Electronics & Telecommunication Engineering

1. Consider the following:
   1. Oscillator
   2. Emitter follower
   3. Cascaded amplifier
   4. Power amplifier

   Which of these use feedback amplifiers?
   (A) 1, 2 (B) 1, 3
   (C) 2, 4 (D) 3, 4

2. Why npn-transistors are preferred over pnp transistors?
   (A) Leakage current in npn transistors is less than pnp transistors
   (B) Mobility of majority carrier in npn transistors is greater than the mobility of majority carrier in pnp transistors
   (C) Bias voltage required in npn is less than in pnp transistors
   (D) Bias voltage required in npn is greater than in pnp transistors

3. Consider the following statements:
   To draw a.c. equivalent circuit of a transistor, all:
   1. d.c. sources are shorted
   2. a.c. sources are shorted
   3. d.c. sources are opened
   4. a.c. sources are connected to d.c. sources

   Which of the above statements is / are correct?
   (A) 2, 4 (B) 1, 2 (C) 1 only (D) 3, 4

4. Which one of the following statements is not correct with regard to power amplifiers?
   (A) The collector current is large
   (B) They are used as the front end of multi-stage amplifiers
   (C) They are used near the end of the multi-stage amplifiers
   (D) They have a high power rating $(>1/2W)$

5. Consider the following statements regarding the class-B power amplifiers (complementary symmetry type):
   1. The efficiency of the amplifier is higher than that of class-A amplifier
   2. The power output is low
   3. Cross over distortion is present
   4. The standby power dissipation is absent

   Which of the above statements are correct?
   (A) 1, 2, 3 (B) 1, 2, 4 (C) 1, 3, 4 (D) 2, 3, 4

6. Consider the following:

1. Distortion 2. Gain 3. Bias stabilization
4. Sensitivity 5. Frequency response

Which of these properties of the power amplifier one should concentrate upon while designing a good power amplifier circuit?

(A) 1, 2, 3 (B) 1, 3, 5
(C) 2, 3, 4 (D) 4, 5

7. Consider the following:

1. Coupling capacitor 2. Emitter by-pass capacitor
3. Emitter to base diffusion capacitance of the BJT
4. Stray capacitance of the circuit

Which of these components in a RC coupled amplifier control the lower cut-off frequency of the amplifier?

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

8. Which one of the following is a regulated power supply?

(A) IC 555 (B) IC 844 (C) IC 3080 (D) IC 723

9. Consider the following statements regarding an OP AMP?

1. All types of negative feedback reduce non-linear distortion
2. All types of negative feedback reduce the output offset voltage
3. Non-inverting (current and voltage) feedback increases the input impedance
4. Inverting (current and voltage) feedback decreases input impedance

Which of the above statements is / are correct?

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

10. Consider the following statements:

The bias stability of an emitter-bias amplifier circuit is improved by:

1. Decreasing the value of R_B 2. Increasing the value of R_E
3. Decreasing the value of R_E 4. Increasing the value of R_B
5. Increasing the value of R_C

Which of the above statements are correct?

(A) 1, 2 (B) 2, 3 (C) 3, 4 (D) 4, 5

11. Which of the following will be true for a CE transistor amplifier if the emitter resistor value is made equal to zero?

1. Its gain will increase 2. Its stability will increase
3. Its gain will decrease 4. Its stability will decrease

Select the correct answer from the codes given below:

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

12. Which one of the following circuits is used for converting a sine wave into a square wave?
(A) Astable multivibrator (B) Monostable multivibrator
(C) Bistable multivibrator (D) Schmitt trigger

13. Which of the transistor models is most preferred for the analysis of a transistor circuit both at mid-band and at high frequencies?
(A) h-parameter model (B) y-parameter model
(C) s-parameter model (D) hybrid - π - model

14. Which of the following describe the correct properties of an emitter follower circuit?
1. It is a voltage series feedback circuit
2. It is a current series feedback circuit
3. Its voltage gain is less than unity
4. Its output impedance is very low
Select the correct answer using the codes given below:
(A) 1, 3, 4 (B) 2, 3, 4 (C) 2, 3 (D) 2, 4

