ELECTRONICS & TELECOMMUNICATION ENGINEERING

PAPER-II

1. Match List I (Circuit) with List II (Property) and select the correct answer :

   List I

   A. R-C coupled single-stage amplifier
   B. Emitter follower
   C. Common base amplifier
   D. Darlington amplifier

   List II

   1. Beta multiplier
   2. Constant current source
   3. Very high input impedance
   4. Phase inverter with voltage gain

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

2. Consider the following statements in respect of a transistor R-C coupled amplifier :

   1. The low frequency response is determined by the transistor junction capacitors.
   2. The high frequency response is limited by coupling capacitors.
   3. The Miller capacitance reduces the gain at high frequencies.
   4. As the gain is increased the bandwidth gets reduced.

   Which of these statements are correct?

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

3. Match List I (Circuit Name) with List II (Characteristics) and select the correct answer :

   List I

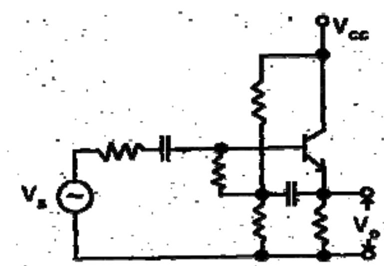
   A. Schmitt trigger
   B. Monostable multivibrator
   C. Astable multivibrator
   D. Blocking oscillator

   List II

   1. It needs a pulse transformer
   2. It is used to generate gating pulse whose width can be controlled
   3. It is a bistable circuit
   4. It has no stable state

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

4.



The biasing shown in the above circuit is

a. Emitter bias
b. Self bias
c. Potential divider bias
d. Bootstrap bias

5. Which of the following main properties of a bipolar junction transistor make it necessary for the transistor to have bias stabilization ?

   1. Variation of V_{BE} with temperature
   2. Variation of h_{FE} with temperature
   3. Variation of I_{CO} with temperature
   4. Variation of h_{FE} with transistor replacement
   5. Variation of V_{BE} with transistor replacement
   6. Variation of I_{CO} with transistor replacement

Select the correct answer using the codes given below:

a. 1, 2 and 6

b. 1, 3 and 4

c. 2, 3 and 5

d. 3, 4, 5 and 6

6. A triangular-square wave generator uses

a. A sine wave oscillation and a comparator

b. An integrator and a comparator

c. A differentiator and a comparator

d. A sine wave oscillator and a clipper

7. An amplifier has two identical cascaded stages. Each stage has a bandwidth of 20kHz. The overall bandwidth shall approximately be equal to

a. 10 kHz

b. 12.9 kHz

c. 20 kHz

d. 28.3 kHz

8. The common emitter current gain-bandwidth product of a transistor (f_T) is defined as the frequency at which

a. Alpha of the transistor falls by 3 dB

b. Beta of the transistor falls by 3 dB

c. Beta of the transistor falls to unity

d. Power gain of the transistor falls to unity

9. Which of the following components control the low frequency of the R-C coupled amplifier?

1. Wiring capacitance
2. Parasitic capacitances of transistor
3. Coupling capacitances
4. Emitter bypass capacitance

Select the correct answer using the codes given below:

a. 1 and 2

b. 2 and 3

c. 3 and 4

d. 1, 2 and 4

10. For a full-wave rectifier with shunt capacitor filter, the peak to peak ripple voltage is

a. $2I_{DC} / f_c$

b. I_{DC} / f_c

c. $I_{DC} / 2f_c$

d. $I_{DC} / 4f_c$

(where f = fundamental power line frequency, I_{DC} = DC current)

11. In a BJT amplifier with the introduction of feedback, the input impedance is reduced, output impedance is increased, bandwidth is increased and distortion is reduced. The feedback is

a. Voltage series

b. Current series

c. Voltage shunt

d. Current shunt

12. Consider the following statements :

1. Intermediate-frequency (IF) amplifier is designed for a bandwidth of a few kHz at a centre frequency of a few hundred kHz for voice-modulated signals.
2. If amplifier is designed for a frequency of 6 MHz at a centre frequency of 40 MHz for TV receivers.
3. Tuned amplifiers are used for IF amplifier.

Which of these statements is/are correct ?

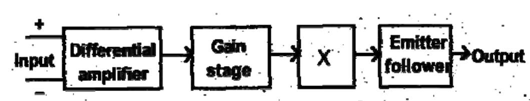
a. 1 only

b. 3 only

c. 2 and 3

d. 1, 2 and 3

13.



