Time : 3 Hours

D

Marks : 200

Instructions :

(i) Each question carries *one* mark.

(ii) Choose the correct or most appropriate answer from the given options to the following questions and darken, with blue/black ball point pen the corresponding digit 1, 2, 3 or 4 in the circle pertaining to the question number concerned in the OMR Answer Sheet, separately supplied to you.

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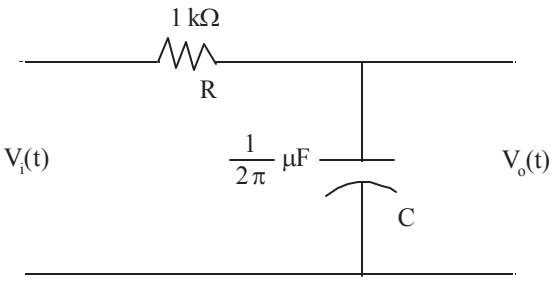
1. Consider an RC LPF as shown below



If $V_i(t)$ is a sinusoidal signal of frequency 1 kHz, then $V_o(t)$

(1) Leads $V_i(t)$ by 90º

(2) Lags behind $V_i(t)$ by 45º

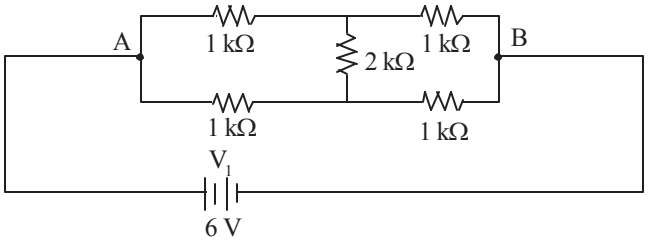
(3) Is in phase with $V_i(t)$

(4) Lags behind $V_i(t)$ by 30º

---

2. The current through the 2 kΩ resistance in the circuit shown below is

(1) 0 mA (2) 1 mA (3) 2 mA (4) 6 mA



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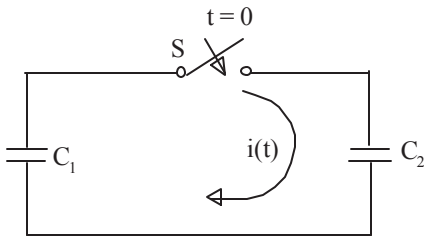
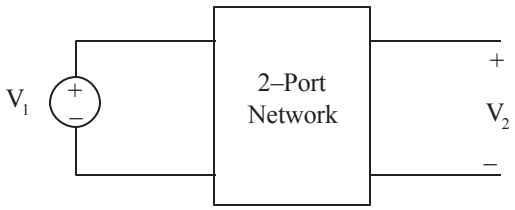
3. In the following figure, C_1 and C_2 are ideal capacitors. C_1 has been charged to 12V before the ideal switch S is closed at t=0. The current i(t) for all t is



(1) zero
(2) a step function
(3) an exponentially decaying function
(4) an impulse function

---

4. Consider a Two Port Network as shown below

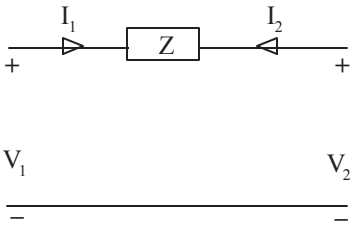


If the network is described in terms of its z-parameters, with Port-2 open $G_{12} = V_2/V_1$ is

(1) $-z_{21}/z_{11}$
(2) z_{21}/z_{11}
(3) $-z_{12}/z_{11}$
(4) z_{12}/z_{11}

---

5. Which one of the following parameters doesn't exist for the two-port network shown in the given figure



(1) ABCD
(2) Y
(3) H
(4) Z

D

6. For a 2-port symmetrical bilateral network, if transmission parameters A = 3 Ω and B = 1 Ω, the value of parameter C is

(1) 3 Ω (2) 8 Ω (3) 10 Ω (4) 9 Ω

---

7. A computer has the following negative numbes stored in binary form as shown. The wrongly stored number is

(1) – 37 as 11011011 (2) – 89 as 10100111

(3) – 48 as 11101000 (4) – 32 as 11100000

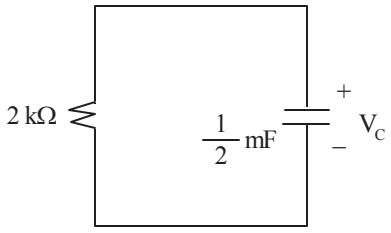
---

8. A lossless transmission line operating at 4.5 GHz has L = 2.5 μ H/m and z_0 = 75 Ω. The corresponding phase velocity is

(1) 135 Km/s (2) 30 Mm/s (3) 150 Km/s (4) 41.6 Mm/s

---

9. In the following RC circuit, $V_C(0) = 10$ V.



Then, $V_C(t)$ is

(1) e^{-t} (2) $5e^{-t}$ (3) $10e^{-t}$ (4) $10 + e^{-t}$

---

10. The radiation resistance of any antenna should be always

(1) As low as possible

(2) As high as possible

(3) Should be high for receiving antennas and low for transmitting antennas

(4) Should be low for receiving antennas and high for transmitting antennas

---

D

11. Match List-I(Laws) with List-II(Applications) and select the correct answer.

List-I	List-II
	To find the
A. Ampere's law	a. Force on a charge
B. Biot's law	b. Force due to a current carrying conductor
C. Coulomb's law	c. Electric flux density at a point
D. Gauss's law	d. Magnetic flux density at a point

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

---

12. Which of the following statements holds for the divergence of electric and magnetic flux densities?

(1) Both are zero

(2) These are zero for static densities but non zero for time varying densities

(3) It is zero for the electric flux density

(4) It is zero for the magnetic flux density

---

13. Directivity of antenna with normalized radiation intensity

$u(0, 4) = \sin \theta \le \theta \le \frac{\pi}{2}$

$\theta \le \phi \le 2\pi$ will be

(1) 1.546 (2) 2.546 (3) 3.546 (4) 4.446

---

14. Which one of the following statements is correct?

Short circuited stubs are preferred to open circuited stubs because the latter are

(1) More difficult to make and connect

(2) Made of a transmission line with a different characteristic impedance

(3) Liable to radiate energy

(4) Incapable of giving a full range of frequencies

---

15. What is the directivity of antenna whose normalized intensity is $\mu(\theta, \phi) = \cos(\theta)$, $0 \le \theta \le \pi/2$, $\theta \le \phi \le 2\pi$?

(1) 1 (2) 2 (3) 3 (4) 4

D

16. A digital TDM system multiplexes 24 voice signals. Each signal is sampled at a rate of 8 kHz and each sample is represented by an 8 bit word. In each rotation, if the multiplexer makes contact with all the signals, the number of bits/rotation at the output of the multiplexer is

(1) 64 (2) 192 (3) 24 (4) 1536

---

17. Which capacitor stores a higher amount of energy?

(1) Air capacitor (2) Paper capacitor

(3) Mica capacitor (4) Plastic film capacitor resistor

---

18. The colour code on a carbon resistor is red-red-black-silver. The value of this resistor is

(1) 22000 Ohms (2) 2200 Ohms

(3) 22 ± 5 % Ohms (4) 22 ±10% Ohms

---

19. Which of the following statements is correct

(1) Thermistors have positive temperature coefficient only

(2) Varistors have negative voltage coefficients only

(3) Both varistors and thermistors are linear resistors

(4) Both varistors and thermistors are temperatuare independent

---

20. If the resistance of a material falls with increasing temperature it is said to have

(1) Negative temperature coefficient (2) Positive temperature coefficient

(3) Zero temperature coefficient (4) Independent of resistance

---

21. Materials which can store electrical energy are called

(1) Magnetic materials (2) Semi conductors

(3) Dielectric materials (4) Super conductors

---

22. Low frequency response and high frequency response in amplifiers can be boosted by using _____ and _____ respectively in their output circuits.

