GATE ELECTRICAL ENGINEERING

MULTUPLE SELECT QUESTIONS (MSQ's)

1. Which of the following options in connection with two-position controller are correct:
(a) If the controller has a 4% neutral zone, its positive error band will be 2% and negative error band will be 8%.
(b) The neutral zone is also known as dead band.
(c) The controller action of a two-position controller is very similar to that of a pure on-off controller.
(d) Air-conditioning system works essentially on a two-position control basis.

2. Which of the following options with reference to the phase plane are correct:
(a) They are general and applicable to a system of any order.
(b) Steady state accuracy and existence of limit cycle can be predicted.
(c) Amplitude and frequency of limit cycle if exists can be evaluated.
(d) Can be applied to discontinuous time system.

3. The pressure can be measured by which of the following units:
(a) Rolta meter
(b) Bourdon tube
(c) Planti meter
(d) Vanes

4. Which of the following options are correct with respect to piezoelectric materials:
(a) A source of ultrasonic waves.
(b) When electric field is applied, the mechanical dimensions of the substances are not at all altered.
(c) Converts electrical energy to mechanical and vice versa.
(d) Converts thermal energy to electrical energy.

5. Which of the following options are correct with respect piezoelectric materials:
(a) Crystal can be shown as electrical equivalent circuit similar to an inductor and a capacitor (Tank circuit).
(b) Quartz, Rochelle salt, tourmaline.
(c) Used in voltage stabilizers.
(d) This exhibits the reverse effect of electrostriction.

6. The transfer impedances of a 2-port network remain constant when the position of excitation and response are interchanged if the network
(a) is linear.
(b) contains bilateral elements.
(c) has high impedance.
(d) is resonant.

7. The coercive force can be increased by
(a) Adding Cobalt because it is a ferromagnetic material.
(b) Adding Gold because it is a diamagnetic material.
(c) Adding Super alloy.
(d) Space charge polarizing.

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8. A step voltage is applied to an under-damped series *RLC* circuit in which *R* is variable. If *R* is
(a) increased, the steady-state voltage across *C* will be reduced.
(b) increased, the frequency of transient oscillations across *C* will be reduced.
(c) reduced, the transient oscillations will die down at a fast rate.
(d) reduced to zero, the peak amplitude of the voltage across *C* will be double that of input voltage.

9. Electrets are the materials which are
(a) having permanent electric moments.
(b) electromagnets.
(c) very similar to permanent magnet materials.
(d) similar to anti-ferroelectric materials.

10. Which of the following options are correct with respect to magnetic susceptibility
(a) depends on the nature of the magnetic material.
(b) is not dependent on the relative permeability of the medium.
(c) cannot be determined by measuring the force exerted on a magnetic material when placed in a magnetic field.
(d) can be determined from *M*-*H* curve.

11. Factors affecting the dielectric loss are
(a) directly proportional to the frequency of supply voltage.
(b) inversely proportional to the supply frequency.
(c) inversely proportional to the square of the supply voltage.
(d) directly proportional to the square of the supply voltage.

12. Characteristics of a good insulating material are
(a) Should give uniform electric and thermal properties.
(b) High permittivity.
(c) Low dissipation factor.
(d) Low insulating resistance.

13. If in measurement of 3-phase power by two-wattmeter method; one of the wattmeter reads negative implying:
(a) Power factor is less than 0.5.
(b) Power flow is in the reverse direction.
(c) Load power factor angle is greater than 60°.
(d) Load is unbalanced.

14. Which of the following options are correct about superconductors:
(a) The temperature at which the conductor becomes a superconductor is called transition temperature.
(b) Superconductors repel magnetic flux lines.
(c) All superconductors are paramagnetic materials.
(d) Superconductors become normal when placed in a magnetic field of certain critical value.

15. Which of the following options are correct in connection with the closed-loop poles of feedback control system:
(a) Poles on $j\omega$-axis will make the output amplitude neither decaying nor growing in time.
(b) Dominant closed-loop poles occur in the form of a complex conjugate pair.
(c) The gain of a higher order system is adjusted so that there will exist a pair of complex conjugate closed-loop poles on $j\omega$-axis.
(d) The presence of complex conjugate closed-loop poles reduces the effects of such non-linearities as dead zones, backlash and coulomb friction.

