ELECTRONICS & TELECOMMUNICATION ENGINEERING

PAPER–II

1. F's complement of $(2BFD)_{hex}$ is
   a. E 304
   b. D 403
   c. D 402
   d. C 403

2. The number of digit 1 present in the binary representation of $3 \times 512 + 7 \times 64 + 5 \times 8 + 3$ is
   a. 8
   b. 9
   c. 10
   d. 12

3. Which of the following conditional IF statements of Pascal are correct?
   1. IF condition 1 THEN statement 1 ELSE IF condition 2 THEN statement 2 ELSE statement 3
   2. IF condition 1 THEN IF condition 2 THEN statement 1 ELSE statement 2
   3. IF condition 1 THEN IF condition 2 THEN statement 1 ELSE statement 2
   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

4. In an assembler, which one of the following is required for variable names in symbol table?
   a. Addresses
   b. Values
   c. Registers
   d. Storage

5. Which of the following operations are performed on linear queues?
   1. Testing a linear queue for underfiow
   2. Enqueue operation.
   3. Dequeue operation.
   4. Testing a linear queue for overflow.
   Select the correct answer using the codes given below:
   a. 1, 2and 3
   b. 2, 3 and 4
   c. 1, 3 and 4
   d. 1, 2, 3 and 4

6. Effective address is calculated by adding or subtracting displacement value to
   a. immediate address
   b. relative address
   c. absolute address
   d. base address

7. The micro programs provided by a manufacturer to be used on his micro programmed computer are generally called
   a. software
   b. netware
   c. firmware
   d. hardware

8. The control logic for a binary multiplier is specified by a state diagram. The state diagram has four states and two inputs. To implement it by the sequence register arid decoder method
   a. two flip-flops and 2×4 decoders are needed
   b. four flip-flops and 2×4 decoders are needed
   c. two-flip-flops and 3×9 decoders are needed
   d. four flip-flops and 3×9 decoders are needed

9. The output voltage of a 5-bit D/A binary ladder that has a digital input of 11010 (Assuming $0 = 0$ V and $1 = +10$ V) is
   a. 3.4375 V
   b. 6.0 V
   c. 8.125 V
   d. 9.6875 V

10. The 54/74164 chip is an 8-bit serial- input- parallel- output shift register. The clock is 1 MHz. The time needed to shift an 8-bit binary number into the chip is
    a. 1 µs
    b. 2 µs
    c. 8 µs
    d. 16 µs

11. The frequency of the driving network connected between pins 1 and 2 of a 8085 chip must be
   a. equal to the desired clock frequency
   b. twice the desired clock frequency
   c. four times the desired clock frequency
   d. eight times the desired clock frequency

12. The 8086 arithmetic instructions work on
   1. signed and unsigned numbers.
   2. ASCII data.
   3. unpacked BCD data.

   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

13. Which of the following are required for a multimedia PC?
   1. CD - ROM drive, speaker and sound card.
   2. Modem and network card.
   3. Hardware needed to display videos and animation.
   4. Software needed to display videos and animation.

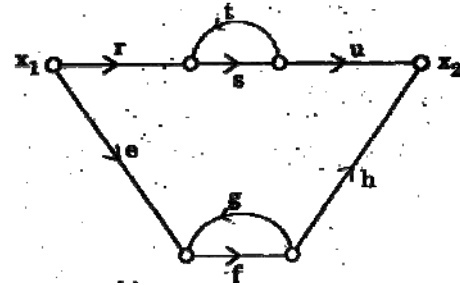   Select the correct answer using the codes given below:
   a. 1, 2 and 3
   b. 1, 2, 3 and 4
   c. 1, 2 and 4
   d. 1, 3 and 4

14. The open loop transfer function of a system is

   $$G(s)H(s) = \frac{k}{(1+s)(1+2s)(1+3s)}$$

   The phase crossover frequency ω_c is
   a. $\sqrt{2}$
   b. 1
   c. Zero
   d. $\sqrt{3}$

15. Open loop transfer function of a system having one zero with a positive real value is called
   a. zero phase function
   b. negative phase function
   c. positive phase function
   d. non - minimum phase function

16. For the signal flow diagram shown in the given figure, the transmittance between x_2 and x_1 is

   a. $\dfrac{r\,s\,u}{1-st} + \dfrac{e\,f\,h}{1-fg}$

   b. $\dfrac{r\,s\,u}{1-fg} + \dfrac{e\,f\,h}{1-st}$

   c. $\dfrac{e\,f\,h}{1-ru} + \dfrac{r\,s\,u}{1-eh}$

   d. $\dfrac{r\,s\,t}{1-eh} + \dfrac{r\,s\,u}{1-st}$

17. The root locus plot of the system having the loop transfer function

 $$G(s)H(s) = \frac{k}{s(s+4)(s^2+4s+5)} \quad \text{has}$$

   a. no breakaway point
   b. three real breakaway points
   c. only one breakaway point
   d. one real and two complex breakaway points