(1) Resistors, Resistors (2) Coils, Capacitors

(3) Capacitors, Coils (4) Transformers, Transformers

D

23. The temperature beyond which substances lose their permanent magnetic properties is known as

(1) Critical temperature (2) Curie temperature

(3) Inversion temperature (4) Conversion temperature

---

24. The property of material by which it can be rolled into sheets is called

(1) Plasticity (2) Elasticity (3) Malleability (4) Ductility

---

25. Among these which has highest dielectric constant ?

(1) Polysterene (2) Mica (3) Cotton (4) Transformer oil

---

26. Magnetically saturated ferrite

(1) causes large hysteresis

(2) produces low eddy current

(3) interacts with ultrasonic heat radiations

(4) interacts with electromagnetic waves

---

27. After curie temperature

(1) Ferrimagnetic becomes paramagnetic material

(2) Paramagnetic becomes ferrimagnetic material

(3) Paramagnetic material becomes antiferro magnetic

(4) Ferromagnetic becomes antiferro magnetic material

---

28. In Silicon, at T = 300 K, the thermal equilibrium concentration of electrons is $5 \times 10^4/cm^3$. If the instrinsic carrier concentration is $1.5 \times 10^{10}/cm^3$, the hole concentration is

(1) $4.5 \times 10^{15}/cm^3$ (2) $0.3 \times 10^{16}/cm^3$ (3) $4.5 \times 10^6/cm^3$ (4) $0.3 \times 10^6/cm^3$

---

29. A sample of Silicon at T = 300 K is doped with Boron at a concentration of 2.5×10^{13} cm^{-3} and with Arsenic at a concentration of 1×10^{13} cm^{-3}. The resulting material is

(1) p-type with thermal equilibrium hole concentration of 1.5×10^{13} cm^{-3}

(2) n-type with thermal equilibrium electron concentration of 1.5×10^{13} cm^{-3}

(3) p-type with thermal equilibrium hole concentration of 2.5×10^{26} cm^{-3}

(4) n-type with thermal equilibrium electron concentration of 2.5×10^{26} cm^{-3}

---

30. In TV Signal Transmission AM is used for Video Broadcasting

(1) for Bandwidth conservation

(2) for having better picture quality

(3) since AM is with better noise performance than FM

(4) since AM signal travels over longer distances

---

31. For a BJT, $I_C = 5.001$ mA, $I_B = 49$ μA and $I_{CBo} = 1$ μA, the DC current gain of BJT is

(1) 91 (2) 100 (3) 80 (4) 50

---

32. One of the applications of current mirror is

(1) Output current limiting

(2) Obtaining a very high current gain

(3) Current feedback

(4) Temperature stabilized biasing

---

33. Match the following List-I with List-II

List–I	**List–II**
A. CB configuration	P. Constant Voltage Source
B. Zener diode	Q. Frequency Variation
C. Varactor diode	R. Constant Current Source

(1) A-P, B-R, C-Q (2) A-R, B-P, C-Q

(3) A-Q, B-Q, C-R (4) A-Q, B-R, C-P

---

34. When the JFET is no longer able to control the current, this point is called the

(1) Breakdown voltage (2) Depletion region

(3) Saturated point (4) Pinch-off region

---

35. In a Varactor diode using alloy junction, the transistor capacitance is proportional to

(1) v_j^2 (2) $1/v_j$ (3) $1/\sqrt{v_j}$ (4) $1/v_j^2$

---

36. The cut in voltage of a "Si" tunnel diode is

(1) 0.7V (2) 0.3V (3) 0.1V (4) 0V

---

37. The material popularly used for contacts and interconnections in ICs is

(1) Copper (2) Aluminum (3) Silver (4) Zinc

---

38. Match the following

(a)	Sampling	(P)	Better S/N
(b)	Quantization	(Q)	Analog signal
(c)	Diode detector	(R)	Power coupling
(d)	Index profile	(S)	FM demodulation
		(T)	Diagonal clipping

Code :

	(a)	(b)	(c)	(d)
(1)	(P)	(Q)	(T)	(R), (S)
(2)	(T)	(T)	(Q), (R)	(R)
(3)	(Q)	(P)	(S), (T)	(R)
(4)	(Q)	(P)	(S)	(T)

---

39. Number of electrons in any shell 'n' of an atom can be determined by the formula

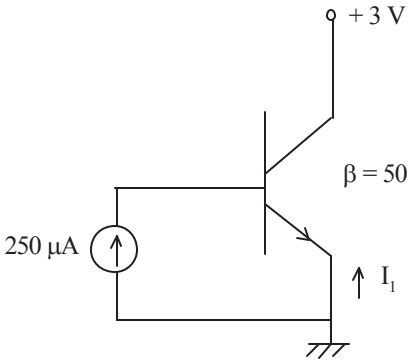
(1) $4n^2$ (2) $3n^2$ (3) $2n^2$ (4) n^2

---

40. The main purpose of the metalization process in IC manufacturing is

(1) to act as heat sink
(2) to interconnect various circuit elements
(3) to protect chip from oxidation
(4) to supply a bonding surface for mounting the chip

41.



In the above circuit I_1 is

(1) – 12.75 mA (2) 12.5 mA (3) 12.75 mA (4) 5 mA

---

42. The threshold voltage of an n-channel MOSFET can be increased by _____

(1) increasing the channel dopant concentration (2) reducing the channel length

(3) reducing the channel dopant concentration (4) reducing the gate oxide thickness

---

43. The power efficiency of Class-A power amplifier is poor because

(1) BJT used is biased at cut off

(2) BJT conducts for less than 180º

(3) Operating point of BJT used is fixed at the center of DC load line

(4) BJT used is biased below cut off

---

44. A network has 7 nodes and 5 independent loops. The number of branches in the network is

(1) 13 (2) 12 (3) 11 (4) 10

---

45. A series circuit consists of two elements has the following current and applied voltage $i = 4\cos(2000t+11.32^{\circ})$ A and $v = 200\sin(2000t+50^{\circ})$. The circuit elements are

(1) Resistance and Capacitance (2) Capacitance and Inductance

(3) Inductance and Resistance (4) Both Resistance

---

46. A distortion less transmission line has the following parameters :

$R = 8\ \Omega/m$; $L = 0.4\ \mu A/m$; $C = 1$ nF/m

The attenuation constant of the line is

(1) 0.16 (2) 0.4 (3) 0.02 (4) 0.8

---

47. Considering the following statements P and Q

P: At the resonant frequency the impedance of series RLC circuit is zero.

Q: In parallel GLC circuit, increasing the conductance G results in increase in its Q-factor. Which of the following is correct.

