right register
List-II
1. Division
2. Multiplication
3. To create delay
4. Transient states
Codes;

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

92. A master slave configuration consists of two identical flip- flops connected in such

a way that the output of the master is input to the slave. Which one of the following is correct?

a. Master is level triggered and slave is edge triggered
b. Master is edge triggered and slave is level triggered
c. Master is positive edge triggered and slave is negative edge triggered
d. Master is negative edge triggered and slave is positive edge triggered

93. What is the number of selector lines required in a single input n-output demultiplexer?

a. 2
b. n
c. 2^n
d. $\log_2 n$

94. Which one of the following equations satisfies the 1K flip-flop truth table?

a. $Q_{n+1} = J_n \bar{Q} + \bar{K}_n Q_n$
b. $Q_{n+1} = \bar{J}_n \bar{Q}_n + \bar{K}_n Q_n$
c. $Q_{n+1} = J_n Q_n + K_n Q_n$
d. $Q_{n+1} = \bar{J}_n \bar{Q}_n + \bar{K}_n \bar{Q}_n$

95. A single ROM is used to design a combinational circuit described by a truth-table. What is the number of address lines in the ROM?

a. Number of input variables in the truth-table
b. Number of output variables in the truth-table
c. Number of input plus output variables in the truth-table
d. Number of lines in the truth-table

96. The Boolean expression Y(A,B,C) A + BC is to be realized using 2-input gates of only one type. What is the minimum number of gates required for the realization?

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

97.
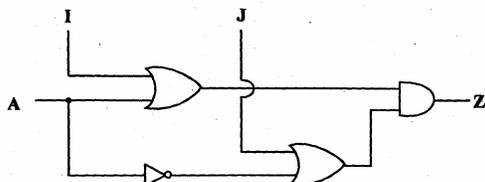
The circuit shown above is to be used to implement the function Z = f(A, B) = $\bar{A}$ + B. What values are to be selected for I and J?

a. I = 0, J = B
b. I = A, J = B.
c. I = B, J = 1
d. I = B, J = 0

98. The Boolean expression
$X(P,Q,R) = \pi(0,5)$ is to be realized using only two 2-input gates. Which are these gates?

a. AND and OR
b. NAND and OR
c. AND and XOR
d. OR and XOR

99. Match List-I (Logic Gate) with List-II (Characteristic) and select the correct answer using the code given below the lists:

List I

A. HTL
B. CMOS
C. I²L
D. ECL

List II

1. High fan-out
2. Highest speed of operation
3. High noise immunity
4. Lowest product of power and delay

Codes;

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

100. Match List-I (TTL Nos.) with List-II (Significance) and select the correct answer using the code given below the lists:

List - I

A. 74 LS 00
B. 74 H 00
C. 74 00
D. 74 L 00

List -II

1. Low power/low speed
2. High speed/high power
3. Basic NAND Gate

4. Low power Schottky

Codes;

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

101.
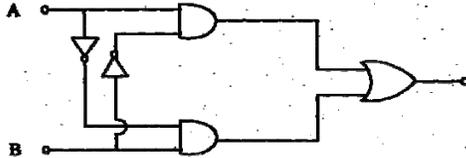
Which one of the following logic operations is performed by the digital circuit shown above?

a. NOR
b. NAND
c. EX-OR
d. OR

102.

A	B	C	f
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	0

What is the boolen expression for the truth table shown above?

a. $B(A+C)(\bar{A}+C)$

b. $B(A+\bar{C})(\bar{A}+C)$

c. $\bar{B}(A+\bar{C})(\bar{A}+C)$

d. $\bar{B}(A+C)(\bar{A}+C)$

103. What does the Boolean expression

$AD + ABCD + ACD + \bar{A}B + A\bar{C}D + \bar{A}\bar{B}$,

on minimization result into?

a. $A+D$
b. $AD + \bar{A}$
c. AD
d. $\bar{A} + D$

104. If A and B are Boolean variables, then what is $(A+B).(A+\bar{B})$ equal to?

a. B

b. A

c. $A+B$

d. AB

105. What is the Boolean expression $A \oplus B \oplus$ equivalent to?

a. $AB + \bar{A}\bar{B}$

b. $\bar{A}B + A\bar{B}$

c. B

d. $\bar{A}$

106. In terrestrial microwave links, the number of 'fades' per unit time increases as

a. Both the transmission frequency and the distance between the antennas are increased

b. The transmission frequency is increased but the distance between the antennas is decreased

c. The transmission frequency is decreased but the distance between the antennas is increased

d. Both the transmission frequency and the distance between the antennas are decreased

107. A half-wave dipole radiating at 100 MHz is situated 50 m above the ground. A similar receiving antenna is situated 20 km away at a height of 20 m above the ground. If the transmitted power is 100 W, what is the received power on direct patch? (Assume maximum power gain of antenna 21 dB)

a. - 743 dBW
b. - 90 dBW
c. - 47 Dbw
d. - 50 dBW

108. Which of the following subtraction operations do not result in F_{16}?

1. $(BA)_{16} - (AB)_{16}$
2. $(BC)_{16} - (CB)_{16}$
3. $(CB)_{16} - (BC)_{16}$

Select the correct answer using the codes given below:

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

109. What is the Gray code word for the binary number 101011?

a. 101011
b. 110101
c. 011111

d. 111110

110. Which one of the following is correct for ASCII codes for all upper case English letter compared to all lower case English letters?
   a. Are all large
   b. Are all smaller
   c. Are all equal
   d. Some are larger and some are smaller

111. Which of the following instructions of an 8086 microprocessor uses the contents of a CX register as a counter?
   1. LOCK
   2. LOOP
   3. ROTATE
   Select the correct answer using the codes given below:
   a. Only 1 and 2
   b. Only 1 and 3
   c. Only 2 and 3
   d. 1, 2 and 3

112. Which one of the following is not correct about recursion?
   a. Depth of stack is proportional to the depth of recursion
   b. Some of the recursive function can not be written as non-recursive one
   c. For some of functions, writing recursive version is easier than non-recursive version
   d. Recursive functions have terminating condition which limits the depth of recursion

113. Self-referential structures of 'C' programming language are very useful in applications that involve
   a. Graphs
   b. Lists
   c. Queues
   d. Stacks

114. If push and pop operation on a stack takes 1 unit time, how much time would it take to delete an element at n^{th} position from bottom?
   a. 1
   b. n
   c. 2

d. Cannot be determined from the given data

115. For which of the following devices, is DMA the most suitable?
   a. Keyboard
   b. Mouse
   c. Joystick
   d. Hard disk

116. Which block replacement algorithm is not generally used in cache operation?
   a. LIFO
   b. FIFO
   c. LRU
   d. Random

117. A Wallace tree is a:
   a. Sequential logic circuit that counts number of pulses
   b. Sequential logic circuit that adds two numbers
   c. Combinational logic circuit that adds two numbers
   d. Combinational circuit that multiplies two numbers

118. Which one of the following pairs is not correctly matched?
   a. Horizontal micro-instruction : CISC-instructions
   b. Multiplier control: 2's complement
   c. Multiplier control unit: Encoding by function
   d. Vertical micro-instruction : IUSC-instructions

119. Which one of the following pairs of 8086 microprocessor's interrupt is not correctly matched?
   a. INT 0   : Divide by zero
   b. INT 1   : Single step
   c. INT 2   : Break point
   d. INT 4   : Overflow

120. Which one of the following registers of 8085 microprocessor is not a part of programming model?
   a. Instruction register
   b. Memory address register
   c. Status register
   d. Temporary data register