18. An open Loop transfer function is given by

   $$G(s)H(s) = \frac{k(s+1)}{s(s+2)(s^2+2s+2)}. \quad \text{If has}$$

   a. one zero at infinity
   b. two zeros at infinity
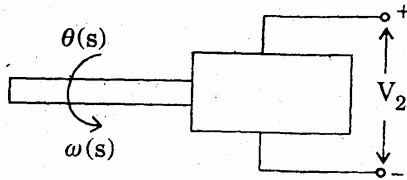   c. three zeros at infinity
   d. four zeros at infinity

19. Consider the mechanical system shown in the given figure. If the system is set into motion by unit impulse force, the equation of the resulting oscillation will be
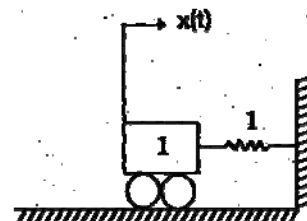

   a. $x(t) = \sin t$
   b. $x(t) = \sqrt{2}\ \sin t$
   c. $x(t) = 1/2\sin 2t$

d. $x(t) = \sin \sqrt{2}\ t$

20. Which one of the following relations holds goods for the tachometer shown in the given figure?

a. $V_2(s) = sk_t \omega(s)$

b. $V_2(s) = k_t s^2 \theta(s)$

c. $V_2(s) = k_t s^2 \omega(s)$

d. $V_2(s) = k_t s \theta(s)$

21. The given characteristic polynomial
$s^4 + s^3 + 2s^2 + 2s + 3 = 0$ has
a. zero root in RHS of s-plane
b. one root in RHS of s-plane
c. two roots in RHS of s-plane
d. three roots in RHS of s-plane

22. Nyquist plot shown in the given figure is for a type
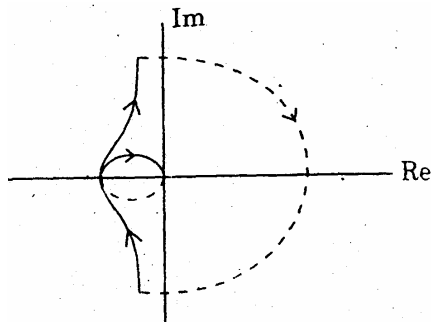
a. zero system
b. one system
c. two system
d. three system

23. Which one of the following is the steady-state error for a step input applied to a unity feedback system with the open loop transfer function $G(s) = \dfrac{10}{s^2 + 14s + 50}$?

a. $e_{ss} = 0$
b. $e_{ss} = 0.83$
c. $e_{ss} = 1$
d. $e_{ss} = \infty$

24. The unit step response of a particular control system is given by $c(t) = 1 - 10e^{-t}$. Then its transfer function is

a. $\dfrac{10}{s+1}$

b. $\dfrac{s-9}{s+1}$

c. $\dfrac{1-9s}{s+1}$

d. $\dfrac{1-9s}{s(s+1)}$

25. The open-loop transfer function of a unity feedback control system is given as

$$G(s) = \frac{1}{s(1+sT_1)(1+sT_2)}$$

The phase crossover frequency and the gain margin are, respectively

a. $\dfrac{1}{\sqrt{T_1 T_2}}\ and\ \dfrac{T_1 + T_2}{T_1 T_2}$

b. $\sqrt{T_1 T_2}\ and\ \dfrac{T_1 + T_2}{T_1 T_2}$

c. $\dfrac{1}{\sqrt{T_1 T_2}}\ and\ \dfrac{T_1 T_2}{T_1 + T_2}$

d. $\sqrt{T_1 T_2}\ and\ \dfrac{T_1 T_2}{T_1 + T_2}$

26. An open loop transfer function of a unity feedback control system has two finite zeros, two poles at origin and two pairs of complex conjugate poles. The slope of high frequency asymptote in Bode magnitude plot will be
a. + 40 dB/decade
b. 0 dB/decade
c. - 40 dB/decade
d. - 80 dB/decade

27. The transfer function of a phase lead network can be written as

a. $\dfrac{1+sT}{1+s\beta T}; \beta > 1$

b. $\dfrac{\alpha(1+sT)}{1+s\alpha T}; \alpha < 1$

c. $\dfrac{\beta(1+sT)}{1+s\beta T + T}; \beta < 1$

d. $\dfrac{(1+sT)}{\alpha(1+sT)}; \alpha > 1$

28. Which one of the following compensations is adopted for improving transient

response of a negative unity feedback system?

a. Phase lead compensation
b. Phase lag compensation
c. Gain compensation
d. Both phase lag compensation and gain compensation