(1) P is false and Q is true (2) Both P and Q are true

(3) P is true and Q is false (4) Both P and Q are false

---

48. A band limited signal x(t) is having a Nyquist's rate of f_o Hz. The Nyquist's rate of $x(t).\cos 2\pi f_o t$ is

(1) $2f_o$ (2) f_o (3) $3f_o$ (4) $4f_o$

---

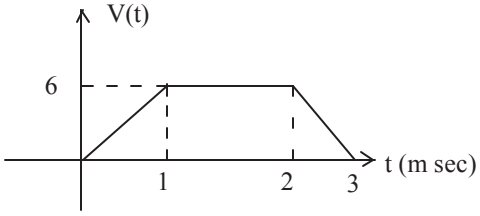
49. A DC voltage source is connected across a series RLC circuit. Under steady state conditions, the applied DC voltage drops entirely across the

(1) R only (2) L only

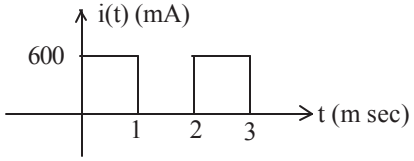
(3) C only (4) R and L combination

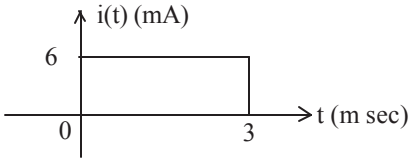
---

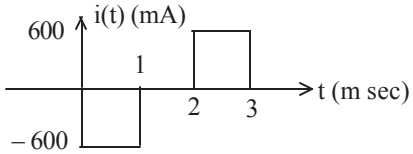
50. The voltage across a 100 μF capacitor is shown as

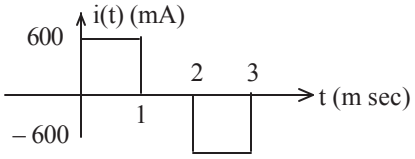


The current in the capacitor is

(1) 

(2) 

(3) 

(4) 

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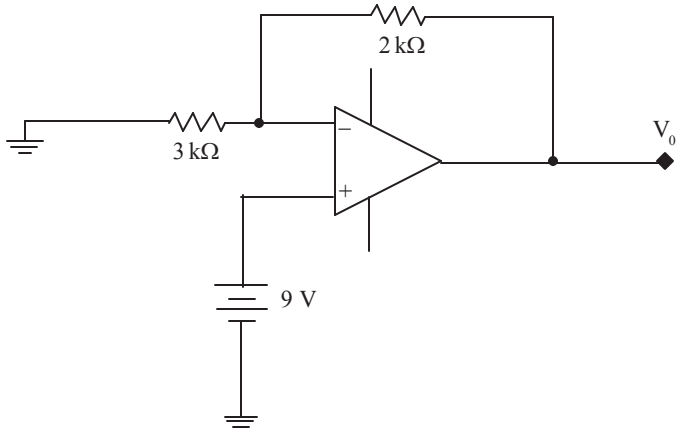
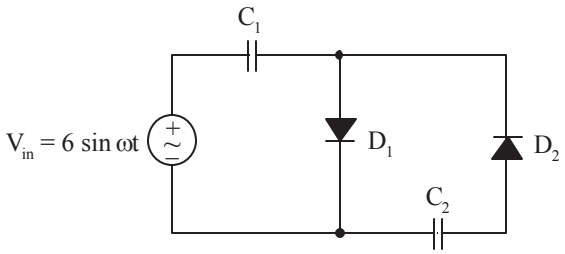
51. If the op-amp is ideal, What is the value of V_0 for circuit given below



(1) 10 V (2) 15 V (3) 3 V (4) 6 V

---

52. The diodes and capacitors shown in the circuit are ideal. The voltage across C_2 is



(1) 6 V (2) 12 V (3) 18 V (4) 20 V

---

53. Match the following

List - 1	**List - 2**
(a) Wein bridge	(p) RF oscillator, two inductances and one capacitance in the reactance network
(b) Colpitts	(q) LC oscillator for RF frequency: three capacitances and one inductance in the reactance network
(c) Hartley	(r) RC oscillator for audio frequency applications
(d) Clapp	(s) RF oscillator, two capacitances and one inductance in the reactance network

	(a)	(b)	(c)	(d)
(1)	(q)	(p)	(s)	(r)
(2)	(q)	(s)	(p)	(r)
(3)	(r)	(s)	(p)	(q)
(4)	(r)	(p)	(s)	(q)

---

54. An op-amp has a slew rate of 5 V/μS. At its output, the largest sinewave output voltage possible at frequency of 1 MHz is

(1) 10π volts (2) 5 volts (3) 5/π volts (4) 5/2π volts

D

55. There are 4 sources S_i (i = 1, 2, 3, 4), each transmitting 2 messages with the respective probabilities as shown below

Source	Message	Probability
S_1	m_{11}	0.9
	m_{12}	0.1
S_2	m_{21}	0.6
	m_{22}	0.4
S_3	S_{31}	0.5
	S_{32}	0.5
S_4	S_{41}	1
	S_{42}	0

The sources carrying maximum and minimum average information/message respectively are

(1) S_3, S_1 (2) S_1, S_2 (3) S_3, S_4 (4) S_4, S_2

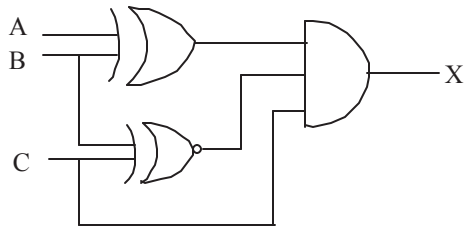
---

56. To implement Y=ABCD using only two input NAND gates, minimum number of NAND gates required are _____

(1) 5 (2) 7 (3) 6 (4) 8

---

57. What are the inputs (A, B, C) to get output X = 1 for the below combinational circuit



(1) A = 1, B = 0, C = 1 (2) A = 1, B = 0, C = 0

(3) A = 0, B = 1, C = 1 (4) A = 0, B = 0, C = 1

---

58. . _____ logic family has the lowest propagation delay

(1) CMOS (2) TTL (3) ECL (4) NMOS

D

59. Indicate which of the following three binary additions are correct ?

(x) 1011 + 1010 = 10101

(y) 1010 + 1101 = 10111

(z) 1010 + 1110 = 1111

(1) (x) only (2) (x) and (y) only

(3) (x) and (z) only (4) (x), (y) and (z)

---

60. A 5-bit modulo-32 ripple counter uses JK flip flop. If the propagation delay of each FF is 50ns, the maximum clock frequency is _____ (in MHz)

(1) 4 (2) 5 (3) 3 (4) 2

---

61. How many states do a 5-bit ripple counter, ring counter, Johnson counter have respectively

(1) 32,5,10 (2) 15,32,5 (3) 5,10,5 (4) 32,10,10

---

62. Match the following

P.	A shift register can be used	A.	Code converter
Q.	A multiplexer can be used	B.	To generate memory chip select
R.	A decoder can be used	C.	To provide delay to the input
		D.	As a many to one switch