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16. Which of the following options are correct:
(a) In conducting medium the field attenuates exponentially with increasing depth.
(b) Conducting medium behaves like an open circuit to the electromagnetic field.
(c) In lossless dielectric relaxation time is infinite.
(d) In charge-free region, the Poisson's equation becomes Laplace's equation.

17. Secondary (or Molecular) bonds are
(a) The attraction forces exist between atoms or molecules.
(b) Stronger than primary bonds.
(c) Can be divided as electrostatic bonds.
(d) Weaker than primary bonds.

18. Which of the following options are correct referring to the magnetization:
(a) In solenoid magnetization is due to a surface current distribution.
(b) Magnetization has its origin in circulating current.
(c) The solenoid dipole is represented by an infinitesimal current loop.
(d) The magnetization is entirely solenoidal and divergent.

19. Which of the following options are correct in connection with the feedback of control systems:
(a) Feedback can improve stability or be harmful to stability if it is not properly applied.
(b) Feedback can always improve stability.
(c) In many situations the feedback can reduce the effect of noise and disturbance on system performance.
(d) In general the sensitivity of the system gain of a feedback system to a parameter variation depends on where the parameter is located.

20. The armature torque in a DC motor is a function of
(a) Field flux.
(b) Armature current.
(c) Speed.
(d) Damping.

21. Which methods among these are for the determination of voltage regulation of an alternator?
(a) EMF
(b) Reversal
(c) MMF
(d) Direct

22. Which of the following parts of a DC machine are subjected to iron loss:
(a) Yoke
(b) Armature core
(c) Brushes
(d) Pole core

23. In which of these devices, the accuracy of compensation is very high and noise level is very low?
(a) Synchronous condenser
(b) Saturable reactor
(c) SCCR
(d) FCCR

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24. Which of the following options is/are correct:
(a) Both have near unity voltage gain.
(b) Both have equal current gain.
(c) Darlington circuit has higher output resistance.
(d) Emitter follower has lower input resistance.

25. Which of the following options is/are correct:
(a) Nuclear fission occurs whenever Uranium reacts with a neutron.
(b) Nuclear fission is accompanied by the release of neutrons and gamma rays.
(c) About 200 MeV of energy is released in the fission of a U^{235} nucleus.
(d) Energy from the fission of U^{235} nucleus is released mainly as kinetic energy of the neutrons and the energy of gamma radiations.

26. Which of these devices do not belong to the family of transistors?
(a) SCR
(b) GTO
(c) BJT
(d) MOSFET

27. Pumped storage plants when operated in interconnected power systems serve to
(a) Increase load factor of steam plant.
(b) Provide added capacity to meet peak loads.
(c) Decrease load factor of steam plant.
(d) Provide added capacity to meet base loads.

28. Which of the following options about FM is/are correct:
(a) Modulation index determines the number of significant sideband components.
(b) Theoretical bandwidth is infinite.
(c) Carrier suppression is not possible.
(d) Sidebands are not symmetric about carrier.

29. Lead
(a) Is not used to form cable sheaths.
(b) Is least affected by sea water.
(c) Has good malleable and ductile properties.
(d) Will not alloy with many other metals.

30. Which of the following options with regards to soft iron is/are correct:
(a) It is a magnetic material.
(b) It conducts electricity.
(c) It is an alloy or iron and copper.
(d) It is used to make permanent magnets.

31. What are the causes of gross error in the instruments?
(a) Misreading of instruments
(b) Incorrect adjustment of instruments
(c) Errors due to defective instrument
(d) Errors due to effect of environment on the instrument

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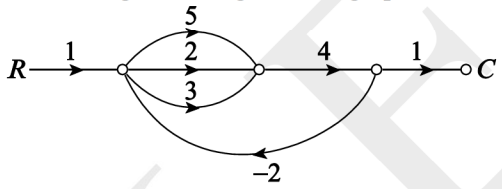
32. Which of the following types of errors come under systematic errors?
(a) Irregular spring tension.
(b) Improper readings of an instruments.
(c) Loading effects.
(d) Error due to the presence of electric field or magnetic field.

33. Which of the following options associated with an energy meter is/are correct:
(a) It is an integrating type instrument.
(b) It is an induction type instrument.
(c) It uses a permanent magnet for rotation of aluminium disc.
(d) It employs a high control torque.