29. A constant N-circle having centre at (-1/2 + j0) in the G-plane, represents the phase angle equal to

a. 180°
b. 90°
c. 45°
d. 0°

30. The constant M-circle represented by the equation $x^2 + 2.25x + y^2 = -1.125$ where x = Re [G(jω)] and y = Im [G(jω)] has the value of M equal to

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

31. A third-order system is approximated to an equivalent second order system. The rise time of this approximated lower order system will be

a. same as original system for any input
b. smaller than the original system for any input
c. larger than the original system for any input
d. larger or smaller depending on the input

32. In industrial control systems, which one of the following methods is most commonly used in designing a system for meeting performance specifications?

a. The transfer function is first determined and then either a lead compensation or lag compensation is implemented
b. The transfer function is first determined and PID controllers are implemented by mathematically determining PID constants
c. PID controllers are implemented without the knowledge of the system parameters using Ziegler Nichols method

d. PID controllers are implemented using Ziegler Nichols method after determining the system transfer function

33. To permit the selection of 1 out of 16 equiprobable events, the number of bits required is

a. 2
b. $\log_{10} 16$
c. 8
d. 4

34. Which one of the following types of noise gains importance at high frequency?

a. Shot noise
b. Random noise
c. Impulse noise
d. Transit-time noise

35. The ratio $\dfrac{(S/N)_{WBFM}}{(S/N)_{AM}}$ for 100% amplitude modulation with identical total transmitted power (m_f is modulation index of FX) is

a. $\dfrac{9}{2}m_f^2$
b. $\dfrac{3}{2}m_f^2$
c. $\dfrac{3}{2}m_f^3$
d. $\dfrac{9}{2}m_f^3$

36. A carrier of frequency 1 MHz is amplitude modulated by a signal of frequency of 1 kHz to a depth of 60%. This is passed through a filter of characteristics shown in the given Figure I and Figure II. If the filter output is fed to an envelope detector, the detector output will be
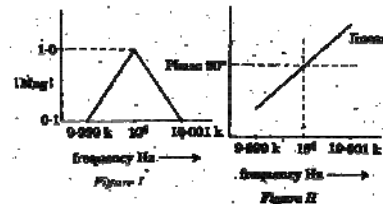
a. zero
b. dc
c. dc + 1 kHz signal
d. 1 kHz signal

37. If the radiated power of AM transmitter is 10 kW, the power in the carrier for modulation index of 0.6 is nearly

a. 8.24 kW
b. 8.47. kW
c. 9.26 kW
d. 9.6 kW

38. In a low-level AM system, the amplifier which follows the modulated stage must be the
a. linear device
b. harmonic device
c. class-C amplifier
d. non-linear device

39. An angle-modulated signal is expressed by

$$f_a(t) = \cos(2 \times 10^8 \pi t) + 75 \sin 2 \times 10^3 \pi t$$

The peak frequency deviation of the carrier is then
a. 1 kHz
b. 7.5 kHz
c. 75 kHz
d. 100 MHz

40. For 10-bit PCM system, the signal to quantization noise ratio is 62 dB. If the number of bits is increased by 2, then the signal to quantization noise ratio will
a. increase by 6 dB
b. increase by 12 dB
c. decrease by 6 dB
d. decrease by 12 dB

41. When the channel is noisy, producing a conditional probability of error p = 0.5; the channel capacity and entropy function would be, respectively,
a. 1 and 1
b. 1 and 0.5
c. 0.5 and 1
d. zero and 1

42. For a given data rate, the bandwidth β_p of a BPSK signal and the bandwidth β_p of the OOK signal are related as
a. $\beta_p = \beta_0 / 2$
b. $\beta_p = 2\beta_0$
c. $\beta_p = \beta_0 / 4$
d. $\beta_p = \beta_0 / 4$

43. In a certain '12 channel TDM' system, it is found that channel No. 3 and channel No. 8 are connected to the same input signal. This technique
a. wastes the channel capacity
b. takes care of different sampling rates
c. is required when different bandwidth signals are to be
d. reduces noise

44. MCVF telegraphy uses
a. SSB techniques
b. Pulse modulation
c. out-of-band signalling
d. FM

45. A radio station works at 800 kHz and uses AM. If this is a public broadcast system, it should transmit using
a. parabolic reflector to transmit all round
b. turnstile antenna for the required band
c. half-wave long horizontal wire
d. a vertical antenna less than quarter for practical reasons

46. Equalizing pulses in TV are sent during
a. horizontal blanking
b. vertical blanking
c. serations (slots)
d. the horizontal retrace

47. Which one of the following relations is correct for luminance signal with Red (R), Green (G) and Blue (B) components?
a. Y = 0.59 R + 0.30 G + 0.11 B
b. Y = 0.11 R + 0.30 G + 0.59 B
c. Y = 0.29 R + 0.11 G + 0.60 B
d. Y = 0.30 R + 0.59 G + 0.11 B