The stage marked X in the above shown architecture of a two-stage op-amp is

a. Direct coupled amplifier

b. Buffer amplifier

c. Level shifter

d. Blocking oscillator

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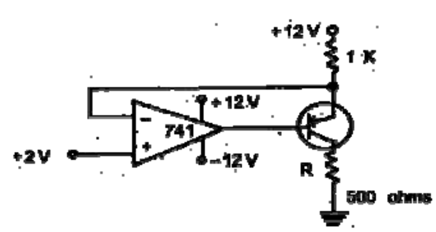


The current through the resistor R in the above circuit is

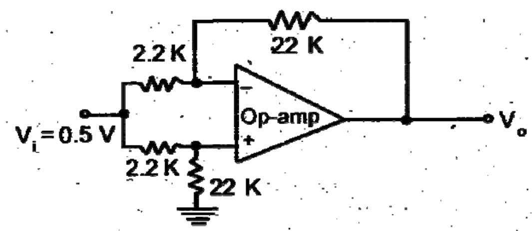
a. 1 mA

b. 4 mA

c. 8 mA

d. 10 mA

15.



In the op-amp circuit shown above (assuming ideal op-amp)

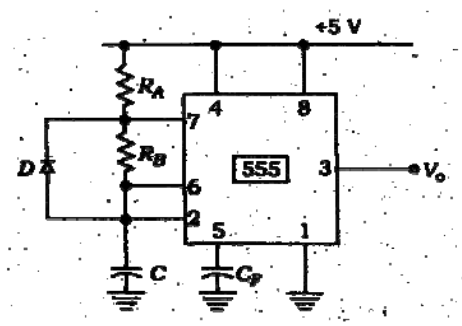
a. $V_0 = -5V$

b. $V_0 = +5V$

c. $V_0 = 0$

d. $V_0 = -2V$

16.



The function of the diode D in the timer circuit shown above is to

a. Increase the charging time of C

b. Decrease the charging time of C

c. Increase the discharging time of C

d. Decrease the discharging time of C

17. The output of a logic gate is '1' when all its inputs are at logic '0'. Then the gate is either

a. A NAND or an EX-OR gate

b. A NOR or an EX-NOR gate

c. An OR or an EX-NOR gate

d. An AND or an EX-OR gate

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

List I

A. $A \oplus B = 0$

B. $\overline{A + B} = 0$

C. $\overline{A} \, . \, B = 0$

D. $A \oplus B = 1$

List II

1. $A \neq B$
2. $A = B$
3. A = 1 OR B = 1
4. A = 1 OR B = 0

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

19. The Boolean expression

$$\left(\overline{A}+B\right)\left(A+\overline{C}\right)\left(\overline{B}+\overline{C}\right)$$

simplifies to

a. $\left(A+B\right)\overline{C}$

b. $\left(A+\overline{B}\right)\overline{C}$

c. $\left(\overline{A}+B\right)\overline{C}$

d. $\left(\overline{A}+\overline{B}\right)\overline{C}$

20. The minimum number of NAND gates required to implement the Boolean junction $A + A\overline{B} + A\overline{B}C$ is equal to

a. zero

b. 1

c. 4

d. 7

21. The addition of two binary variables A and B results into a SUM and a CARRY output. Consider the following expressions for the SUM and CARRY outputs :

1. $SUM = A \, . \, B + \overline{A} \, . \, \overline{B}$
2. $SUM = A . \, \overline{B} + \overline{A} \, . \, B$
3. $CARRY = A \, . \, B$
4. $CARRY = A + B$

Which of these expressions are correct ?

a. 1 and 3

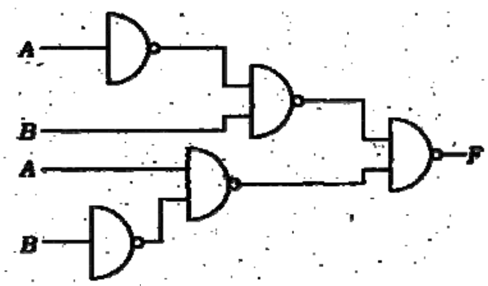
b. 2 and 3

c. 2 and 4

d. 1 and 4

22. For a binary half-subtractor having two inputs A and B, the correct sets of logical expressions for the output D (= A minus B) and X (= borrow) are
    a. $D = AB + \overline{A}B, X = \overline{A}B$
    b. $D = \overline{A}B + A\overline{B}, X = A\overline{B}$
    c. $D = \overline{A}B + A\overline{B}, X = \overline{A}B$
    d. $D = AB + \overline{A}\overline{B}, X = A\overline{B}$

23.