	P	Q	R
(1)	C	D	B
(2)	A	B	C
(3)	A	C	B
(4)	B	C	D

---

63. The number of minterms after minimizing the Boolean expression

[D' + AB' + A'C + AC'D + A'C'D]' is

(1) 1 (2) 2 (3) 3 (4) 4

---

64. What is the minimal form of the function represented by the K-map

	1		1
1		1	

(1) $(a'b + ab')c$ (2) $(a'b + ab')c'$

(3) $a'b'c'$ (4) $a \oplus b \oplus c$

---

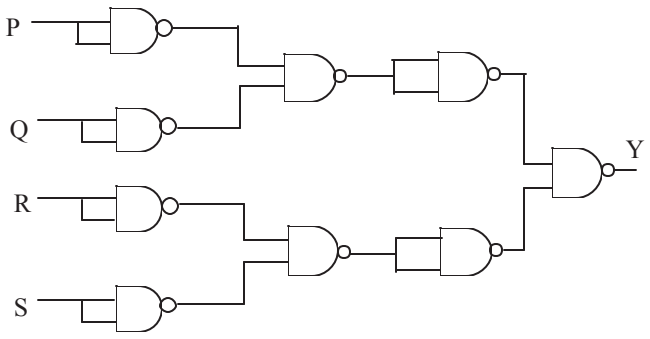
65. A 4-bit ripple counter and a 4-bit synchronous counter are made using flip-flops having a propagation delay of 10 ns each. If the worst case delay in the ripple counter and the synchronous counter be R and S respectively, then

(1) R = 10 ns, S = 40 ns (2) R = 40 ns, S = 10 ns

(3) R = 10 ns, S = 30 ns (4) R = 30 ns, S = 10 ns

---

66. For the circuit shown in Fig. the Boolean expression for the output Y in terms of inputs P, Q, R and S is

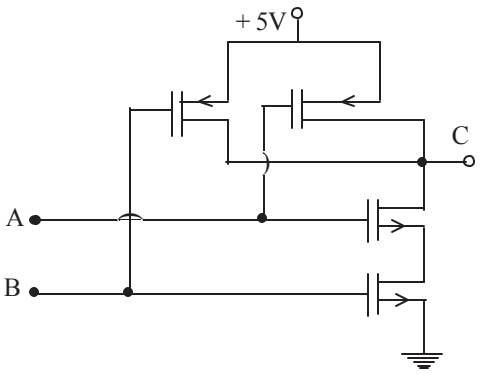


(1) $\overline{P} + \overline{Q} + \overline{R} + \overline{S}$ (2) $P + Q + R + S$

(3) $(\overline{P} + \overline{Q})(\overline{R} + \overline{S})$ (4) $(P + Q)(R + S)$

D

67. Identify the logic gate given in the figure



(1) NOR (2) NAND (3) AND (4) OR

---

68. The AM signal $x(t) = 2(1 + 2 \cos 2\pi (1000) t] \cos 2\pi (10^5) t$ can be detected using

(1) Envelope Detector

(2) Square Law Detector

(3) Synchronous Detector

(4) Envelope, Square Law and Synchronous Detector

---

69. A 1 KHz sinusoidal signal is ideally sampled at 1500 samples/sec and the sampled signal is passed through an ideal LPF with cut-off frequency 800Hz. The output signal has the frequency

(1) 0.25KHz (2) 0.5KHz (3) 0.15KHz (4) 0.75KHz

---

70. A communication channel with AWGN operating at a signal to noise ratio SNR >> 1 and bandwidth B has capacity C_1. If SNR is doubled keeping B constant, the resultant capacity C_2 is given by

(1) $C_2 \approx C_1 + B$ (2) $C_2 \approx C_1 + 2B$

(3) $C_2 \approx 2C_1$ (4) $C_2 \approx C_1 + 0.3B$

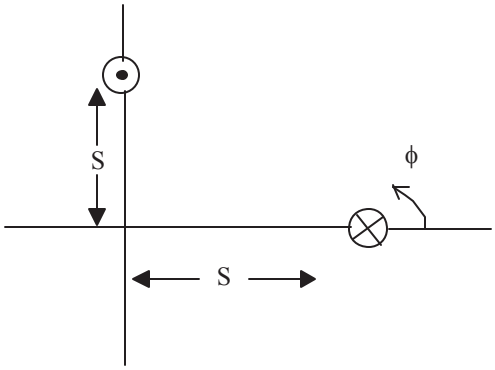
---

71. The amplitude of a random signal is uniformly distributed between –5 V and +5V. If it is sampled and quantized uniformly into 130 levels, the S/N_q available is

(1) 42 dB (2) 48 dB (3) 54 dB (4) 60 dB

---

72. Two identical antennas are placed in the $\theta = \frac{\pi}{2}$ plane as shown in fig. The elements have equal amplitude excitation with 180° polarity difference, operating at wavelength λ. The correct value of the magnitude of far zone resultant electric field strength normalized with that of a single element, both computed for $\phi = 0$, is



(1) $2\cos\left(\frac{2\pi S}{\lambda}\right)$ (2) $2\sin\left(\frac{2\pi S}{\lambda}\right)$ (3) $2\cos\left(\frac{\pi S}{\lambda}\right)$ (4) $2\sin\left(\frac{\pi S}{\lambda}\right)$

---

73. What is the free space attenuation of a satellite communication system operating at 36,000 km above the earth at 5GHz ?

(1) 198dB (2) 202dB (3) 142dB (4) 138dB

---

74. Light is confined within the core of a step index fiber by

(1) Refraction
(2) Total internal reflection at the outer edge of the cladding
(3) Total internal reflection at the core cladding boundary
(4) Reflection from the fiber's plastic coating

---

75. In cellular networks, simultaneous users over the same channel is achieved by:

I. Digital Technology
II. Frequency re-use
III. CDMA and TDMA
IV. Using VLRs in each area and the HLR in the network switching centre.

(1) I and II (2) I and III (3) II and III (4) IV only

D

76. An antenna consisting of a 50 meter long vertical conductor operates over a perfectly conducting ground plane. It is base-fed at a frequency of 600 kHz. It has a loss resistance of 1.5 ohms. The radiation resistance and efficiency of the antenna is:

(1) $\frac{2\pi^2}{5}$, 89% (2) $\frac{\pi^2}{5}$, 76% (3) $\frac{4\pi^2}{5}$, 84% (4) $20\pi^2$, 65%

---

77. A lossless transmission line having 50Ω characteristic impedance and length λ/4 is short circuited at one end and connected to an ideal voltage source of 1V at other end. The current drawn from the voltage source is

(1) 0 Amp (2) 0.02 Amp (3) ∞ (4) 0.01 Amp

---

78. A helical antenna is used for satellite tracking because of its

(1) circular polarization (2) maneuverability

(3) broad bandwidth (4) good front to back ratio

---

79. A dipole antenna of λ/8 length has an equivalent total resistance of 1.5 Ω. The efficiency of the antenna is

(1) 0.89159% (2) 8.9159% (3) 89.15% (4) 891.59%

---

80. Which of the following statements is not correct ?

(1) Thermo couple meters can be used to measure DC

(2) Moving coil meters can be used for measuring ac

(3) Moving Iron meters can be used for measuring DC

(4) Moving Iron meters and thermocouple meters can be used for measuring both ac and DC