34. Which of the following options in connection with deflection and null type instruments is/are correct:
(a) Null type instrument is more accurate than the deflection type one.
(b) Null type of instrument can be highly sensitive as compared with deflection type instrument.
(c) Under dynamic conditions, null type instrument is not preferred to deflection type instrument.
(d) Response is faster in null type instrument as compared to deflection type instrument.

35. Which of the following options with regards to signal flow graph is/are correct:



(a) The number of loops is 3.
(b) The number of loops is 2.
(c) The number of forward paths is 3.
(d) $\frac{C}{R}$ ratio is $\frac{40}{81}$.

36. Which of the following options regarding root loci plot is/are correct:
(a) When gain K is zero, the roots coincide with the poles.
(b) When K is increased, the roots move away from the poles.
(c) A root locus diagram is always symmetric about the imaginary axis.
(d) The number of branches terminates on infinity is open loop poles plus zeros.

37. Which of the following are the absolutely essential conditions for parallel operation of transformers:
(a) The same voltage ratio
(b) The same polarity
(c) The same phase sequence
(d) The relative phase displacement

38. The economics of power plant is greatly influenced by
(a) Load factor
(b) Utilization factor
(c) Unit capacity
(d) Type of load

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39. The main objectives of load frequency control in a power system are
(a) To bring the steady state error to zero after load change
(b) To maintain the net tie-line flow
(c) To maintain voltages on all buses
(d) To economize the cost of generation

40. Compared to the bipolar junction transistor, a JFFT
(a) Has a larger gain bandwidth production
(b) Is less noisy
(c) Has less input resistance
(d) Has current flow due to only majority carriers

41. Which of the following options is/are correct**:**
(a) A Zener diode degrades the input signal at high frequencies due to its transition capacitance.
(b) The Zener voltage V, does not vary with temperature.
(c) Regulation the Zener diode is adversely affected at the knee current I due to limited power dissipation capacity.
(d) In a simple Zener diode regulated circuit, amplification is not possible.

42. The h-parameters of a BJT
(a) Represent the input resistance, output conductance, current gain etc.
(b) Can be easily measured in the laboratory
(c) Can be used in circuit analysis over a wide range of frequencies
(d) Constitute a simple small signal model for easy circuit analysis at low frequencies where junction capacitances can be neglected.

43. Which of the following options is/are correct**:**
(a) Amplitude distortion arises due to different frequency components being amplified differently
(b) White noise gives the same noise per unit bandwidth across the entire frequency spectrum
(c) If an amplifier has two poles such that $p_2 = 4p_1$, then the dominant pole is p_2
(d) The self-biasing emitter resistance of an amplifier is bypassed by a large capacitance to reduce degeneration at higher frequencies

44. The 8259 A programmable interrupt controller can
(a) Manage eight interrupts
(b) Vector an interrupt request anywhere in memory map
(c) Have 8-bit of 16 bit interval between interrupt vector locations
(d) Initialized with operational command words (OCW's)

45. A thyristor can be switched from a non-conducting state to a conducting state by applying
(a) Voltage more than forward break over voltage
(b) A voltage with high dv/dt
(c) Positive gate current with positive anode voltage
(d) Negative gate current with positive anode voltage

46. Which of the following options is/are correct:
(a) A thyristor requires turn off circuit while transistor does not.
(b) The voltage drop of a thyristor is less than that of a transistor.
(c) A thyristor requires a continuous gate current.
(d) A transistor draws continuous base current.

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47. Any element connected in
(a) series with a voltage source is redundant
(b) parallel with a voltage source is redundant
(c) series with a current source is redundant
(d) parallel with a current source is redundant

48. Which of the following are the objectives of a data acquisition system?
(a) It must acquire necessary data at correct speed and time.
(b) It must collect and store data.
(c) There should be provision for real-time data display.
(d) There should be provision for stored data display on request.