The circuit shown above is functionally equivalent to
    a. NOR gate
    b. OR gate
    c. EX-OR gate
    d. NAND gate

24. Match List I (Digital Circuit) with List II (Circuit Type) and select the correct answer :

    List I
    A. BCD to 7-segment Decoder
    B. 4- to -1 Multiplexer
    C. 4-bit Shift Register
    D. BCD Counter

    List II
    1. Sequential circuit
    2. Combinational circuit
    3. Neither sequential nor combinational circuit

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

25. The output of a Moore sequential machine is a function of
    a. All present states of the machine
    b. All the inputs
    c. A few combination of inputs and the, present state
    d. All the combinations of inputs and the present state

26. Minimum number of J-K flip-flops needed to construct a BCD counter is
    a. 2
    b. 3
    c. 4
    d. 5

27. Consider the following features in an 8085 microprocessor system with memory mapped I/O :
    1. I/O devices have 16-bit addresses
    2. I/O devices accessed using IN and OUT instructions
    3. There can be maximum of 256 input devices and 256 output devices
    4. Arithmetic and logic operations can be directly performed with the I/O data

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

28. In 8085 microprocessor the value of the most significant bit of the result following the execution of any arithmetic or Boolean instruction is stored in
    a. The carry status flag
    b. The auxiliary carry status flag
    c. The sign status flag
    d. The zero status flag

29. In a microprocessor when a' CPU is interrupted, it
    a. Stops execution of instructions
    b. Acknowledges interrupt and branches of subroutine
    c. Acknowledges interrupt and continues
    d. Acknowledges interrupt and waits for the next instruction from the interrupting device

30. A 10-bit ADC with full-scale output voltage of 10.24 V is designed to have a

±LSB/2 accuracy. If the ADC is calibrated at 25 °C and the operating temperature ranges from 0°C to 50°C, then the maximum net temperature coefficient of ADC should not exceed

a. ± 200 μV/°C

b. ± 400 μV/°C

c. ± 600 μV/°C

d. ± 800 μV/°C

31. The characteristic equation for the next state (Q_{n+1}) of a J-K flip-flop is

a. $Q_{n+1} = JQ_n + K\overline{Q}_n$

b. $Q_{n+1} = \overline{J}\,\overline{Q}_n + \overline{K}\,\overline{Q}_n$

c. $Q_{n+1} = J\overline{Q}_n + \overline{K}Q_n$

d. $Q_{n+1} = JQ_n + KQ_n$

(where Q_n represents the present state)

32. The number of unused states in a 4-bit Johnson counter is

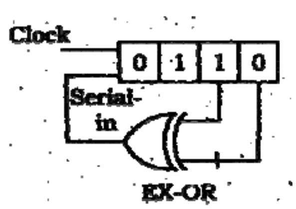
a. 2

b. 4

c. 8

d. 12

33.



The initial contents of the 4-bit serials-in-parallel-out, right shift, shift register as shown in figure above are 0110. After 3 clock pulses the contents of the shift register will be

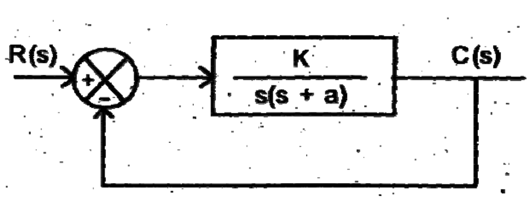
a. 0000

b. 0101

c. 1010

d. 1110

34.



Consider the unity feedback system as shown above. The sensitivity of the steady state error to change in parameter K and parameter a with ramp inputs are respectively

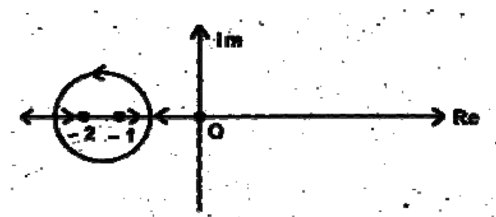
a. 1, –1

b. –1, 1

c. 1, 0

d. 0, 1

35.



The above figure shows the root locus of a unity feedback system. The open loop transfer function of the system is

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

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

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

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

36. Which one of the following techniques is utilized to determine the actual point at which the root locus crosses the imaginary axis ?

a. Nyquist technique

b. Routh-Hurwitz criterion

c. Nichol's criterion

d. Bode technique

37. Which one of the following application softwares is used to obtain an accurate root locus plot ?

a. LISP

b. MATLAB

c. dBase

d. Oracle

38. Consider the following techniques :

1. Bode plot
2. Nyquist plot
3. Nichol's chart
4. Routh-Hurwitz criterion

Which of these techniques are used to determine relative stability of a closed loop linear system?

a. 1 and 2

b. 1 and 4

c. 1, 2 and 3

d. 2, 3 and 4

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

$s^6 + 2s^5 + 8s^4 + 12s^3 + 20s^2 + 16s + 16 = 0$

The number of the roots of the equation which lie on the imaginary axis of s-plane is

a. Zero

b. 2

c. 4

d. 6

40. Which one of the following is the transfer function of a linear system whose output is t^2e^{-t} for a unit step input ?