15. Which one of the following type of negative feedback increases the input resistance and decreases the output resistance of an amplifier?
(A) Current series feedback (B) Voltage series feedback
(C) Current shunt feedback (D) Voltage shunt feedback

16. Which one of the following oscillators is well suited for the generation of wide range audio-frequency sine waves?
(A) RC phase shift oscillator (B) Wien bridge oscillator
(C) Col-pitts oscillator (D) Hartley oscillator

17. Consider the following statements about a good power supply:
1. The a.c. ripple should be high
2. S_V, (Voltage Stability factor) should be low
3. S_T, (Temperature stability factor) should be low
Which of the above statements are correct?
(A) 1, 2, 3 (B) 2 (C) 3 (D) 2, 3

18. Which of the following are non-linear applications of op-amp?
1. Current-to-voltage converter 2. Comparator
3. Peak detector 4. Limiter
Select the correct answer using the code given below:
(A) 1, 2, 3 (B) 2, 3, 4 (C) 1, 3, 4 (D) 1, 2, 4

19. Consider a 565 PLL with $R_T = 10k\Omega$ and $C_T = 0.01\mu F$. What is the output frequency of the VCO?
(A) 10kHz (B) 5kHz (C) 2.5kHz (D) 1.25kHz

20. Which of the following does not show non-linear V-I characteristics?
(A) Schottky diode (B) Tunnel diode
(C) Thermister, at a fixed temperature (D) p-n junction diode

21. Which of the following conditions must be satisfied for a transistor to remain under saturation?
1. Its collector to base junction should be under forward bias
2. Its collector to base junction should be under reverse bias
3. Its emitter to base junction should be under reverse bias
4. Its emitter to base junction should be under forward bias
Select the correct answer using the code given below:
(A) 1, 2 (B) 1, 3 (C) 2, 3 (D) 1, 4

22. Which of the following Boolean algebra rules is correct?
(A) $A \cdot \overline{A} = 1$ (B) $A + AB = A + B$ (C) $A + \overline{A}B = A + B$ (D) $A(A + B) = B$

23. What are the ultimate purposes of minimizing logic expressions?
1. To get a small size expression
2. To reduce the number of variables in the given expression
3. To implement the function of the logic expression with least hardware
4. To reduce the expression for making it feasible for hardware implementation
Select the correct answer from the codes given below:
(A) 1 (B) 2, 3 (C) 3 (D) 3, 4

24. Which of the following factors are responsible to design IC logic gates to operate at a fixed supply voltage of 5 volts?
1. Low heating of IC logic gates
2. Compatibility with other logic gates 3. Satisfactory and safe operation
4. Standardization from IC manufacturing point of view
Select the correct answer from the codes given below:
(A) 1 only (B) 2 only (C) 2, 3 (D) 3, 4

25. Which of the following statements is not correct?
(A) Propagation delay is the time required for a gate to change its state
(B) Noise immunity is the amount of noise which can be applied to the input of a gate without causing the gate to change state
(C) Fan-in of a gate is always equal to fan-out of the same gate
(D) Operating speed is the maximum frequency at which digital data can be applied to a gate

26. Which junction has least junction capacitance?
(A) Alloy (B) Grown (C) Diffused (D) Point contact

27. Which of the following are universal gates?
1. NAND 2. NOR 3. XOR
Select the correct answer from the codes given below:
(A) 1, 2 (B) 1, 3 (C) 2, 3 (D) 1, 2, 3

28. Which of the following output configurations are available in a TTL gate?
1. Open collector output 2. Totem pole output
3. Tristate output
Select the correct answer from the codes given below:
(A) 1 only (B) 1, 2 (C) 2, 3 (D) 1, 2, 3

29. Which one of the following logic families can be operated using a supply voltage from 3V to 15V?
(A) TTL (B) ECL (C) PMOS (D) CMOS

30. Which of the following circuits come under the class of combinational logic circuits?
1. Full adder 2. Full subtractor
3. Half adder 4. JK flip flop
5. Counter
Select the correct answer from the codes given below:
(A) 1 only (B) 3, 4 (C) 4, 5 (D) 1, 2, 3