---

81. Consider the following statements:

In a measuring instrument,

A. Linearity is more important than sensitivity

B. High precision indicates high accuracy

C. Accuracy cannot be better than resolution

(1) A, B, C are correct (2) A and B are correct

(3) B and C are correct (4) A and C are correct

82. What is the correct sequence of the following types of ammeter and voltmeter with increasing accuracy?

A. Moving iron .

B. PMMC

C. Induction

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

---

83. If the accuracy of a 100 mA meter is ± 2%, then, at a reading of 50 mA, the maximum value of the actual reading may be

(1) 48 mA (2) 49 mA (3) 51 mA (4) 52 mA

---

84. In a PCM system, the number of quantization levels is 68. If it is required to improve the existing signal to quantization noise ratio by 12 dB, the data word length required is

(1) 7 bits/sample (2) 8 bits/sample (3) 9 bits/sample (4) 10 bits/sample

---

85. A band limited source with a bandwidth of 'B' Hz is sampled at its Nyquist's rate and quantized into 4 levels. If all the Q-levels are equiprobable, the entropy of the source in bits/sec is

(1) 2 B (2) 4 B (3) 2 (4) 4

---

86. The maximum percentage error in the difference of two measured voltages, when Vl= 100 V ±1% and V2 = 80 V ± 5% will be

(1) ± 5% (2) ± 1% (3) ± 10% (4) ± 25%

---

87. The addition of _____ converts the basic D'arsonval movement into DC voltmeter

(1) parallel resistor (2) series resistor

(3) parallel capacitor (4) series capacitor

---

88. The difference between *true value* and *measured value* is called as _____

(1) Relative error (2) Static error

(3) Linearity error (4) Limiting error

---

89. The accuracy of a thermometer having range of 200ºC is specified as 99% of its full scale reading. If the reading is 50ºC then the static error = _____

(1) 0.5ºC (2) 1ºC (3) 2ºC (4) 5ºC

---

90. Which of the following is an Active Transducer?

(1) Thermometer (2) Thermistor

(3) Thermocouple (4) Strain gauge

91. The radiation resistance of an antenna is 40 Ω and the loss resistance of 10 Ω. If it has a power gain of 16, its directivity is

(1) 20 (2) 10 (3) 12.8 (4) 16

---

92. Which type of the following wattmeters cannot be used for both A.C. and D.C. power measurement

(1) Dynamometer type (2) Electrostatic type

(3) Induction type (4) Electromagnetic type

---

93. An RC Coupled CE amplifier circuit uses a silicon transistor. The capacitors C_C and C_E can be assumed to be short at signal frequency and the effect of output resistance R_0 can be ignored. If C_E is disconnected from the circuit, which one of the following statements is TRUE ?

(1) The input resistance R_i increases and the magnitude of voltage gain A_V decreases

(2) The input resistance R_i decreases and the magnitude of voltage gain A_V increases

(3) Both input resistance R_i and the magnitude of voltage gain A_V decrease

(4) Both input resistance R_i and the magnitude of voltage gain A_V increase

---

94. To draw ac equivalent circuit of a Transistor, all

a. DC sources are shorted

b. ac sources are shorted

c. DC sources are opened

d. ac sources connected to DC sources

(1) b and d (2) a and b

(3) a only (4) c and d

---

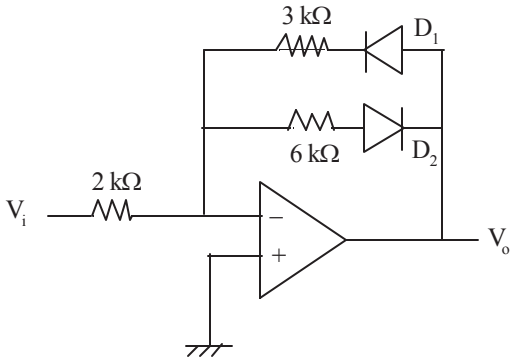
95. A source follower has a voltage gain of

(1) gm*rd (2) gm *rs

(3) (gm *rs) / (1+gm* rs) (4) (gm *rd)/ (1+gm *rd)

D

96.



In the above circuit, assuming op–amp, D_1 and D_2 are ideal, if V_i = 2 volts, the o/p V_o is

(1) –6 V (2) – 3 V (3) – 8 V (4) – 2 V

---

97. The output voltage of OPAMP for input voltage of V_1 = 150 μV; V_2 = 140 μV and differential gain of A_d = 4000, the value of CMRR is 100 is

(1) 45.8 mV (2) 40.66 mV

(3) 10 μV (4) 145 μV

---

98. Match the following

A.	BJT	P.	Population inversion
B.	MOS capacitor	Q.	Pinch-off voltage
C.	LASER diode	R.	Early effect
D.	JFET	S.	Flat-band voltage

(1) A-S, B-P, C-R, D-Q (2) A-R, B-S, C-P, D-Q

(3) A-P, B-Q, C-R, D-S (4) A-Q, B-R, C-P, D-S

---

99. Which of the following are valid with respect to a lead compensating network ?

(a) It improves response time

(b) It stabilizes the system having low phase margin

(c) It results in moderate increase in gain without affecting stability

(d) Increases resonant frequency

(1) (a) and (b) (2) (a) and (c)

(3) (a), (c) and (d) (4) (a), (b), (c) and (d)

D

100. The Q-point in a voltage amplifier is selected in the middle of the active region because

(1) It gives better stability

(2) The circuit needs a small no. of capacitors

(3) The biasing circuit need less number of resistors

(4) It gives distortion less output

---

101. The RST 5.5 interrupt service routine start from location

(1) 0020H (2) 0024H (3) 0028H (4) 002CH

---

102. The stack is a specialized temporary _____ access memory during _____ and _____ instructions

(1) random, store, load (2) random, push, load

(3) sequential, store, pop (4) sequential, push, pop

---

103. Background controls of many picture tubes are for the

(1) ac bias (2) dc bias (3) ac video signal (4) dc video signal

---

104. The number of lines scanned per frame in the raster on the picture tube screen is

(1) 525 (2) 262 (3) 20 (4) 10

---

105. If the horizontal flyback is 10 percent, this time equals

(1) 10 μs (2) 56 μs (3) 6.4 μs (4) 83 μs

---

106. The Boolean expression $(x + y)(x + \overline{y})(\overline{x} + y)$ is equal to

(1) $\overline{x}\,y$ (2) $x\,\overline{y}$ (3) xy (4) $\overline{x}\,\overline{y}$

---

107. Which one of the following antennas is best excited from a waveguide

(1) Biconical (2) Horn (3) Helical (4) Discone

D

108. The microwave link repeaters are typically 50 km apart
(1) To overcome atmospheric attenuation
(2) Because of output tube power limitations
(3) Because of earth's curvature
(4) To ensure that the applied dc voltage is not excessive

---

109. The percentage power saving in an AM-SSB-SC signal with reference to AM-DSB-FC signal at 25% Modulation, under Tone Modulation is

(1) $\frac{65}{66}$ % (2) 50% (3) $\frac{32}{33}$ % (4) 25%

---

110. In digital Time Division multiplexing, synchronization is performed by _____ technique

(1) bit stuffing (2) bit coding (3) bit interleaving (4) bit surfing

---

111. In Nyquist pulse shaping, the synchronizing problems can be reduced by _____ the signaling rate and using pulses with _____ roll off spectrum

(1) reducing, sine (2) reducing, cosine (3) increasing, sine (4) increasing, cosine