a. $\frac{s}{(s+1)^3}$

b. $\frac{2s}{(s+1)^3}$

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

d. $\frac{2}{s(s+1)^2}$

41. Assuming unit ramp input, match List I (System Type) with List II (Steady State Error) and select the correct answer :

List I

A. 0

B. 1

C. 2

D. 3

List II

1. K

2. ∞

3. 0

4. 1/K

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

42. When the time period of observation is large, the type of the error is

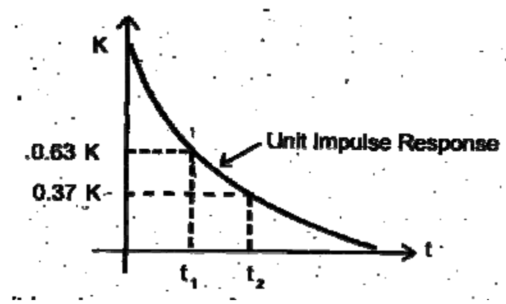
a. Transient error

b. Steady state error

c. Half-power error

d. Position error constant

43.



The unit impulse response of a system having transfer function $\frac{K}{s+\alpha}$ is shown above. The value of α is

44. Consider the following open loop frequency response of a unity feedback system :

ω, rad/s → :	2	3	4	5	6	8	10
|G(jω)| → :	7.5	4.8	3.15	2.25	1.70	1.00	0.64
∠G(jω) → :	-118°	-130°	-140°	-150°	-157°	-170°	-180°

The gain and phase margin of the system are respectively

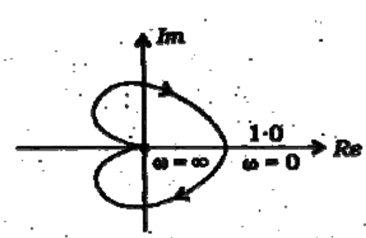
a. 0.00 dB, –180°

b. 3.86 dB, –180°

c. 0.00 dB, –10°

d. 3.86 dB, 10°

45.



The Nyquist plot shown above, matches with the transfer function

a. $\frac{1}{(s+1)^3}$

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

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

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

46. The phase margin (PM) and the damping ratio (ξ) are related by

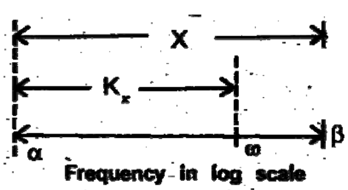
a. $PM = 90^o - \tan^{-1}\left\{\dfrac{\sqrt{-2\xi^2+\sqrt{1+4\xi^4}}}{2}\right\}$

b. $PM = \tan^{-1}\left\{\dfrac{2\xi}{\sqrt{-2\xi^2+\sqrt{1+4\xi^4}}}\right\}$

c. $PM = 90^o + \tan^{-1}\left\{\dfrac{\sqrt{2\xi^2+\sqrt{1+4\xi^4}}}{2\xi}\right\}$

d. $PM = 180^o + \tan^{-1}\left\{\dfrac{\sqrt{2\xi^2-\sqrt{1+4\xi^4}}}{2}\right\}$

47.



The frequency ω in terms of frequencies a and in the above figure is

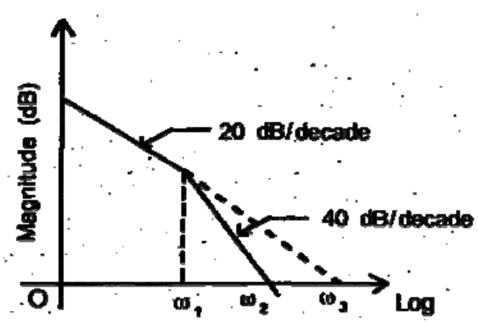
a. $K(\log\alpha - \log\beta)$

b. $(\beta/\alpha)^K$

c. $\alpha^K.\beta^{K-1}$

d. $\alpha^{1-K}.\beta^K$

48.



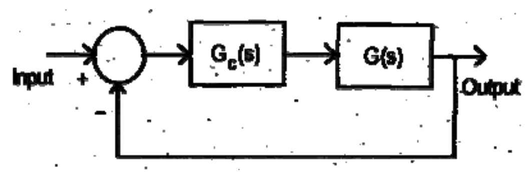
Consider the following statements regarding the frequency response of a system as shown above :

1. The type of the system is one
2. ω_3 = static error coefficient (numerically)
3. $\omega_2 = \dfrac{\omega_1+\omega_3}{2}$

Select the correct answer using the codes given below:

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

49.