31. Consider the multiplexer with X and Y as data inputs and Z as control input. Z = 0 selects input X and Z = 1 selects input Y. What are the connections required to realize the 2-variable Boolean function f = T + R, without using any additional hardware?
(A) R to X, 1 to Y, T to Z (B) T to X,R to Y,T to Z
(C) T to X,R to Y,0 to Z (D) R to X, 0 to Y,T to Z

32. With which decoder, is it possible to obtain many code conversions?
(A) 2 line to 4 line (B) 3 line to 8 line
(C) Not possible with any decoder (D) 4 line to 16 line decoder

33. Match List I (applicable of circuit) with List II (circuit name) and select the correct answer using the code given below the lists:

List I		List II	
P	Divider	1	Astable multivibrator
Q	Clips input voltage at two predetermined levels	2	Schmitt trigger
R	Square wave generator	3	Bistable multivibrator
S	Narrow current pulse generator	4	Blocking oscillator

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

34. Consider the following statements:
For a master-slave JK flip-flop,
1. The toggle frequency is the maximum clock frequency at which the flip-flop will toggle reliably.
2. The data input must precede the clock triggering edge transition time by some minimum time.
3. The data input must remain fixed for a given time after the clock triggering edge transition time for reliable operation.
4. Propagation delay time is equal to the rise time and fall time of the data.
Which of the above statements is / are correct?
(A) 1, 2, 3 (B) 1, 2 (C) 2, 3 (D) 3, 4

35. Consider the following statements:
1. A flip flop is used to store 1-bit of information.
2. Race-around condition occurs in a JK flip-flop when both the inputs are 1.
3. Master-slave configuration is used in flip-flops to store 2-bits of information.
4. A transport latch consists of a D-type flip-flop.
Which of the above statements is / are correct?
(A) 1 (B) 1, 3, 4 (C) 1, 2, 4 (D) 2, 3

36. Which of the following flip-flop is used as a latch?
(A) JK flip flop (B) RS flip flop (C) T flip flop (D) D flip flop

37. Which of the following conditions should be satisfied to call an astable multivibrator circuit using discrete components as a digital circuit?
1. A flip-flop is always a digital circuit
2. Only when we assign 1 and 0 to the high and low levels of the output, a flip-flop is called a digital circuit.
3. Only if the power supply voltage is maintained at +5V or -5V, it is called a digital circuit.
4. Only if it is in IC form, following the technology of IC manufacture, it is called a digital circuit.
Select the corrector answer from the codes given below:
(A) 1 (B) 2, 3 (C) 2 (D) 3, 4

38. Which of the following circuits come under the class of sequential logic circuits?
1. Full adder 2. Full subtractor 3. Half adder
4. JK flip flop 5. Counter
Select the correct answer from the codes given below:
(A) 1, 2 (B) 2, 3 (C) 3, 4 (D) 4, 5

39. Consider the following statements regarding registers and latches:
1. Registers are made of edge-triggered FFs, whereas latches are made from level-triggered FFs.
2. Registers are temporary storage devices whereas latches are not
3. A latch employs cross-coupled feedback connections
4. A register stores a binary word whereas latch does not.

Which of the above statements is / are correct?

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

40. Which of the following capabilities are available in a Universal Shift Register?
1. Shift left 2. Shift right 3. Parallel load
4. Serial add

Select the correct answer from the codes given below:

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

41. Which of the following measurements can be done using a counter?
1. Pulse duration 2. Interval between two pulses
3. Amplitude of the pulse 4. Rise time of a pulse

Select the correct answer from the codes given below:

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

42. Match List I (type of n-bit ADC) with List II (characteristics)

List I		**List II**	
P	Flash converter	1	Integrating type
Q	Successive approximation	2	Fastest converter
R	Counter ramp	3	Maximum conversion time = n-bits
S	Dual slope	4	Uses a DAC in its feedback path

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

43. In which one of the following types of analog to digital converters the conversion time is practically independent of the amplitude of the analog signal?

(A) The dual slope integrating type (B) Successive approximation type
(C) Counter ramp type (D) Tracking type

44. Consider the function $F(s) = \frac{\varpi}{s^2 + \varpi^2}$ where F(s) is the Laplace Transform of $f(t)$.

What is the steady-state value of $f(t)$?