49. When compared with other transducers measuring temperature, a four-lead platinum RTD
(a) has better linearity over a wide operating range
(b) has better accuracy and precision
(c) has better stability at high temperature
(d) is inexpensive

50. The open-circuit test in a transformer can be used to obtain
(a) Core losses
(b) Magnitude of exciting current
(c) Copper losses
(d) Equivalent series impedance

51. Which of the following options regarding magnetic materials is/are correct:
(a) A diamagnetic material has no permanent dipole
(b) Paramagnetic material has anti parallel orientation of equal moments with neighbouring dipoles
(c) Ferrimagnetic material has anti parallel orientation of unequal moments between neighbouring dipoles
(d) Antiferromagnetic material has negligible interaction between neighbouring dipoles

52. A network N consists of resistors, independent voltage and current sources. The value of its determinant based on the loop analysis:
(a) cannot be negative
(b) cannot be zero
(c) is independent of the values of voltage and current sources
(d) dependent on the values of the resistances and the voltage and current sources

53. An A.C. source of voltage E_s and an internal impedance of $Z_s = (R_s + jX_s)$ is connected to a load of impedance
$Z_L = (R_L + jX_L)$. The valid conditions for maximum power transfer from the source to the load are
(a) $X_L = X_S$, if only X_L is varied
(b) $X_L = -X_S$ if only X_L is varied
(c) $R_L = \sqrt{[R_S^2 + (X_S + X_L)^2]}$, if only R_L is varied
(d) $|Z_L| = |Z_S|$, if the magnitude alone of Z_L is varied, keeping the phase angle fixed

54. Which of the following options regarding advantages of closed loop negative feedback control systems over open loop systems is/are correct:
(a) The overall reliability of the closed loop system is more than that of open loop system.
(b) The transient response in a closed loop system decays more quickly than in open loop system.
(c) In an open loop system, closing of the loop increases the overall gain of the system.
(d) In the closed loop system, the effect of variation of component parameters on its performance is reduced.

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55. Which of the following options concerning the utility of mesh-connected tertiary windings in star-star transformers is/are correct:
(a) It is used to suppress harmonic voltages
(b) It is used to allow flow of earth fault current for operation of protective devices
(c) It facilitates supply of single-phase loads
(d) It provides low-reactance paths for zero sequence currents

56. The calculation performed using short line approximate model instead of nominal-Π model for a medium length transmission line delivering lagging load at a given receiving end voltage always results in higher:
(a) Sending end current
(b) Sending end power
(c) Regulation
(d) Efficiency

57. Which of the following options referring to an *n* channel FET operated in the active region is/are correct:
(a) The gate voltage V_{GS} reverse biases the junction
(b) The drain voltage V_{DD} is negative with respect to the source
(c) The current in the *n* channel is due to elections
(d) Increasing the reverse bias V_{GS} increases the cross section for conduction

58. A Darlington emitter-follower circuit is sometimes used in output stage of a TTL gate in order to
(a) Increase its I_{OL}
(b) Reduce its I_{OH}
(c) Increase speed of operation
(d) Reduce power dissipation

59. Arithmetic Logic Unit (ALU)
(a) Performs arithmetic operations
(b) Performs comparisons
(c) Communicates with I/O devices
(d) Keeps watch on the system

60. A microprocessor based safety control system installed in a nuclear power plant must be stress tested under which of the following conditions?
(a) Ageing due to radiation
(b) Thermal stresses
(c) Seismic vibration
(d) Inadequate nuclear reactor coolant

61. Which of the following options regarding Thyristors is/are correct:
(a) It conducts when forward biased and positive current flows through the gate
(b) It conducts when forward biased and negative current flows through the gate
(c) It commutates when reverse biased and negative current flows through the gate
(d) It commutates when the gate current is withdrawn

62. Switched mode power supplies are preferred over the continuous types, because they are
(a) Suitable for use in both ac and dc
(b) More efficient
(c) Suitable for low-power circuits
(d) Suitable for high-power circuits

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63. Which of the following options associated with the basic electrostatic properties of ideal conductors is/are correct:
(a) The resultant field inside is zero.
(b) The net charge density in the interior is zero.
(c) Any net charges reside on the surface.
(d) The surface is always equipotential.

64. Which of the following are associated with soft superconductors?
(a) Silsbee's rule
(b) Meissner effect
(c) Faraday rotation
(d) Curie–Weiss law

65. Any element connected in
(a) Series with an ideal current source is redundant.
(b) Parallel with an ideal current source is redundant.
(c) Series with an ideal voltage source is redundant.
(d) Parallel with an ideal voltage source is redundant.

66. In an induction type energy meter, the steady speed attained by the rotating disc is
(a) Proportional to the deflecting torque.
(b) Proportional to the resistance of the path of eddy currents.
(c) Inversely proportional to the effective readings of disc from its axis.
(d) Inversely proportional to the square of brake magnet flux.