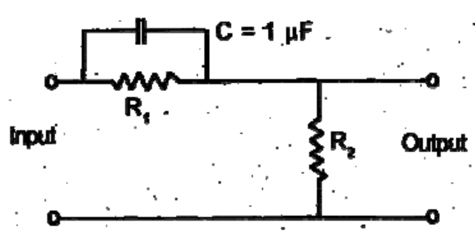
A closed loop system, employing lag-lead compensator $G_c(s)$ is shown in the figure given above

$$G_c(s) = \left[\frac{1+\tau_1 s}{1+\dfrac{\tau_1 s}{\beta}}\right]\left[\frac{1+\tau_2 s}{1+\beta\tau_2 s}\right], \beta < 1$$

If G(s) has 3 poles in the left half of a s-plane, then the shape of the Bode plot for $|G(s)G_c(s)|$ in the highest frequency range will be

a. – 20 dB/decade
b. – 40 dB/decade
c. – 60 dB/decade
d. – 80 dB/decade

50.



The transfer function of a phase lead network, as shown in the figure above is

$$\frac{K(1+0.3s)}{(1+0.17s)}$$

The values of R_1 and R_2 are respectively

a. 300 kΩ and 300 kΩ

b. 300 kΩ and 400 kΩ

c. 400 kΩ and 300 kΩ

d. 400 kΩ and 400 kΩ

51. Constant M circles have their centre. and radius as

a. $\left(\frac{-M^2}{M^2-1}, 0\right)$ and $\left(\frac{M^2}{M^2-1}\right)$

b. $\left(\frac{-M^2}{M^2-1}, 0\right)$ and $\left(\frac{M}{M^2-1}\right)$

c. $\left(0, \frac{M^2}{M^2-1}\right)$ and $\left(\frac{M^2}{M-1}\right)$

d. $\left(0, \frac{M^2}{M^2-1}\right)$ and $\left(\frac{M}{M^2-1}\right)$

52. The maximum value of a controller output is 100 V and is obtained when the input error is 1 V. If the Controller is working at 20% proportional band, the error and output will be respectively

a. 0.2 V and 100 V

b. 1 V and 20 V

c. 1 V and 120 V

d. 0.2 V and 120 V

53. Thermal noise is passed through an ideal los-pass filter having cut-off at $f_c = \omega$ Hz. The autocorrelation value of the noise at the output of the filter is given as

a. A delta function at t = 0

b. Gaussian over the range $-\infty \le t \le \infty$

c. Sinc function over the range $-\infty \le t \le \infty$

d. Triangular function over the range $-1/2\omega \le t \le 1/2\omega$

54. A random process obeys Poisson's distribution. It is given that the mean of the process is 5. Then the variance of the process is

a. 5

b. 0.5

c. 25

d. 0

55. Consider the following :

1. Filter system
2. Phase-shift method
3. Third method
4. Balanced modulator

Which of these can be used to remove unwanted side- bands in SSB?

a. 1, 2 and 4

b. 1, 2 and 3

c. 2, 3 and 4

d. 1, 3 and 4

56. In a modulator it is found that the amplitude spectrum consists of a component at f_c, the carrier frequency and one component each at $f_c - f_s$ and $f_c + f_s$, where f_s is the modulating signal frequency. Then the modulator used is

a. AM

b. AM and/or Narrow band FM with depth ≤ 0.5

c. FM

d. PAM

57. The modulation index of an AM wave is changed from 0 to 1. The transmitted power is

a. Unchanged

b. Halved

c. Increased by 50%

d. Quadrupled

58. In an SSB transmitter one is most likely to find

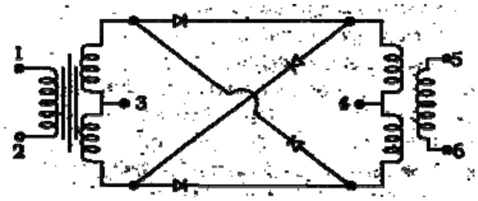
a. Class-C audio amplifier

b. Tuned modulator

c. Class-B RF amplifier

d. Class-AB power amplifier

59.



In the circuit shown above the transformers are centre tapped and the diodes are connected as shown ma bridge. Between the terminals 1 and 2 an a.c. voltage source of frequency 400 Hz is connected. Another a.c. voltage of 1.0

MHz is connected between 3 and 4. The output between 5 and 6 contains components at

a. 400 Hz, 1.0 MHz, 1000.4 kHz, 999.6 kHz

b. 400 Hz, 1000.0 kHz, 999.6 kHz

c. 1 MHz, 1000.4 kHz, 9996 kHz

d. 1000.4 kHz, 999.6 kHz

60. Consider a noisy binary channel with bit error probability $p_e = 5 \times 10^{-5}$. Assume 10000 bits are being transmitted over such a channel. The probability that there will be 2 or less number of bits in error is

a. 10^{-4}

b. ~ 0.5

c. ~1

d. 10^{4}

61. A public broadcast system using amplitude modulation with double sideband should invariably have which one of the following features at the transmitter?