48. Fthe false alarm probability (P_{fa}) in a radar is found to be 0.05 under conditions like large prf and pulse integration. Then the detection probability
a. is independent of p_{fa}
b. is equal to $(1 - \sqrt{0.05})$
c. is equal to $(1 - 0.05)$
d. depends on the power received in echo

49. Which of the following is/are the hyperbolic system(s) of the navigation?
1. VOR
2. LORAN
3. DECCA
4. TACAN
Select the correct answer using the codes given below:
a. 1 and 2
b. 2 alone
c. 2 and 3
d. 1 and 4

50. A received signal in a Radar system occupies an IF bandwidth of 12 MHz. If the transmitted signal was a pulsed carrier of 10 GHz with duty ratio 1: 0.5 @ 400 Hz, the received signal power will contain the
   a. frequency component at 400 Hz
   b. frequency spread over the whole IF bandwidth
   c. dc or average value of the IF
   d. RF signals at 10 GHz and 12 MHz

51. Consider the following statements:
   In optical communications, the losses in optical fibres can be caused by
   1. impurities
   2. attenuation in glass
   3. micro bending
   4. stepped index operation
   Which of these statements are correct?
   a. 1, 2 and 3
   b. 1, 3 and 4
   c. 1, 2 and 4
   d. 2, 3 and 4

52. A TV station works at 300 MHz and radiates 100 kW of power. This signal received at a distance of 200 km will be
   a. a few μ/m due to attenuation by atmosphere
   b. 1 - 5 mV due to ionospheric reflection
   c. nil since propagation is line of sight
   d. nil because signal fades completely at 300 MHz

53. For a parabolic reflector antenna with diameter of 3 m, the far field pattern measurement at 10 GHz should be carried out at a distance of at least
   a. 30 m
   b. 200 m
   c. 400 m
   d. 600 m

54. In a Gunn oscillator where the diode is operated in a tunable resonant circuit, most of the sample length of the Gunn device is maintained in the negative conductance state during most of the R.F cycle for
   a. delayed domain mode
   b. quenched domain mode
   c. ISA mode
   d. hybrid mode

55. Match List (names of the devices) with List II (Applications) and select the correct answer:
   List I
   A. Step-recovery Diodes
   B. MESFET
   C. Pin Diode
   List II
   1. Switching circuit
   2. To produce multiple harmonics in comb generator
   3. Microwave amplifier
   Codes;

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

56. Consider the following statements:-
   Cross field amplifier (CFA) is a microwave power amplifier which
   1. is a cross between the TWT and the magnetron' in its operation S
   2. Uses a magnetron structure to provide on interaction between crossed dc electric and magnetic field on one hand and RF fields on the other hand.
   3. uses interaction between electron beam and stationary RF fields.
   Select the correct answer using the codes given below:
   a. 1 and 2
   b. 1 and 3
   c. 3 alone
   d. 2 and 3

57. Broad banding a microwave transistor RF amplifier is difficult because
   a. of shunt capacitance loading effect
   b. of series capacitance loading effect
   c. changes in inductive loading affect terminating impedance
   d. changes in output loading 'affect input impedance

58. Which of the following conditions will not guarantee a distortion less transmission line?
   a. $R = G = O$
   b. $RC = GL$

c. Very low frequency range (R $\gg$ ωL, G $\gg$ wC)

d. Verh high frequency range (R $\ll$ ωL, G $\ll$ C)

59. In an air line, adjacent maxima are found at 12.5 cm and 37.5 cm. The operating frequency is
   a. 1.5 GHz
   b. 600 MHz
   c. 300 MHz
   d. 1.2 GHz

60. The propagation of TE_{10} mode in a rectangular waveguide is used to excite a circular waveguide as shown in figure I and figure II. The mode excited in the circular waveguide of figure I and figure II will, respectively, be
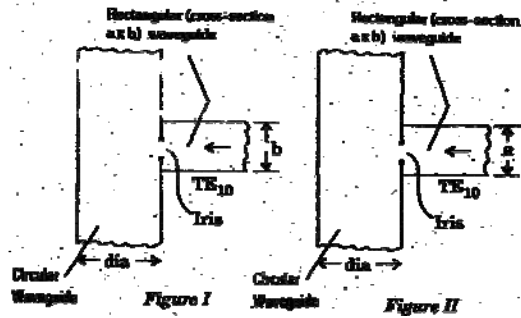
Figure I   Figure II

   a. TE_{11} and TM_{01}
   b. TM_{01} and TE_{11}
   c. TE_{01} and TM_{01}
   d. TM_{01} and TE_{01}

61. Figure I shows an open circuited transmission line. The switch is closed at time t = 0 and after a time t, the voltage distribution on the line reaches that shown in figure II. If c Is the velocity in the line, then