(A) Zero (B) One
(C) Two (D) A value between -1 and +1

45. The transfer function of a linear-time-invariant system is given as $\frac{1}{(s+1)}$. What is the steady-state value of the unit-impulse response?
(A) Zero (B) One (C) Two (D) Infinite

46. What is the characteristics of a good control system?
(A) Sensitive to parameter variation
(B) Insensitive to input command
(C) Neither sensitive to parameter variation nor sensitive to input commands
(D) Insensitive to parameter variation but sensitive to input commands

47. How can the bandwidth of a control system be increased?
(A) By the use of phase lead network
(B) By the use of phase lag network
(C) By the use of both phase-lag and phase-lead network
(D) By the use of cascaded amplifiers in the system

48. Which of the following may result in instability problem?
(A) Larger error (B) High selectivity (C) High gain (D) Noise

49. A negative-feedback closed-loop system is supplied to an input of 5V. The system has a forward gain of 1 and feedback gain of 1. What is the output voltage?
(A) 1V (B) 1.5V (C) 2V (D) 2.5V

50. For what positive value of K does the polynomial $s^4 + 8s^3 + 24s^2 + 32s + K$ have roots with zero real parts?
(A) 10 (B) 20 (C) 40 (D) 80

51. How many roots with positive real parts do the equation $s^3 + s^2 - s + 1 = 0$ have?
(A) 0 (B) 1 (C) 2 (D) 3

52. The characteristic equation of a control system is given as $s^4 + 8s^3 + 24s^2 + 32s + K = 0$. What is the range of the values of K for this system to be stable?
(A) $0 \le K < 80$ (B) $0 \le K < 100$ (C) $0 \le K < 300$ (D) $0 \le K < 600$

53. Consider the equation $s^2 + 2s + 2 + K(s+2) = 0$, where do the roots of this equation break on the root loci plot?
(A) -3.414 (B) -2.414 (C) -1.414 (D) -0.414

54. How many number of branches the root loci of the equation $s(s+2)(s+3) + K(s+1) = 0$ have?
(A) 0 (B) 1 (C) 2 (D) 3

55. The characteristic equation of a control system is given as $s^4 + 4s^3 + 4s^2 + 3s + K = 0$. Which value of K for which this system is marginally stable?
(A) 9/16 (B) 19/16 (C) 29/16 (D) 39/16

56. Which of the following can be used as a tacho-generator in control systems?
(A) Microsyn (B) d.c. servomotor
(C) a.c. servomotor (D) Magnetic amplifier

57. The transfer function of a controller is given as $K_p + K_d \cdot s$, where K_p and K_d are constants. What type of controller is this?
(A) Proportional (B) Proportional plus integral
(C) Proportional plus derivative (D) Integral plus derivative

58. The transfer function of a controller is given as $K_p + K_d \cdot s + \frac{K_i}{s}$ where K_p and K_d and K_i are constants. What type of controller is this?
(A) Proportional (B) Proportional plus integral
(C) Proportional plus derivative (D) Integral plus derivative

59. In a closed loop control system, what is the sensitivity of the gain of the overall system, M to the variation in G?
(A) $\frac{1}{1+G(s)H(s)}$ (B) $\frac{1}{1+G(s)}$ (C) $\frac{G(s)}{1+G(s)H(s)}$ (D) $\frac{G(s)}{1+G(s)}$

60. Which of the following statements about the matched filter in a communicating receiver are correct?
1. Its impulse response depends on the signed shape
2. It maximizes the SNR at the detection instant
3. It produces ISI
4. It may produce phase error, if the synchronization is improper
Select the correct answer from the codes given below:
(A) 1, 4 (B) 1, 2 (C) 2, 3, 4 (D) 1, 2, 4

61. A single mode fibre does not suffer from which type of dispersion?
(A) Waveguide dispersion (B) Material dispersion
(C) Inter-modal dispersion (D) Polarization mode dispersion

62. A balanced modulator is used in the generation of which of the following signals?
(A) DSB-SC (B) FM (C) PM (D) PAM

63. An amplitude modulated signal occupies a frequency range from 395kHz to 405kHz. It can be demodulated by which of the following?