67. Which of the following functions functions is/are *LC* driving point impedances:
(a) $\frac{(s^2+1)(s^2+3)}{s(s^2+2)}$
(b) $\frac{s(s^2+1)(s^2+3)}{(s^2+0.5)(s^2+2)}$
(c) $\frac{(s^4+4s^2+3)}{s^2+2s}$
(d) $\frac{s^5+4s^3+3s}{s^4+2.5s+1}$

68. Which of the following are active transducers:
(a) LVDT
(b) Piezoelectric
(c) Thermocouple
(d) Photovoltaic cell

69. In a power system, which of the following is/are critical clearance time of a fault related to?
(a) Transient reactance
(b) Sub-transient reactance
(c) Reactive power limit
(d) Transient stability limit

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70. The intrinsic carrier concentration of a semiconductor
(a) Depends on doping
(b) Increases exponentially with decrease of band gap of the semiconductor
(c) Increases non-linearly with increase of temperature
(d) Increases linearly with increase of temperature

71. Which of the following expressions are equivalents of the expression $Y = A \oplus B \oplus C \oplus D$:
(a) $Y = f(A, B, C, D) = \sum(1, 2, 4, 7, 8, 11, 13, 14)$
(b) $Y = f(A, B, C, D) = \sum(3, 5, 7, 10, 11, 12, 13, 14)$
(c) $Y = f(A, B, C, D) = \Pi(0, 3, 5, 6, 9, 10, 12, 15)$
(d) $Y = f(A, B, C, D) = \Pi(0, 1, 2, 4, 6, 8, 9, 15)$

72. Which of the following 8-bit registers of 8085 μP can be paired together to make a 16-bit register?
(a) Accumulator and flag register
(b) B and C registers
(c) D and E registers
(d) H and L registers

73. Which of the following are the advantages of FM over AM?
(a) Better noise immunity is provided
(b) Lower bandwidth is required
(c) Transmitted power is more useful
(d) Less modulating power is required

74. Comparing delta modulation (DM) with PCM system; DM requires
(a) A lower sampling rate
(b) A higher sampling rate
(c) A higher bandwidth
(d) Simple hardware

75. SCR can be turned on by
(a) Applying anode voltage at a sufficiently fast rate
(b) Applying sufficiently large anode voltage
(c) Increasing the temperature of SCR to sufficiently large value
(d) Applying sufficiently large gate current

76. For the V-I characteristics of an SCR, which of the following statements are correct?
(a) It will trigger when the applied voltage is more than the forward break over voltage
(b) Holding current is greater than latching current
(c) When reverse biased, a small value of leakage current will flow
(d) It can be triggered without gate current

77. Phase controlled converters at small values of output voltage have
(a) Large harmonics in utility system
(b) Poor power factor
(c) High efficiency
(d) Notches in line voltage waveform

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78. Which of the following options regarding two-port parameters is/are correct:
(a) h_{12} and h_{21} are dimensionless.
(b) h_{11} and B have dimensions of ohms.
(c) BC is dimensionless.
(d) C is dimensionless.

79. Maxwell equations
(a) are extension of the works of Gauss, Faraday and Ampere
(b) help studying the application of electrostatic fields only
(c) can be written in integral form and point form
(d) need not be modified depending upon the media involved in the problem

80. A unit impulse function is defined as
(a) a pulse of area 1
(b) a pulse compressed along horizontal axis and stretched along vertical axis keeping the area unity
(c) $\frac{du}{dt}$
(d) $\delta(t) = 0, t \neq 0$

81. Frequency counter can be used to measure
(a) fundamental frequency of input signal
(b) fundamental and harmonic frequencies of input signal
(c) time interval between two pulses
(d) pulse width

82. Which of the following options with respect to Routh–Hurwitz criterion is/are correct:
(a) It can be used to determine relative stability.
(b) It is valid only for real coefficients of the characteristic equation.
(c) It is applicable only for non-linear systems.
(d) It does not provide the exact location of closed-loop poles in left- or right-half of s-plane.

83. The first element of each of the rows of a Routh–Hurwitz stability test showed the signs as follows:

Row	I	II	III	IV	V
Sign	+	−	−	+	−

Which of the following options is/are correct:
(a) The system has three roots in the right-half of s-plane.
(b) The system has three roots in the left-half of s-plane
(c) The system is stable.
(d) The system is unstable.