a. Band limit the signal to 5 kHz

b. Use a high frequency carrier oscillator

c. Use a stable crystal oscillator

d. Use an all-round radiating transmitting antenna

62. Consider the following :

1. Pulse-position modulation
2. Pulse-code modulation
3. Pulse-width modulation

Which of these communications are not digital?

a. 1 and 2

b. 2 and 3

c. 1 and 3

d. 1, 2 and 3

63. The code which provides for parity check is

a. Baudot

b. A S C I I

c. E B C D I C

d. Excess-3

64. The number of signaling bits per channel per frame in TI multiplexer following CCITT hierarchy is

a. 64000

b. 128

c. 4

d. 400

65. A TV signal transmitted in New Delhi can be received in Nagpur which is about 1000 km away if and only if

a. Transmitting antenna is at a height of 5000 m

b. A cable TV system is employed

c. Power of the order of 100 kW is radiated

d. A satellite is employed for this

66. In television, 4 : 3 represents the

a. Interlace ratio

b. Maximum horizontal to vertical deflection

c. Aspect ratio

d. Horizontal to vertical sweep frequency ratio

67. Consider the following :

1. Synch
2. Video
3. Sweep
4. Sound

Which of these voltages are found in the output of a normal monochrome receiver video detector ?

a. 1, 3 and 4

b. 1, 2 and 4

c. 2, 3 and 4

d. 1, 2 and 3

68. A television composite video signal is found to contain a large number of pulses. These pulses are provided so that

a. News can be transmitted to be displayed at the bottom

b. Audio information like speech, music, etc., can be transmitted in PCM form

c. Receiver can achieve synchronism in sweep

d. Correction can be made in contrast

69. In a satellite ground station, the received signal is directly amplified in a low noise parametric amplifier followed by an FET amplifier. The gains and effective noise

temperatures of the amplifiers are 20 dB, 9.0 K and 10 dB, 200 K respectively. The effective noise temperature of the combination is

a. 11.0 K

b. 20 K

c. 29.0 K

d. 39 K

70. In a reflex kylstron, the velocity modulation

a. Occurs near the reflector

b. Occurs in the resonator gap

c. Occurs near the accelerating grid

d. Does not occur at all

71. For a Gunn diode, the drift velocity of electron through active drift region is 10^7 cm/s and the active region is 10×10^{-4} cm. The critical voltage of the diode (critical field = 3.2 kV/cm) is

a. 0.032V

b. 0.32 V

c. 3.2V

d. 32 V

72. As an, ideal local oscillator for microwave frequency measurements, the most suitable microwave source is a

a. Multicavity magnetron

b. Reflex kylstron

c. Double cavity klystron

d. Travelling wave tube

73. The maximum theoretical output circuit efficiency of a double resonator klystron amplifier is

a. 25%

b. 50%

c. 58%

d. 85%

74. Which one of the following can be used for amplification of microwave signals?

a. Gunn diode

b. Strapped magnetron

c. Reflex kylstron

d. Double cavity klystron

75. If the height of the waveguide is halved its cut-off wavelength will

a. Be halved

b. Be doubled

c. Remain unchanged

d. Be one-fourth of the previous value

76. In a rectangular waveguide with broader dimension a and narrow dimension b, the dominant mode of microwave propagation would be

a. TE_{10}

b. TM_{10}

c. TE_{01}

d. TM_{01}

77. A cavity wavemeter is connected parallel to a waveguide transmission line which terminates in a resistive load. The microwave power reaching the load-end is monitored by a power meter. As the cavity wavemeter is tuned to the resonant frequency of the input signal through the waveguide assembly the power indicated by the power meter will show

a. A sudden dip

b. A sudden rise

c. Rapid fluctuations

d. A steady level

78. A two-port non-reciprocal device which produces a minimum attenuation to e.m. wave propagation in one direction and a very high attenuation in opposite direction is generally known as

a. Phase shifter

b. Isolator

c. Polariser

d. Circulator

79. A metal probe inserted into a rectangular waveguide through the broader wall of the guide will provide a property across the guide. This property is a

a. Shunt

b. Reactance

c. Reverberation

d. Resonance

80. Typical f/D ratio in practice for a paraboloid reflector (where f is the focal length and D is the aperture diameter) is in the range of

a. 0.2 to 0.3

b. 2 to 3

c. 0.02 to 0.03

d. 0.5 to 1

81. A parabolic dish antenna has a diameter of 1 m. The maximum possible (ideal) gain of the antenna at a wavelength of 314 cm is