(A) Using an envelope detector and filter (B) Multiplying with a 395kHz local signal
(C) Multiplying with a 405kHz local signal (D) Low pass filtering with cut off of 400kHz

64. An audio signal is band limited to 4kHz. It is sampled at 8kHz. What will be the spectrum of the sampled signal?
(A) -4kHz to 4kHz
(B) -8kHz to 8kHz
(C) Every 4n kHz and repeating
(D) Every ± 8kHz and repeating as well as at zero (k integer)

65. A signal occupies a band 5kHz to 10kHz. For proper error free reconstruction at what rate it should be sampled?
(A) 10kHz (B) 20kHz (C) 5kHz (D) $(10+5)\times 2$kHz

66. The spectral range of a band pass signal extends from 10MHz to 10.4MHz. What is the minimum sampling frequency required for reconstruction?
(A) 20MHz (B) 20.8MHz (C) 20.4MHz (D) 0.8MHz

67. An audio signal is to be transmitted digitally. Which is the system best suited for good fidelity?
(A) 8-bit PCM
(B) 13-bit PCM
(C) 32-bit PCM
(D) PCM system with non-uniform quantizer

68. For good quality signal transmission all frequency components should have the same transmission delay, t_d and same phase shift - ϕ_s. What can be said about the statement?
(A) Correct
(B) True for t_d but not for ϕ_s
(C) Not true for t_d but true for ϕ_s
(D) Both t_d and ϕ_s are not involved in quality

69. Which of the following introduces mode partition noise?
(A) Coaxial line (B) Wave guide
(C) Fibre transmission line (D) Both coaxial line and wave guide

70. Which of the following does not cause losses in optical fibre cables?
(A) Impurities (B) Micro-bending
(C) Attenuation in glass (D) Stepped index operation

71. On which bands, do the optical fibres operate?
1. Ultra violet band
2. Ultra high frequency band
3. Visible light band
4. Infra red band

Select the correct answer from the codes given below:
(A) 1 (B) 1, 2 (C) 1, 2, 3 (D) 1, 3, 4

72. Which one of the following photo-detector does not provide gain?
(A) Photo transistor
(B) Photo conductor
(C) Avalanche photodiode
(D) p-i-n photodiode

73. Consider the following statements:
In the case of space wave propagation, the signal strength at the receiver is:
1. Directly proportional to transmitter and receiver heights
2. Inversely proportional to distance between transmitter and receiver
3. Directly proportional to frequency

Which of the above statements is / are correct?
(A) 1, 2 (B) 1, 3 (C) 2, 3 (D) 3

74. What was the first commercial geostationary communication satellite?
(A) INTELSAT-1 (B) ECHO (C) INSAT-1A (D) SPUTNIK

75. What does a link budget for satellite communication include?
(A) Total cost of satellite
(B) Cost of satellite plus launch vehicle
(C) Signal and noise level in dB
(D) Margins of error permitted

76. Which of the following is a transferred electron device?
(A) BARITT diode (B) IMPATT diode (C) TRAPATT diode (D) Gunn diode

77. Consider the transmission line of length 37.5 cm, which is terminated into zero resistance. This line is being exited by a source of 1GHz which has an internal impedance of 50ohms. What is the input impedance of the line as seen by the source?
(A) 50 ohms (B) 0 ohms (C) 100 ohms (D) infinite ohms

78. Which of the following is a microwave source with a cross-field structure?
(A) Double cavity klystron
(B) Reflex klystron
(C) Magnetron
(D) Travelling wave tube

79. Which of the following devices has the negative resistance characteristic?
(A) Reflex klystron
(B) Gunn diode
(C) p-n-p transistor
(D) Magnetron

80. Which of the following devices is a hot-electron diode?
(A) Thermionic tube diode (B) Schottky-Barrier diode
(C) Thomson-Deletion diode (D) Thermal electron diode

81. Which of the following uses transferred electron effect for production of microwaves?
(A) Silicon (B) Germanium
(C) Metal-semiconductor junction (D) Thermal electron diode

82. Which of the following is a microwave power amplifier?
(A) Gunn diode (B) Reflex klystron
(C) Magnetron (D) Travelling wave tube

83. Consider the following statements:
The Klystron and travelling wave tube differ from each other,
1. In TWT the microwave circuit is non-resonant
2. In klystron, the microwave circuit is resonant
3. TWT uses attenuator
4. The wave in TWT is a non-propagating wave
Which of the above statements are correct?
(A) 1, 2 (B) 3, 4 (C) 1, 2, 3 (D) 2, 3, 4