84. In a McMurray inverter, diodes are connected in inverse parallel to thyristors to
(a) Protect the thyristor
(b) Make the turn off of the thyristor successful
(c) Make the turn on of the thyristor successful
(d) Provide path to the reactive component of the load current

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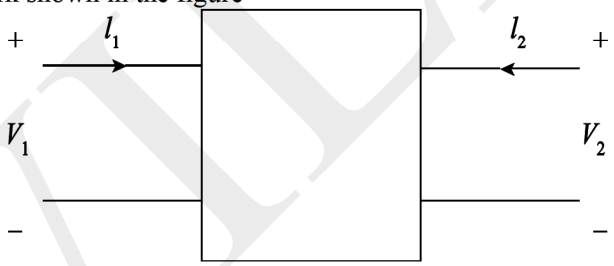
85. Which of the following options about IGBT is/are correct:
(a) It has high input impedance.
(b) It has low ON state voltage drop.
(c) Its switching speed is higher than that of the MOSFET.
(d) It is a voltage controlled device.

86. Superconductivity in a material can be destroyed by
(a) increasing the temperature above a certain limit
(b) applying a magnetic field above a certain limit
(c) passing a current above a certain limit
(d) decreasing the temperature to a point below the critical temperature

87. Which of the following options is/are correct:
(a) Both ferromagnetic and ferrimagnetic materials have domain structures; each domain has randomly oriented magnetic moments when no external field is applied.
(b) Both ferromagnetic and ferrimagnetic materials make those domains that have favourable orientation to the applied field grow in size.
(c) The net magnetic moment in ferromagnetic material is higher than that in ferrimagnetic material.
(d) The net magnetic moment in ferrimagnetic material is higher than that in ferromagnetic material.

88. A short in any type of circuit (series, parallel or combination) causes the total circuit
(a) resistance to decrease
(b) power to decrease
(c) current to increase
(d) voltage to increase

89. For the two-port network shown in the figure



$V_1 = 60I_1 + 20I_2$ and $V_2 = 20I_1 + 40I_2$

Which of the following options for the above network is/are correct:
(a) The network is both symmetrical and reciprocal.
(b) The network is reciprocal
(c) $A = D$
(d) $y_{11} = \frac{1}{50}$

90. Which of the following options is/are correct:
(a) Adding a zero to the $G(s)H(s)$ tends to push root locus to the left.
(b) Adding a pole to the $G(s)H(s)$ tends to push root locus to the right.
(c) Complementary root locus (CRL) refers to root loci with positive K.
(d) Adding a zero to the forward path transfer function reduces the maximum overshoot of the system.

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91. Which of the following losses for short circuit test on a transformer is/are correct:
(a) Copper loss
(b) Copper and iron losses
(c) Eddy current and hysteresis losses
(d) Friction and windage losses

92. Which of the following conditions must be satisfied for a transistor to be in saturation?
(a) Its collector to base junction should be under forward bias
(b) Its collector to base junction should be under reverse bias
(c) Its emitter to base junction should be under reverse bias
(d) Its emitter to base junction should be under forward bias

93. Which of the following options is/are correct:
(a) Race-around condition occurs in a *JK* flip-flop when the inputs are 1, 1
(b) A flip-flop is used to store one bit of information
(c) A transparent latch consists of *D* type flip-flops
(d) Master-slave configuration is used in a flip-flop to store two bits of information

94. If a, b, c are 3-input variables, then Boolean function $y = ab + bc + ca$ represents
(a) A 3-input majority gate
(b) A 3-input minority gate
(c) Carry output of a full adder
(d) Product circuit for a, b and c

95. Which of the following instructions are machine control instructions:
(a) LOCK
(b) STD
(c) HLT
(d) CLI

96. If the interrupt for 8085 microprocessor is to be vectored to any memory location then which of the following interrupts is/are correct:
(a) INTR
(b) RST 5.5
(c) RST 6.5
(d) RST 7.5

97. Which of the following circuits are classified as sequential logic circuits:
(a) Full adder
(b) Half adder
(c) *JK* flip-flop
(d) Counter

98. Which of the following options is/are correct:
(a) Semiconductor memories are organized as linear array of memory locations
(b) To address a memory location out of N memory locations, at least log N bits of address are required
(c) 8086 can address 1,048,576 addresses
(d) Memory for an 8086 is set up as two banks to make it possible to read or write a word with one machine cycle