a. 20 dB

b. 30 dB

c. 40 dB

d. 50 dB

82. A slotted line is used for the measurement of VSWR. The slot is cut at the centre, because

a. The field inside the waveguide will not be perturbed

b. To get a good impedance matching

c. Maximum field will be induced to the penetrating probe

d. No field will be coupled to the probe

83. In a microwave measurement set-up, the power reaching to the load is found to be 50 mW. If a 3 dB coupler is placed before the load, the power to the load will be

a. 50 mW

b. 25 mW

c. 12.5 mW

d. 6.25 mW

84. The variation of resistance of an element with absorption of microwave power is the underlying principle of operation of a/an

a. Attenuator

b. Wave filter

c. Phase shifter

d. Bolometer

85. In microwave communication links, path-diversity and frequency-diversity are adopted to overcome fading in the path due to

a. Polarization shifting

b. Phase lagging

c. Rain attenuation

d. Fog accumulation.

86. In microwave communication systems using circularly polarized beams, the receiving antenna should be

a. Helical antenna

b. Horn antenna

c. Crossed rhombic antenna

d. Biconical loop antenna

87. The extended range propagation occurs due to

a. High conductivity of the ground

b. Low conductivity of the ground

c. Blobs of different dielectric constants randomly distributed in the volume of the upper atmosphere

d. High conductivity of the upper atmosphere

88. In LOS-line of sight propagation systems, to take account of normal refraction, an effective earth radius factor k is used whose value is

a. 4/3

b. 4

c. 3/4

d. 1/2

89. Which one of the following frequency bands is allocated by ITU (International Telecommunication Union) for DBS – Direct Broadcast Service (also referred as DTH – Direct to Home service) ?

a. 14/12 GHz

b. 6/4 GHz

c. 2/1 GHz

d. 42/40 GHz

90. In hexadecimal arithmetic, the result of $77_{16} - 3B_{16}$ is equal to

a. $3D_{16}$

b. $3G_{16}$

c. 60_{16}

d. 73_{16}

91. A certain well-known computer family represents the exponents of its floating-point numbers as 'Excess-64' integers. Which one of the following numbers is represented by the exponent $e_6e_5e_4e_3e_2e_1e_0$?

a. $e = -64 + \sum_{i=0}^{6} 2^i e_i$

b. $e = -64 + \sum_{i=0}^{6} 2e_i$

c. $e = 64 - \sum_{i=0}^{6} 2^i e_i$

d. $e = 64 - \sum_{i=0}^{6} 2e_i$

92. Which one of the following correctly defines a C-macro for computing the square?

a. # defines sqr (x) x * x

b. # defines sqr (x) (x * x)

c. # defines sqr (x) ((x) * (x))

d. # defines sqr (x) (x) * (x)

93. Consider the following declaration of C :

in (*P) ( ) :

Which of the following is true for the above declaration ?

a. P is pointed to function returning integer

b. P is pointer to an array of integers

c. P is an array of pointers

d. P is a function returning pointer to integer

94. Consider tile following Pascal program fragment

```
        var i, j : integer;
        procedure Y(p, q : integer) ;
        begin
        p : p – q ;
        q : p + q ;
        p : q – p
end ;
        i : = 2 ;
        i : = 3 ;
        Y (i, j) ;
```

If both parameters to Y are passed by reference, what are the values of i and j at the end of the program fragment ?

a. i = 0, j = 2

b. i = 1, j = 5

c. i = 2, j = 3

d. i = 3, j = 2

95. Consider the following C program :

```
# include < stdio        h >
main ( )
{ float total 0.0, q = 1.0, p = 2.0 while (p/q
> 0.001)
        {
        q = q + q ;
        total = total + p/q ;
        print f (“% f\n”, total) ;
        }
}
```

Which one of the following is the integer that best approximates the last number printed ?

a. 0

b. 1

c. 2

d. 3

96. Which of the following correctly declares a painter to an array of integers in C ?

a. int *P [20] ;

b. int *P [20] ;

c. int (*P) [20] ;

d. int *(P[20]);

97. Consider the assembler directives :

```
        ORG         8000
T :     DW          OFAOFH
```

Which one of the following is correct ?

a. The contents of the locations 8000 and 8001 get erased

b. The contents of the locations 8000 and 8001 remain unchanged

c. The least significant byte OF will be stored at location 8000 and the most significant byte FA will be stored at location 8001

d. The least significant byte OF will be stored at location 8001 and the most significant byte FA will be stored at location 8000

98. Consider the following information :

An array A [1 .m] is said to be p-ordered if

A (i – p) ≤ A [i] ≤ A [i + p]

for each i such that p < i ≤ m – p. For example, the array 1 4 2 6 3 7 5 8 is 2-ordered.