84. Which device can detect the presence of both forward and backward waves in a waveguide?
(A) Filter (B) Detector
(C) Directional coupler (D) Magic T

85. Which of the following modes can exist in a rectangular wave guide?
(A) TM_{10} (B) TE_{10} (C) TM_{00} (D) TM_{01}

86. Which of the following antenna is obtained by modifying a wave guide?
(A) High gain (B) Reasonably good bandwidth
(C) Folded dipole (D) Parasitic elements

87. Which of the following antenna is obtained by modifying a waveguide?
(A) Microstrip antenna (B) Helical antenna
(C) Horn antenna (D) Dipole antenna

88. Which of the following is circularly polarized antenna?
(A) Horn (B) Dipole (C) Helical (D) Pyramidal

89. Which of the following antennas uses a number of varying length parallel elements?

(A) Helical (B) Pyramidal horn

(C) Corner reflection (D) Yagi-uda

90. The following components are used to measure power output of a 2kW TWT amplifier:

1. TWTA
2. Low pass / high pass filter
3. 20 dB attenuator
4. 40dB directional complex with matched load
5. Power meter

What is the correct sequence of connection of these components?

(A) 2-4-1-3-5 (B) 1-3-4-2-5 (C) 1-2-4-3-5 (D) 2-4-1-5-3

91. Match List I (Microwave measuring instruments) with List II (Measurement effected)

List I		List II	
P	Bolometer	1	Reflection coefficients
Q	VSWR meter	2	Half power beam widths
R	Cavity wave meter	3	Microwave power
S	Pattern recorder	4	Microwave frequency

(A) P-2, Q-1, R-4, S-3 (B) P-3, Q-1, R-4, S-2

(C) P-2, Q-4, R-1, S-3 (D) P-3, Q-4, R-1, S-2

92. Which one of the following statements is correct?

(A) AGC in radio receivers will keep the total signal output fairly constant but the noise components will be reduced; with the result that S/N ratio will improve

(B) AGC in radio receivers is a linear operation with respect to both signals and noise

(C) Sudden changes in the output while tuning, which may cause damage to the components, is an unavoidable feature of AGC

(D) AGC operation is independent of the filter components used in AGC circuit

93. Consider the following statements:

1. Taking 2's complement is equivalent to sign change
2. In the 2's complement representation, the most significant bit (MSB) is zero for a positive number.
3. In a 4-bit binary representation of a binary number A, A+1's complement is $A=2^4$.

Which of the above statements is / are correct?

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

94. Consider the following statements:
1. Strictly speaking C supports 1-dimensional arrays only
2. An array element may be an array by itself
3. Array elements need not occupy contiguous memory locations.

Which of the above statements is / are correct?

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

95. What can be maximum dimension of an array in C language program?

(A) 3 (B) 4
(C) 5 (D) It is compiler dependent

96. With reference to C programming language, which of the following statements are correct?
1. An identifier may start with an underscore
2. An identifier may end with an underscore
3. IF is a valid identifier
4. The number of significant characters in an identifier is implementation dependent.

Select the correct answer from the codes given below:

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

97. How many distinct binary trees can be constructed with three nodes?

(A) 1 (B) 2 (C) 3 (D) 5

98. Consider the following statements:
1. Internal sorting is used, if the number of items to be sorted is very large
2. External sorting is used, if the number of items to be sorted is very large
3. External sorting needs auxiliary storage
4. Internal sorting needs auxiliary storage

Which of the above statements are correct?

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

99. Which of the following has a major role in implementation of function calls in C?

(A) Processor's registers (B) Data segment
(C) The heap (D) System stack

100. Which one of the following algorithms design techniques is used to quick sort algorithm?

(A) Dynamic programming (B) Backtracking
(C) Divide and conquer (D) Greedy

101. There are four different algorithms A1, A2, A3 and A4 to solve a given problem with the complexity order $\log(n)$, $\log(\log(n))$, $n\log(n)$ and $n/\log(n)$ respectively. Which is the best algorithm?
(A) A1 (B) A2 (C) A3 (D) A4