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99. Modulation is used to
(a) Separate different transmissions
(b) Reduce the bandwidth requirement
(c) Allow the use of practicable antennas
(d) Ensure that intelligence may be transmitted over long distances

100. Which of the following features are advantages of FM over AM:
(a) Better noise immunity is provided
(b) Lower bandwidth is required
(c) The transmitted power is better utilized
(d) Less modulating power is required

101. The main units in a pulse code modulator are:
(a) Sampler
(b) Quantiser
(c) Encoder
(d) Comparator

102. Which of the following options is/are correct:
(a) The critical magnetic field of a superconductor is maximum at absolute zero.
(b) Transition temperature of a superconductor is sensitive to its structure.
(c) The critical magnetic field of a superconductor is zero at its critical temperature.
(d) Superconductors show very high conductivity below the critical temperature.

103. Which of the following statements are correct regarding dot product of vectors?
(a) Dot product is less than or equal to the product of magnitudes of two vectors.
(b) When two vectors are perpendicular to each other, then their dot product is non-zero.
(c) Dot product of two vectors is positive or negative depending whether the angle between the vectors is less than or greater than $\pi/2$.
(d) Dot product is equal to the product of one vector and the projection of the vector on the first one.

104. Susceptibility of a diamagnetic material is
(a) Negative
(b) Positive
(c) Dependent on the temperature
(d) Independent of the temperature

105. Which of the following options is/are correct:
(a) Nano means 10^{-9} so that nano materials have an order of dimension higher than the size of atom and come in the form of rods, tubes, spheres or even thin sheets/films.
(b) Nano materials have enhanced or changed structural property.
(c) Nano clements lend themselves to mechanical processing like rolling, twisting, positioning.
(d) Nano elements show important electrical, magnetic and optical characteristics that are useful in electrical industry.

106. Which of the following are satisfied in a non-linear network?
(a) Associative
(b) Superposition
(c) Homogeneity
(d) Bilaterality

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107. Which of the following options regarding Peer-to-Peer computing environment is/are correct:
(a) In this system, clients and servers are not distinguished from one another.
(b) All nodes distributed throughout the system (within) are considered Peers and each may act as either a client or a server.
(c) Peer-to-Peer system assuredly offers certain advantages over the traditional client-server system.
(d) Peer-to-Peer system is just a replica of the file-server system.

108. Which of the following components in a multi-stage *RC* coupled amplifier effectively control high frequencies:
(a) Parasitic capacitance of transistor
(b) Coupling capacitance
(c) Stray capacitance
(d) Wiring capacitance

109. Which of the following options is/are correct:
(a) Salient pole alternators have small diameters and large axial lengths.
(b) Cylindrical rotor alternators have a distributed winding.
(c) Cylindrical rotor alternators are wound for large number of poles.
(d) Salient pole alternators run at speeds slower than cylindrical rotor machines.

110. Which of the following options regarding corona is/are correct:
(a) It causes radio interference.
(b) It attenuates lightning surges.
(c) It causes power loss.
(d) It is more prevalent in the middle conductor of a transmission line employing flat conductor configuration.

111. Which of the following statements are correct regarding uniform plane waves?
(a) Uniform plane waves are transverse
(b) The relation between E and H is $E/H = \sqrt{\varepsilon/\mu}$
(c) $E \times H$ gives the direction of the wave travel
(d) For a uniform plane wave travelling in x direction, $E_x = 0$

112. Which of the following operating aspects necessitate the computation of Regulation of an alternator?
(a) When load is thrown off
(b) For designing of an automatic voltage-control equipment
(c) For determination of steady-state and transient stability
(d) For parallel operation of alternators

113. The stability of a system, when subjected to a disturbance, is assessable by which of the following methods?
(a) Swing curve
(b) Equal-area criterion
(c) Power-angle diagram
(d) Power-circle diagram

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114. Which of the following options is/are correct:
(a) Flash type ADCs are considered the fastest
(b) In successive approximation type ADCs, conversion time depends upon the magnitude of the analog voltage
(c) Counter-type ADCs work with fixed conversion time
(d) Dual slope ADCs are considered the slowest

115. Which of the following would refer to an ideal transformer?
(a) Winding-resistances are negligible
(b) Leakage-fluxes are included
(c) Core-losses are negligible
(d) Magnetization characteristic is linear

116. Which of the following statements are correct about SRAM?
(a) It provides faster access as compared to DRAM.
(b) It is cheaper than DRAM.
(c) It is more expensive than DRAM.
(d) It has higher bit density than DRAM.