---

112. An AWGN Communication channel operating at an SNR >> 1 and Bandwidth B has a Capacity C_1. If the SNR is doubled keeping B constant, the resulting capacity C_2 is given by

(1) $C_2=2C_1$ (2) $C_2=C_1+B$ (3) $C_2=C_1+2B$ (4) $C_2=C_1+0.3B$

---

113. In a microwave link having a transmitter power of (400π) watts, transmitting antenna of 10 dB gain, the received power density at 1 km is _____ mW/sq.m

(1) 10 (2) 01 (3) 100 (4) 1000

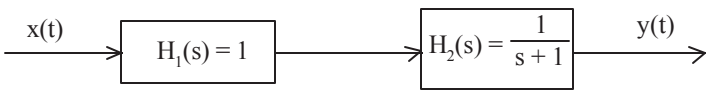
---

114. The dominant mode in a hollow rectangular waveguide is

(1) TE10 (2) TM10 (3) TEM (4) TE11

---

115. Consider the following cascade of two causal systems



The unit impulse response of the cascade is

(1) $e^{t} \cdot u(-t)$ (2) $e^{t} \cdot u(t)$ (3) $e^{-t}u(t)$ (4) $e^{-t} \cdot u(-t)$

D

116. If the broad dimension of a rectangular guide is 3.0 cm, it's dominated mode cut-off frequency is _____

(1) 3 GHz (2) 5 GHz (3) 10 GHz (4) 6 GHz

---

117. Ferrite microwave devices are _____

(1) Passive, reciprocal (2) Passive, non-reciprocal

(3) Active, reciprocal (4) Active, non-reciprocal

---

118. The frequency deviation of the Angle Modulated signal $x(t) = \cos(2000\,\pi t + 20\,t^2)$ for $0 \le t \le 1$ in Hz is

(1) $\frac{10}{\pi}$ (2) $\frac{20}{\pi}$ (3) $\frac{30}{\pi}$ (4) $\frac{40}{\pi}$

---

119. A VSWR meter operates typically at _____

(1) 1 GHz (2) 10 GHz (3) 1 MHz (4) 1 kHz

---

120. The scattering matrix of magic tee is

(1) $\frac{1}{\sqrt{2}}\begin{bmatrix} 0 & 0 & 1 & 1 \\ 0 & 0 & 1 & 1 \\ 1 & 1 & 0 & 0 \\ 1 & 1 & 0 & 0 \end{bmatrix}$ (2) $\frac{1}{\sqrt{2}}\begin{bmatrix} 0 & 0 & -1 & 1 \\ 0 & 0 & 1 & 1 \\ -1 & 1 & 0 & 0 \\ 1 & 1 & 0 & 0 \end{bmatrix}$

(3) $\frac{1}{\sqrt{2}}\begin{bmatrix} 0 & 0 & 1 & 1 \\ 0 & 0 & 1 & -1 \\ 1 & 1 & 0 & 0 \\ 1 & -1 & 0 & 0 \end{bmatrix}$ (4) $\frac{1}{\sqrt{2}}\begin{bmatrix} 0 & 0 & 1 & 1 \\ 0 & 0 & -1 & 1 \\ 1 & -1 & 0 & 0 \\ 1 & 1 & 0 & 0 \end{bmatrix}$

---

121. The biggest advantage of the TRAPATT diode over the IMPATT diode is its

(1) lower noise (2) higher efficiency

(3) ability to operate at high frequencies (4) lesser sensitivity to harmonics

---

D

122. A Gunn diode is a negative resistance device, which is used as source of microwaves. What is the number of p-n junctions available in it ?

(1) 1 (2) 2 (3) 3 (4) 0

---

123. A reflectometer consists of

(1) Two directional couplers
(2) One directional coupler and an insulator
(3) One directional coupler and a circulator
(4) Two directional couplers and a circulator

---

124. To avoid difficulties with strapping at high frequencies, what type of cavity structure is used in the magnetron ?

(1) Hole and Slot
(2) Slot
(3) Vane
(4) Rising Sun

---

125. The full form of MASER is

(1) Microwave amplification by stimulated emission of radiation
(2) Microwave antenna by stimulated emission of radiation
(3) Microwave amplification for simultaneous emission of radiation
(4) Microwave antenna for simultaneous emission of radiation

---

126. The Modulation Scheme used in GSM is

(1) FSK (2) GMSK (3) OQPSK (4) QAM

---

127. Equivalent of decimal value of 178 in straight binary code is _____ and in BCD is _____

(1) 11000,11111111
(2) 10111101,100000
(3) 10110010,101111000
(4) 111111,1100000

---

128. The Post Fix Form for the INFIX form of (a+b*c)

(1) bac*+ (2) abc*+ (3) bac+* (4) abc+*

---

129. Match the following

A.	SRAM	a.	non volatile
B.	DRAM	b.	less power
C.	ROM	c.	costly
D.	Hard disk	d.	large size

(1) c,a,b,d (2) c,b,a,d (3) d,a,b,c (4) d,b,a,c

---

130. How will you free the allocated memory?

(1) remove(var-name) (2) free(var-name)

(3) delete(var-name) (4) dalloc(var-name)

---

131. In which of the following technologies is the term HFC used ?

(1) DSL (2) PPPoE (3) Dedicated T1 (4) Frame relay

---

132. Memory Buffer Register (MBR) is

(1) hardware memory device which denotes the location of the current instruction being executed

(2) a group of electrical circuits (hardware), that performs the intent of instructions fetched from memory

(3) contains the address of the memory location that is to be read from or stored into

(4) contains a copy of the designated memory location specified by the MAR after a "read" or the new contents of the memory prior to a "write"

---

133. A collection of related fields in data organization is called

(1) Group (2) Register (3) File (4) Organization

---

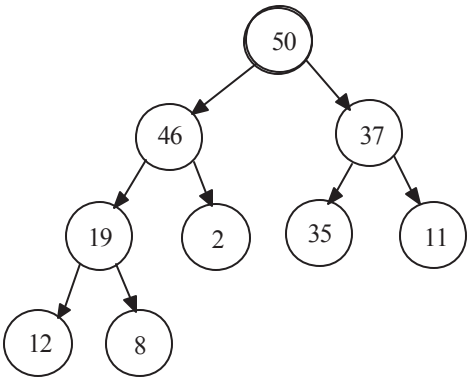
134. In a reproduced picture in a TV receiver, the left hand portion is too broad, and the right portion is too thin. This is due to

(1) Poor vertical scanning (2) Poor interlacing

(3) Poor synchronization (4) Poor horizontal scanning

D

135.



The above given Tree is

(1) Complete and heap
(2) Full and complete
(3) Full
(4) Heap

---

136. We can use C++ as

(1) Procedural language only
(2) Object oriented language only
(3) Both Object oriented and Procedural language
(4) Neither Object oriented nor Procedural language

---

137. CISC stands for

(1) Common instruction set computers
(2) Complex instruction set compilers
(3) Complex instruction set computers
(4) Compound instruction set computers

---

138. Virtual memory consists of

(1) Magnetic memory (2) Dynamic RAM (3) Static RAM (4) ROM

---

139. Schemas are like _____ in DBMS

(1) Stacks (2) Files (3) Folders (4) Databases

---

140. Which of the following is correct ?

(1) Address Bus is a Bidirectional Bus

(2) Data Bus is a Bidirectional Bus

(3) Both Address Bus and Data Bus are bidirectional

(4) Neither Address Bus nor Data Bus is bidirectional

---

141. If the data is available in the instruction itself, it is called _____ addressing mode

(1) Direct (2) Register (3) Immediate (4) Indirect

---

142. Consider the sequence of 8085 instructions given below:

```
LXI   H,   9258
MOV   A,   M
CMA
MOV   M,   A
```

which one of the following is performed by this sequence?