Figure I   Figure II
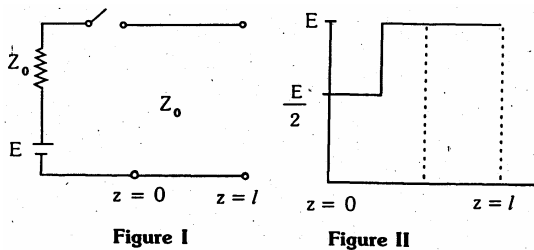
   a. $t < l/c$
   b. $t = l/c$
   c. $2l/c > t > l/c$
   d. $t < 2l/c$

62. For producing circularly polarized beams in microwave communication field, the type of antenna ideally suited is
   a. helical antenna
   b. parabolic dise with circular aperture
   c. pyramidal hom with symmetrical beam shapes in E and H plane
   d. circular Loop antenna

63. Given figure shows a 900 sector of spherical reflector with vertex V, centre of curvature 'C' and equal distances VI), DF, FE and EC. When a beam of electromagnetic wave is incident parallel to the axis, all the energy will pass through the region
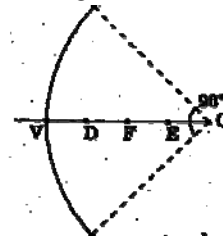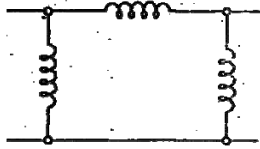

   a. VD
   b. DF
   c. FE
   d. EC

64. A cylindncal cavity resonator has diameter of 24 mm and length 20 mm. The dominant mode and the lowest frequency band are operated as
   a. TE_{111} and X-band
   b. TM_{111} and C-band
   c. TM_{011} and Ku-band
   d. TM_{010} and X-band

65. The equivalent circuit of a gap in the strip conductor of a micro strip is

   a.

   b.

   c.
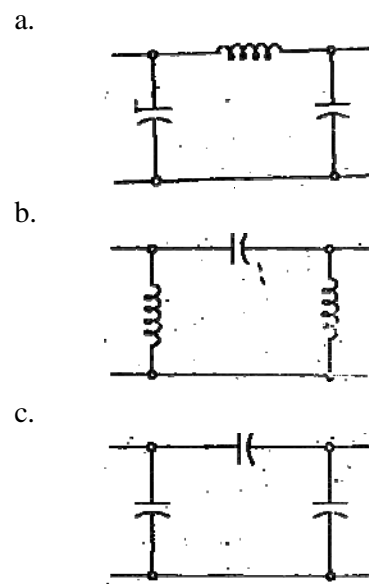
   d.

66. In parametric amplifier used in microwave communication systems, the gain is mainly restricted by
     a. ambient temperature
     b. pump frequency
     c. pump bandwidth
   d. pump energy

67. Which of the following statements on communication by geosynchronous satellites are correct?
     1. The propagation loss over each direction (uplink are down-link) is about 200 dB at 5 GHz.
     2. Radius of the geosynchronous orbit is 42250 km.
     3. An arc of about 17° must be covered by the satellite antenna in the equatorial plane.
     4. The Polar Regions are well covered by the satellite antenna. Select the correct answer using the codes given below:
     a. 1, 2 and 4
     b. 2 and 3
     c. 1 and 4
     d. 1, 2 and 3

68. Two identical antennas 1 km apart and operating at λ = 10 cm in an LOS link, have an obstacle 10 m high midway between them. The height of the antennas such that the fist Fresnel zone is free of any obstacle, should be
     a. 15 m
     b. 15 m
     c. 20 m
     d. 25 m

69. In the measurement of microwave signal as shown in the given figure, the power meter reads 0.01 μW. The coupler directivity is

     a. 20 dB
     b. 30 dB
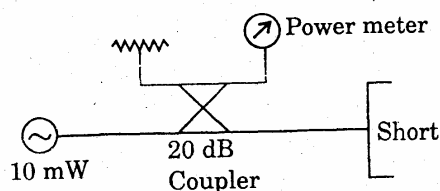
c. 40 dB
d. 50 dB

70. Assertion: (A) One problem with micro strip circuits (or other planar circuits) is that of inevitable discontinuities at bends, stop changes in width, and junctions which can cause a degradation of circuit performance.
     Reason (R): Bends, step changes in width and junction discontinuities introduce parasitic reactancews that can lead to phase and amplitude errors, input and output mismatch, and spurious coupling.
     a. Both A and Rare true and R is the correct explanation of A
     b. Both A and. R are true but R is NOT, the correct explanation of A
     c. A is true but R is false
     d. A is false but R is true

71. Assertion (A): Optical fibres are highly desirable for communication links for lasers.
     Reason (R) Active nature, of optical fibres provides high spectral purity of the signal.
     a. Both A and Rare true and R is the correct explanation of A
     b. Both A and. R are true but R is NOT, the correct explanation of A
     c. A is true but R is false
     d. A is false but R is true