102. Which of the following is / are correct statements?
1. Bus is a group of wires carrying information
2. Bus is needed to achieve reasonable speed of operation
3. Bus can carry data or address
4. A bus can be shared by more than one device

Select the correct answer from the codes given below:
(A) 1 (B) 1, 2 (C) 2, 3, 4 (D) 1, 2, 3, 4

103. Which of the following is the architecture of a computer?
1. Addressing modes, CPU
2. Instruction set, data formats
3. Secondary memory, operating system

Select the correct answer from the codes given below:
(A) 1, 2 (B) 1, 3 (C) 2, 3 (D) 3

104. A 3 x 8 decoder with two enable inputs is to be used to address 8 blocks of memory. What will be the size of each memory block when addressed from a sixteen bit bus with two MSB's used to enable the decoder?
(A) 2K (B) 4K (C) 16K (D) 64K

105. Match List I (Type of memory) with List II (Used as)

List I		**List II**	
P	DRAM	1	Cache memory
Q	SRAM	2	Main memory
R	Parallel access registers	3	BIOS memory
S	ROM	4	CPU registers

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

106. Which of the following are the memory performance parameters?
1. Access time and latency
2. Block size and Block access time
3. Cycle time and Bandwidth

Select the correct answer from the codes given below:
(A) 1 (B) 1, 2 (C) 2, 3 (D) 1, 2, 3

107. What is the address space of 8086 CPU?
(A) 1MB (B) 256kB (C) 1k MB (D) 64kB

108. Which of the following counters can be used to divide the clock frequency of a microprocessor by 5?
(A) 3-bit counter
(B) 5-bit counter
(C) MOD 3 counter
(D) MOD 5 counter

109. Identification of highest priority interrupt can be achieved in a minimum time by which of the following schemes?
(A) Hardwired polling
(B) Priority encoder circuit
(C) Software polling
(D) Subdivision of interrupt register into a number of sub registers which are checked parallely

110. Which of the following is used as the interface chip for data transmission between 8086 and a 16-bit ADC?
(A) 8259 (B) 8255 (C) 8253 (D) 8251

111. Which one of the following address modes is used in the instruction PUSH B?
(A) Direct
(B) Register
(C) Register indirect
(D) Immediate

112. What is the purpose of a start bit in RS232 serial communication protocol?
(A) To synchronize receiver for receiving every byte
(B) To synchronize receiver for receiving a sequence of byte
(C) Acts as a parity bit
(D) To synchronize receiver for receiving the last byte

113. The resolution of a DAC depends on which of the following?
(A) The number of bits
(B) Monotonocity
(C) Reference voltage
(D) The values of resistance

114. What is the purpose of DMA facility in microprocessor based systems?
(A) To increase the speed of data transfer between the μP and the I/O devices
(B) To increase the speed of data transfer between the μP and the memory
(C) To increase the speed of data transfer between the memory and the I/O devices
(D) To improve the reliability of the system

115. Personal computer cannot be used for which one of the following?
(A) Game playing
(B) Weather forecasting
(C) Office automation
(D) Home computing

Following 5 (five) items consist of two statements, one labelled as the Assertion (A) and the other as Reason (R). You are to examine these two statements carefully and select the answers to these items using the codes given below:

(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 fixed bias BJT circuit exhibits better performance as compared to a self bias BJT circuit.

Reason : A fixed bias BJT circuit uses less components as compared to a self bias BJT circuit

117. **Assertion** : The small signal analysis of a transistor amplifier is done to obtain the current gain, voltage gain and the conversion efficiency of an amplifier.

Reason : The small signal analysis of a transistor amplifier uses the small signal parameters of the transistor.

118. **Assertion** : A rectifier with inductor filter is more efficient for high load current

Reason : In rectifier with inductor filter we can use a larger choke to reduceripple, larger choke will have higher d.c. resistance which will result in lower d.c. output voltage for higher load current

119. **Assertion** : It is not desirable to drive a transistor into hard saturation in high speed switching circuits.

Reason : It may not be possible to bring it back to cut off state, if it is driven into hard saturation.

120. **Assertion** : When all inputs of a NAND-gate are shorted to get a one input, one output gate, it becomes an inverter.

Reason : When all inputs of a NAND-gate are at logic '0' level, the output is at logic '1' level.