(1) Contents of location 9258 are moved to the accumulator

(2) Contents of location 9258 are compared with the contents of accumulator

(3) Contents of location 9258 are complemented and stored in location 9258

(4) Contents of location 5892 are complemented and stored in location 5892

---

143. Assertion (A) : A look-ahead carry adder is a fast adder

Reason (R) : A parallel carry adder generates sum digits directly from the input digits

(1) Both (A) and (R) are true and (R) is correct explanation of (A)

(2) Both (A) and (R) true but (R) is not the correct explanation of (A)

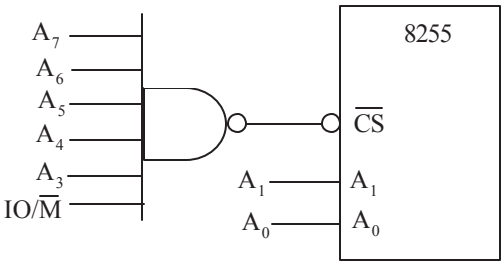
(3) (A) is true but (R) is false

(4) (A) is false but (R) is true

---

144. An 8255 chip is interfaced to an 8085 microprocessor system as an I/O mapped I/O as shown in the figure. The address lines A0 and A1 of the 8085 are used by the 8255 chip to decode internally its three ports and the control register. The address lines A0 to A7 as well as the IO/M' signal are used for address decoding. The range of addressees for which the 8255 chip would get selected is

(1) F8H-FBH (2) F8H-FCH (3) F8H-FFH (4) F0H - F7H



---

145. For the 8085 assembly language program given below, the content of the accumulator after the execution of the program is

```
3000    MVI A, 45H
3002    MOV B, A
3003    STC
3004    CMC
3005    RAR
3006    XRA B
```

(1) 00H (2) 45H (3) 67H (4) E7H

---

146. In an 8085 microprocessor, the instruction CMP B has been executed while the content of the accumulator is less than that of register B. As a result,

(1) Carry flag will be set but Zero flag will be reset

(2) Carry flag will be reset but Zero flag will be set

(3) Both Carry flag and Zero flag will be reset

(4) Both Carry flag and Zero flag will be set

D

147. Which of the following pins of 8085 is used in the interfacing of a slow peripheral device to it ?

(1) TRAP (2) RESET (3) HOLD (4) READY

---

148. Which of the following flag is not available in 8085

(1) Sign flag (2) Overflow flag

(3) Zero flag (4) Auxiliary carry flag

---

149. Which register is used in I/O operation in 8085

(1) SP (2) IR (3) A (4) B-C pair

---

150. The minimum number of address lines required to address 256 kb of memory are

(1) 8 (2) 16 (3) 18 (4) 20

---

151. Dialling procedure for accessing local, STD & ISD facilities from extension phone is through

(1) EPABX (2) Virtual calling (3) Conference call (4) Digital call

---

152. PSTN (PUBLIC SWITCHED TELEPHONE NETWORK) telephone networks depend on _____ switching to connect one phone to another

(1) Packet switching (2) Circuit switching

(3) Network switching (4) Digital switching

---

153. The type of multiple accessing used in GSM technology is _____

(1) FDD/TDMA (2) CDMA (3) OFDMA (4) SDMA

---

154. Which of the following is not based on wideband system ?

(1) FDMA (2) CDMA (3) SSMA (4) FHMA

---

155. A minimum sampling rate of _____ is required for a good quality representation of telephone conversation.

(1) 20 KHz (2) 4 KHz (3) 40 KHz (4) 8 KHz

---

156. Which of these block processes CDMA channels, and performs digital and analogue signal processing for IS-95A calls of each channel and interface with the RF block ?

(1) BHI (2) CCB (3) TCP (4) TMP

---

157. A local loop has _____ cable that connects the subscriber telephone to the nearest end office.

(1) Twisted wire pair (2) Co-axial (3) Fiber-optic (4) Coiled

---

158. To enable DSL technology internet service provider must have a _____ located in their networks to interact with customer modem

(1) LAN switch (2) .RPR (3) DSLAM (4) PRP

---

159. Which of the following encoding methods does not provide for synchronization ?

(1) RZ (2) NRZ-L (3) NRZ-I (4) Manchester

---

160. In Manchester and differential Manchester encoding, the transition at the middle of the bit is used for _____

(1) Bit transfer (2) Synchronization (3) Baud transfer (4) Cloud transfer

---

161. In a DS-SS systems the

bilt rate = 1 Mbps

chip rate = 7 Mbps

The length of the memory of the PN sequence generator of the above system is

(1) 4 (2) 5 (3) 3 (4) 6

D

162. The rate of the PN code in a spread spectrum system is called

(1) Chipping Frequency (fc)
(2) Information rate
(3) Chip
(4) Epoch

---

163. Direct inward dialling is a feature in

(1) PSTN (2) PBX (3) EPABX (4) VPN

---

164. The phase margin of a system is 0º. It represents a

(1) stable system
(2) unstable system
(3) conditionally stable system
(4) marginally stable system

---

165. 20 db/decade is equal to

(1) 10 db/octave (2) 5 db/octave (3) 6 db/octave (4) 20 db/octave

---

166. Signal flow graph is used to find

(1) stability of the system
(2) controllability of the system
(3) observability of the system
(4) transfer function of the system

---

167. A unity feedback system has open loop transfer function $G(s) = \frac{2s}{(s+1)(s+2)}$. The steady state response of the closed loop system to a unit step reference input is

(1) unit step (2) unit ramp (3) unit impulse (4) zero

---

168. Which of the following points is not on the root-locus of the system with the open loop transfer function $G(s)\,H(s) = \frac{K}{s(s+3)(s+5)}$

(1) -4 (2) -3 (3) -2 (4) $-\infty$

---

169. For a second-order system with the closed loop transfer function $T(s) = \frac{16}{s^2 + 6s + 16}$ the settling time in seconds for 2% band is

(1) 1 (2) 1.33 (3) 2 (4) 1.43

---

170. A system has a single pole at origin. Its impulse response will be

(1) Constant (2) Ramp

(3) Decaying exponential (4) Oscillatory

---

171. For a system given by G(s) H(s) =k/[(s(s+1)(s+2)(s+3)], the number of separate root loci is

(1) 1 (2) 2 (3) 3 (4) 4

---

172. Roots of system's characteristic equation are same as

(1) The closed loop poles (2) The open loop poles

(3) The closed loop poles and zeros (4) The closed loop zeros

---

173. A second order system has transfer function given by $G(s)=25/s^2+8s+25$. If the system is initially at rest and is subjected to a unit step input at t=0, then the second peak in response will occur at