72. Assertion (A): In an op-amp circuit when one input terminal of the op-amp is grounded, the other terminal becomes a virtual ground.
     Reason (R): Input impedance of the op-amp is high.
     a. Both A and Rare true and R is the correct explanation of A
     b. Both A and. R are true but R is NOT, the correct explanation of A
     c. A is true but R is false
     d. A is false but R is true

73. Assertion (A): While using UJT for the generation of saw-tooth voltage, it has to be biased so that it can work within the range of V - I characteristic.
     Reason (R): Within a range of its V - I characteristics, the UJT has negative resistance and can be used as an oscillator.
     a. Both A and Rare true and R is the correct explanation of A

b. Both A and. R are true but R is NOT, the correct explanation of A

c. A is true but R is false

d. A is false but R is true

74. Assertion (A): In an amplifier with negative feedback, the gain-stability is improved by the factor $1 + A\beta$ where A is the magnitude of gain and β is the feedback factor.

Reason (R): The relation between gain with feedback A_f and gain without feedback A, is

$$A_f = \frac{A}{1 + A\beta}. \text{ Thus } \frac{dA_f}{A_f} = \frac{1}{1 + A\beta}\left|\frac{dA}{A}\right|$$

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

b. Both A and. R are true but R is NOT, the correct explanation of A

c. A is true but R is false

d. A is false but R is true

75. Assertion (A): Two stage stagger-tuned amplifier should have greater bandwidth and flatter pass band.

Reason (R): When synchronous tuning is used in two cascaded tuned circuits, the bandwidth reduces considerably.

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

b. Both A and. R are true but R is NOT, the correct explanation of A

c. A is true but R is false

d. A is false but R is true

76. Assertion (A): A processor can reference a memory stack without specifying an address.

Reason (R): The address is always available and automatically updated in the stack pointer.

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

b. Both A and. R are true but R is NOT, the correct explanation of A

c. A is true but R is false

d. A is false but R is true

77. Assertion (A): Some redundancy is useful in programming language syntax.

Reason (R): Redundancy makes a program easier to read and also allows more error-checking to be done during translation.

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

b. Both A and. R are true but R is NOT, the correct explanation of A

c. A is true but R is false

d. A is false but R is true

78. Assertion (A): The stator winding of a control transformer has higher impedance per phase.

Reason (R): The rotor of control transformer is cylindrical in shape.

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

b. Both A and. R are true but R is NOT, the correct explanation of A

c. A is true but R is false

d. A is false but R is true

79. 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.

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

b. Both A and. R are true but R is NOT, the correct explanation of A

c. A is true but R is false

d. A is false but R is true

80. Assertion (A): Master-slave JK flip flop is free from race-around condition.

Reason (R): Master-slave uses two JK flip flops.

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

b. Both A and. R are true but R is NOT, the correct explanation of A

c. A is true but R is false

d. A is false but R is true

81. Assertion (A): ECL gate has the highest speed of operation as compared to other logic families.

Reason (R): ECL gate dissipates more power

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

b. Both A and. R are true but R is NOT, the correct explanation of A
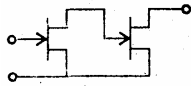
c. A is true but R is false

d. A is false but R is true

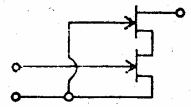82. Match List I (Circuit name) with list II (Circuit diagram) and select the correct answer:

List I

A. Cascade connection

B. Cascode connection

C. Darlington connection
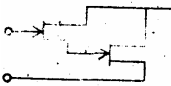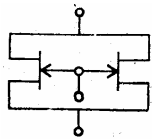
D. Parallel connection

List II

1.

2.

3.

4.

83. Thermal runaway is not possible in EFT because as the temperature of FET increases

   a. the mobility decreases

   b. the tran conductance increases

   c. the drain current increases

   d. the mobility increases

84. In. a 741 op-amp, there is 20 dB/decade fall-off starting at a relatively law frequency. This is due to the

   a. applied load

   b. internal compensation

   c. impedance of the source

   d. power dissipation in the chip

85. The input differential stage of op-amp 741 is biased at about 10 μA current. Such a low current of the input stage gives

   1. high CMRR.

   2. high differential gain.

   3. low differential gain.

   4. high input impedance.

   Which of these are correct?

   a. 1 and 2

   b. 1, 2 and 4

   c. 3 and 4

   d. 1, 2, 3 and 4

86. The condition to be satisfied to prevent thermal runaway in a transistor amplifier where (P_c = Power dissipated at Collector, for, T_j = junction temperature, T_A = Ambient temperature, Q = Thermal resistance) is

   a. $\dfrac{\partial P_c}{\partial T_j} > \dfrac{1}{Q}$

   b. $\dfrac{\partial P_c}{\partial T_A} < \dfrac{1}{Q}$

   c. $\dfrac{\partial P_c}{\partial T_j} < \dfrac{1}{Q}$

   d. $\dfrac{\partial P_c}{\partial T_A} > \dfrac{1}{Q}$

87. Consider the following statements:

The function of bleeder resisteance in filter circuit is to

   1. maintain minimum current necessary for optimum inductor filter operation.