In a 2-ordered array of 2N elements, what is the maximum number of positions that an element can be from its position if the array were 1-ordered?

a. 1

b. 2

c. N\2

d. N

99. Which of the following are included in the architecture of computer?

1. Addressing modes, design of CPU
2. Instruction set, data formats
3. Secondary memory, operating system

Select the correct answer using the codes given below :

a. 1 and 2

b. 2 and 3

c. 1 and 3

d. 1, 2 and 3

100. The content of which of the following determines the state of the CPU at the end of the execute cycle (when the interrupt is recognized)?

1. Program counter
2. Processor register
3. Certain status conditions

Select the correct answer using the codes given below :

a. 1 and 2

b. 2 and 3

c. 1 and 3

d. 1, 2 and 3

101. The first machine cycle of an instruction is always

a. A memory read cycle

b. A fetch cycle

c. An I/O read cycle

d. A memory write cycle

102. Match List I (Type of Memory) with List II (Used as) and select the correct answer :

List I

A. DRAM

B. SRAM

C. Parallel Access Registers

D. ROM

List II

1. Cache memory
2. Main memory
3. BIOS memory
4. CPU registers

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

103.

PUSH	a	POP	BX
PUSH	b	ADD	AX, BX
PUSH	c		
POP	AX		
Pop	BX		
SUB	AX, BX		

The expression computed by the above program and stored in AX is

a. a + b – c

b. c + b – a

c. c – b + a

d. c – b – a

104. Match List I (8085 Register) with List II (8086 Register) and select the correct answer :

List I

A. A

B. H

C. L

D. B

List II

1. CH
2. AL
3. BL
4. BH

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

105. Consider the Motorola 68008, 68010, 68012 and 68020 microprocessors. In systems that are severely constrained by the space available for the printed circuit board, it is better to use

a. 68008
b. 68010
c. 68012
d. 68020

106. Assertion (A) : If the emitter bypass capacitor of an R-C coupled, CE amplifier gets disconnected, its voltage gain increases.

Reason (R) : The unbypassed emitter resistor gives negative feedback.

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

107. Assertion (A) : A self-biased BJT circuit is more stable as compared to a fixed biased one

Reason (R) : A self-biased BJT circuit uses more components as compared to a fixed biased one.

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

108. Assertion (A) : In a shunt regulator, the control element is connected in shunt with the load to achieve constant output voltage.

Reason (R) : The impedance of the control element varies to keep the total current flowing through the load and the control element constant.

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

109. Assertion (A) : Wien bridge oscillator is generally used as a variable audio frequency oscillator.

Reason (R) : By varying either the capacitor or resistor value in one of the arms of the bridge, the frequency of the Wien bridge oscillator can be varied.

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

110. Assertion (A) : The switching speed of ECL gate is very high.

Reason (R) : The devices in ECL gate operate in active region.

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

111. Assertion (A) : When transistor switches are to be used in an application where speed is a premium, it is better to reduce the storage time.

Reason (R) : It is comparatively easy to reduce storage time rather than the rise time and fall time of transistor switch.

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

112. Assertion (A) : Asynchronous sequential circuits are difficult to design.

Reason (R) : External clock is used for synchronization of asynchronous sequential circuits.

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

113. Assertion (A) : A linear, negative feedback control system is invariably stable if its open loop configuration is stable.

Reason (R) : The negative feedback reduces the overall gain of the 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

114. Assertion (A) : Narrow band FM signal can be detected using an envelope detector

Reason (R) : Narrow band FM signal contains a carrier component and two sideband components.

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

115. Assertion (A) : Though raw binary bits can be transmitted over communication channels, often coding is done to transmit the data in a more error-free and reliable manner.

Reason (R) : Coding assigns uneven distribution of binary digits to various symbols of the signal depending upon probability.

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

116. Assertion (A) : Fading is encouraged in shortwave radio communication while at VHF fading does not occur.

Reason (R) : Short-wave communication depends on refraction from the ionosphere and hence fluctuations of ion density cause fading whereas VHF systems use line of sight propagation and hence do not encounter fading

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

117. Assertion (A) : In call-by-value parameter passing technique, function call overheads are less as compared to that of call-by-reference.

Reason (R) : In call-by-reference parameter passing technique, address of actual parameter is pushed into the stack.

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

118. Assertion (A) : Insertion and deletion in a sorted array can be time-consuming.

Reason (R) : All the elements following the inserted or deleted element must be shifted approximately.

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

119. Assertion (A) : Reduced Instruction Set Computers (RISC) use pipelined control unit.

Reason (R) : Pipelining reduces memory requirements of programs.

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

120. Assertion (A) : The data which is keyed in can be viewed through a Visual display Unit (VDU).

Reason (R) : VDU is also called a terminal.

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