(1) π sec (2) $\pi/3$ sec (3) $2\pi/3$ sec (4) $\pi/2$ sec

---

174. Consider the equation $2s^4+s^3+3s^2+5s+10=0$. This equation has _____ roots in the right half of s-plane.

(1) one (2) two (3) three (4) four

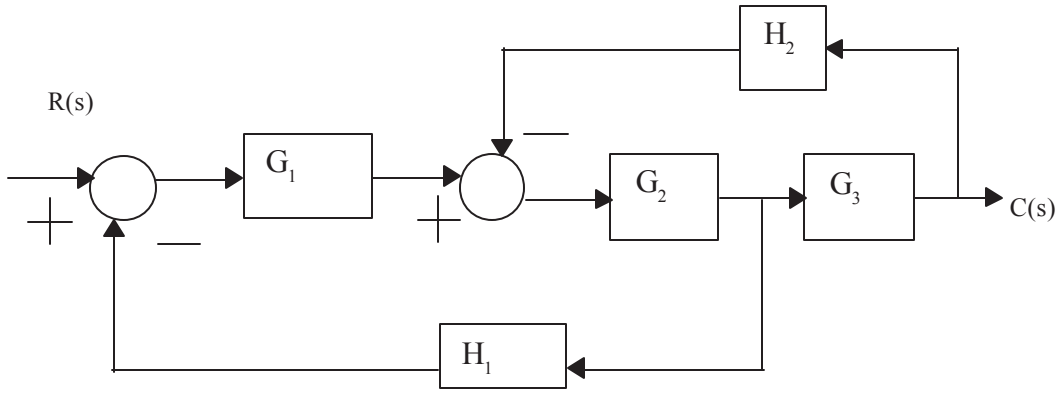
---

175. GH = $k/s(s+6)(s^2 + 6s +18)$, the value of 'k' at break away point is

(1) 81 (2) 9 (3) 3 (4) 72

D

176. For the block diagram shown in fig C(s)/R(s) is

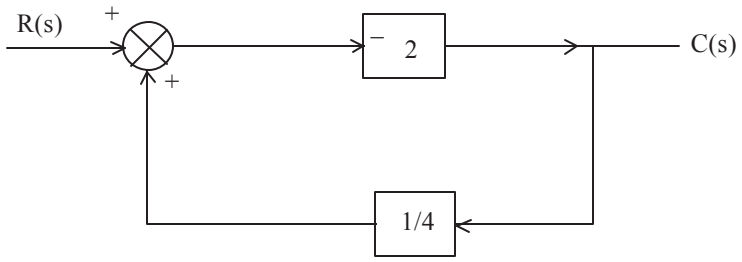


(1) $G_1G_2G_3/(1+H_2G_2G_3+H_1G_1G_2)$ (2) $G_1G_2G_3/(1+G_1G_2G_3H_1H_2)$

(3) $G_1G_2G_3/(1+G_1G_2G_3H_1+G_1G_2G_3H_2)$ (4) $G_1G_2G_3/(1+G_1G_2G_3H_1)$

---

177. The closed loop gain of the following system is



(1) -4 (2) 4 (3) $-\frac{4}{3}$ (4) $\frac{4}{3}$

---

178. The angle between rotating axis and beam axis in conical scanning is called

(1) Incident angle (2) Reflected angle (3) Squint angle (4) Beam angle

---

179. Given the pulse width of 8μs and duty cycle of 8%, the pulse repetition time of radar system is

(1) 1 μs (2) 10 μs (3) 100 μs (4) 1000 μs

---

180. What radar measurement of an object is referred to true north

(1) Height (2) Surface angle (3) Vertical angle (4) One-way distance

---

D

181. Surface search radar normally scans _____ degrees of azimuth

(1) 30° (2) 180° (3) 90º (4) 360º

---

182. Doppler frequency is given by

(1) $f_d = 2\, v_r/\lambda$ (2) $f_d = 2\, \lambda/v_r$ (3) $f_d = v_r/\lambda$ (4) $f_d = \lambda/v_r$

where v_r : radial speed of target, λ: wavelength of transmitted energy

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183. Which of the following can be used to improve range resolution in a Radar

(1) Short duration pulse (2) long duration pulse

(3) high frequency of operating signal (4) increasing pulse width

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184. Identify the Radar systems loss among the following

(1) Beam shaped loss (2) Elastic loss

(3) Iron core magnetic loss (4) Copper loss

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185. Air Route Surveillance Radar landing systems provides

(1) track of all aircraft (2) keeps not safe and separate

(3) help in good weather conditions (4) gives direction

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186. Abbreviation of GCA is

(1) Ground-Controlled Approach (2) Ground-Controlled Aircraft

(3) Ground Cabinet Arteritis (4) Ground Cargo Aircraft

---

187. In a Radar, which is used to indicate the range and direction of the target ?

(1) A – Scan (2) FM Altimeter

(3) PPI Indicator (4) Radar Altimeter

---

188. x and y are Boolean variables if xy = 0, $x \oplus y$ is equal to

(1) $x + y$ (2) $\bar{x} + \bar{y}$ (3) $x\, y$ (4) $\bar{x}\,\bar{y}$

D

189. Which of the following is the remedy for blind speed problem

(1) change in Doppler frequency
(2) use of MTI
(3) use of Monopulse
(4) variation of PRF

---

190. A simple CW radar does not give range information because

(1) it uses the principle of Doppler shift
(2) continuous echo cannot be associated with any specific part of the transmitted wave
(3) CW wave do not reflect from a target
(4) multi echoes distort the information

---

191. Which of the following is true in case of the FM-CW Doppler radar?

(1) it does not give the target velocity
(2) it does give the target position
(3) a duplexer is required at the radar
(4) it gives the target range

---

192. Which of the following frequency is wrong

(1) 15,750 Hz for horizontal sync and scanning
(2) 60 Hz for vertical sync and scanning
(3) 31,500 Hz for equalising pulses and serrations in the vertical sync pulses
(4) 31,500 Hz for the vertical scanning frequency

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193. Microwave links are generally preferred to coaxial cable for television transmission because

(1) they have less overall phase distortion
(2) they are cheaper
(3) of their greater bandwidth
(4) of their relative immunity to impulse noise

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194. The output stage of a television transmitter is most likely to be a

(1) Plate-modulated class C amplifier
(2) Grid-modulated class C amplifier
(3) Screen-modulated class C amplifier
(4) Grid- modulated class A amplifier

D

195. Which of the following deflection system is used in monochrome picture tube ?

(1) Electrostatic (2) Electromagnetic (3) Dynamic (4) Magnetostatic

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196. Number of lines per picture according to CCIR-B

(1) 425 (2) 525 (3) 625 (4) 725

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197. A crystal-ringer circuit is used for the

(1) Y video amplifier (2) AFPC on color oscillator

(3) color demodulator (4) chroma BPA

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198. The color level control is in the

(1) demodulator (2) BPA (3) AFPC (4) D. G-Y amplifier

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199. A comb filter is used to

(1) cancel chroma crosstalk (2) separate white from black

(3) clip the sync from blanking (4) separate alternating from direct current

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200. An AM radio receiver is to be operated in the frequency range 550 kHz – 1650 kHz, with an IF of 450 kHz. The ratio of maximum to minimum capacitance of the signal section required to achieve the above is

(1) 9 : 1 (2) 4.4 : 1 (3) 5 : 1 (4) 8 : 1