   2. work as voltage divided in order to provide variable output from the supply.

   3. provide discharge to capacitors so that output becomes zero when the circuit has been de-energized.

Which of these statements are correct?

   a. 1 and 2

   b. 2 and 3

   c. 1 and 3

   d. 1, 2 and 3

88. Consider the following rectifier circuits:

   1. Half-wave rectifier without filter.

   2. Full-wave rectifier without filter.

   3. Full-wave rectifier with series inductance filter.

   4. Full-wave rectifier with capacitance filter.

The sequence of these rectifier circuits in decreasing order of their ripple factor is

   a. 1,2,3,4

   b. 3,4,1,2

   c. 1,4,3,2

   d. 3,2,1,4

89. The use of a rectifier filter in a capacitor circuit gives satisfactory performance only when the load

a. current is high
b. current is low
c. voltage is high
d. voltage is low

90. In a single-stage RC coupled common emitter amplifier, the phase shift at the lower 3 dB frequency is
    a. zero
    b. 135°
    c. 180°
    d. 225°

91. The main drawback in the performance of shunt peaked wide band amplifier is
    a. too low gain at low frequency
    b. reduced gain at middle frequency
    c. poor phase response
    d. that the maximum gain of the stage is small

92. A circuit using an op-amp is shown in the given figure.
   It has
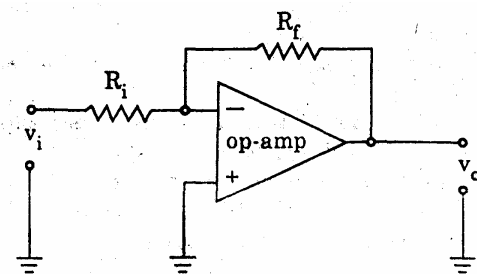
    a. voltage series feedback
    b. voltage shunt feedback
    c. current shunt feedback
    d. current series feedback

93. The IF amplifier in a super heterodyne receiver is
    a. single-stage single-turied amplifier
    b. two stages of single-tuned amplifier
    c. double-tuned amplifier
    d. Class-C amplifier

94. RC network shown in the given figure can provide a maximum theoretical phase shift of
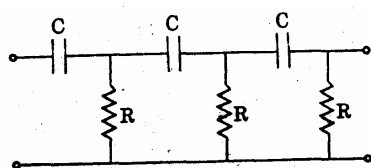

    a. 90°
    b. 180°

c. 270°
d. 360°

95. Which one of the following circuits is most suitable as an oscillator at a frequency of 100 Hz?
    a. Hartley oscillator
    b. Colpitts oscillator
    c. Crystal oscillator
    d. Twin-? oscillator

96. A circuit is shown in the given figure. The largest value of R_L that can be used, is
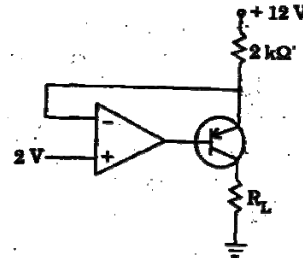
97. A differential amplifier is invariable used in the input stage of all op-amps. This is done basically to provide the op-amps with a very high
    a. CMRR
    b. Bandwidth
    c. slew rate
    d. open-loop gain

98. In the circuit shown in the given figure, the current 'I' through the resistance R is
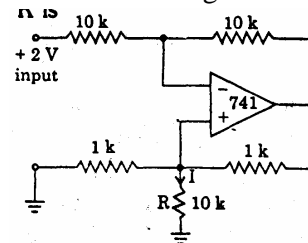
    a. 100 μA
    b. - 100 μA
    c. 1 mA
    d. - 1 mA

99. The effect of a finite gain of an operational amplifier used in an integrator is that
    a. it would not integrate
    b. the slope of the output will vary with time
    c. the final value of the output voltage will reduce
    d. there will be instability in the circuit

100. In a PLL, lock occurs when the
    a. input frequency and the VCO frequency are the same

b. phase error is 180°

c. VCO frequency is double the input frequency

d. phase en-or is 90°

101. Consider the following logic families
1. MOS
2. DTL
3. RTL
4. ECL

The sequence of these logic families in the order of their increasing noise margin is

a. 3, 4, 1, 2

b. 3, 4, 2, 1

c. 4, 3, 1, 2

d. 4, 3, 2, 1

102. An 8-bit D/A converter has a full scale output voltage of 20 V. The output voltage when the input is 11011011, is

a. 160 mV

b. 78 mV

c. 20 V

d. 17 V

103. In the negative logic system,

a. the more negative of he two logic levels represents a logic '1' state

b. the more negative of the two logic levels represents a logic '0' state

c. all input and output voltage levels are negative

d. the output is always complement of the intended logic function

104. If the output of a logic gate is '1' when all its inputs are at logic '0', the gate is either

a. A NAND or NOR

b. an AND or an EX-NOR

c. an OR or a NAND

d. an EX-OR or an EX-NOR

105. For the Karnaugh map shown in the given figure, the minimum Boolean function is

yz \ x	0	1
00	1	1
01	1	
11	1	1
10	1	1

a. $x'y'+z'+yz$

b. $xz'+z+zy'$

c. $xy+z+y'z$

d. $x'z+z'+yz$

106. The circuit shown in the given figure is
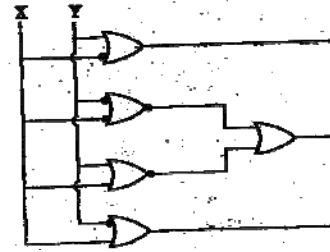
a. an adder circuit

b. a subs tractor circuit

c. a comparator circuit

d. a parity generator circuit

107. Which one of the following is equivalent to the Boolean expression $Y = \overline{AB} + \overline{BC} + \overline{CA}$?

a. $AB + BC + CA$

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

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

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

108. Given Boolean theorem

$AB + \overline{A}C + BC = AB + \overline{A}C$

Which one of the following identities is true?

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

b. $AB + \overline{A}C + BC = AB + BC$

c. $AB + \overline{A}C + BC = (A+B).(\overline{A}+C).(B+C)$

d. $(A+B).(\overline{A}+C).(B+C) = AB + \overline{A}C$

109. The transistor in the circuit of the given figure is operating
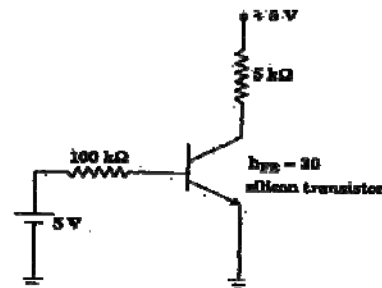
a. in the but-off region

b. in the active region

c. in the saturation region

d. either in the active or the saturation region

110. Which of the following regions of operation are mainly responsible for beating of the transistor under switching operation?

1. Saturation region.
2. Cut-off region.
3. Transition from saturation to cut-off.
4. Transition from cut-off to saturation.

Select the correct answer using the codes given below;

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

111. The circuit shown in the given figure

a. is an oscillating circuit and its output is a square wave
b. is one whose output remains stable in '1' state
c. is one whose output remains stable in '0' state
d. gives a single pulse of 3 times propagation delay

112. The circuit of a gate in the resistor transistor logic (RTL) family shown in the given figure is a/an
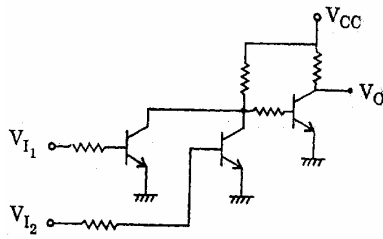
a. AND gate
b. OR gate
c. NAND gate
d. NOR gate

113. The decoding error of the counter can be avoided by

a. increasing propagation delay of flip-flops used in the counter
b. using very fast logic gates
c. using the strobe signal
d. reducing the propagation delay of flip-flops used in the counter

114. Which one of the following flags is not used for branch ing in a microprocessor?

a. Carry flag
b. Auxiliary carry flag
c. Overflow flag
d. Parity flag

115. The number of comparator circuits required to build a three-bit simultaneous A/D converter is

a. 7
b. 8
c. 15
d. 16

116. The number of 4-line-to-164ine decoders required to make an 8-line-to-256-line decoder is

a. 16
b. 17
c. 32
d. 64

117. The characteristic equation of the T-flip=-flop is given by

a. $Q^+ = \bar{T}Q + T\bar{Q}$
b. $Q^+ = T\bar{Q} + Q\bar{T}$
c. $Q^+ = TQ$
d. $Q^+ = T\bar{Q}$

118. The initial contents of the 4-bit serial-in parallel-out, right-shift, shift register shown in the given figure is 0110. After three clock pulses are applied, the contents of the shift register will be
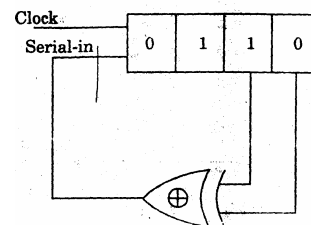
a. 0000
b. 0101
c. 1010
d. 1111

119. A relaxation oscillator is one which

a. Has two stable states
b. Oscillates continuously
c. Relaxes in definitely
d. Produces non-sinusoidal output

120. Four memory chips of 16×4 size have their address buses connected together. This system will be of size

a. 64×4
b. 16×16
c. 32×8
d. 256×1