117. The memory management function of virtual memory includes
(a) Space allocation
(b) Program relocation
(c) Program execution
(d) Code sharing

118. Which of the following specifications regarding the power supplies which are used extensively in industrial applications are required to meet are correct:
(a) Isolation between the source and the load
(b) High conversion efficiency
(c) Low power density for reduction of size and weight
(d) Controlled direction of power flow

119. Which of the following statements are correct for an ideal constant voltage source?
(a) Its output voltage remains absolutely constant whatever the change in load current.
(b) It possesses zero internal resistance so that internal voltage drop in the source is zero.
(c) Output voltage provided by the source would remain constant irrespective of the amount of current drawn from it.
(d) Output voltage provided by the source varies with the amount of current drawn from it.

120. Which of the following statements are correct?
(a) A lowpass filter passes low frequencies and stops high frequencies.
(b) A highpass filter passes high frequencies and rejects low frequencies.
(c) A bandpass filter passes frequencies within a frequency band and attenuates frequencies outside the band.
(d) A bandstop filter passes frequencies within the band and blocks/attenuates frequencies outside a frequency band.

121. The magnetizing force at the centre of a circular coil varies
(a) Directly as the number of its turns.
(b) Directly as the current.
(c) Directly as its radius.
(d) Inversely as its radius.

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122. Which of the following statements are correct?
(a) Accuracy is the closeness with which an instrument approaches the true value of the quantity being measured.
(b) Precision is a measure of the reproducibility of the measurement.
(c) Precision of an instrument can be improved upon by calibration.
(d) Accuracy may be specified in terms of limits of errors.

123. Which of the following design levels of a computer are widely used in computer design?
(a) Gate level
(b) Processor level
(c) Register level
(d) User level

124. Which of the following factors are to be considered while selecting number representations to be used in a computer?
(a) Number types to be represented
(b) Range of values to be encountered
(c) Cost of the hardware to store and process the numbers
(d) Positional notation with fixed weight

125. A signal is said to be
(a) Deterministic if there is no uncertainty over the signal at any instant of time.
(b) Deterministic if it is expressible through a mathematical equation.
(c) Random or non-deterministic if there is uncertainty over the signal at the instant of time.
(d) Random or non-deterministic if it is not expressible through a mathematical equation.

126. It is assumed that quantization error, $e(n)$ is a sequence of random variables where
(a) The statistics do not change with time.
(b) It is a sequence of uncorrelated random variables.
(c) It is uncorrelated with the quantizer input $x(n)$.
(d) The probability density function is uniformly distributed over the range of values of-quantization error.

127. Which of the following statements are correct?
(a) The pair (AB) is controllable implies that the pair (A^TB^T) is observable.
(b) The pair (AB) is controllable implies that the (A^TB^T) is unobservable.
(c) The pair (AC) is observable implies that the pair (A^1C^1) is controllable.
(d) The pair (AC) is observable implies that the pair (A^TC^T) is uncontrollable.
where A, B and C are having their standard meanings.

128. Bounded-input bounded-output stability implies asymptotic stability for
(a) Completely controllable system
(b) Completely observable system
(c) Uncontrollable system
(d) Unobservable system

129. In which of the following respects, the servomotors differ in application capabilities from large industrial motors?
(a) They produce high torque at all speeds including zero speed.
(b) They are capable of holding a static position.
(c) They do not overheat at standstill or lower speeds.
(d) Due to low-inertia they are not able to reverse direction quickly.

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130. Which of the following factors affect Corona?

(a) Atmospheric conditions, temperature, humidity, moisture, ice and fog
(b) Current of conductor
(c) Waveform
(d) Condition of surface of conductors, smoothness and dust

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ANSWER KEY

1.	(b, c, d)	**2.**	(b, c, d)	**3.**	(b)	**4.**	(a, c)	**5.**	(a, b, c, d)
6.	(a, b)	**7.**	(a, c)	**8.**	(b, d)	**9.**	(a, c)	**10.**	(a, d)
11.	(b, c)	**12.**	(a, c)	**13.**	(a, c)	**14.**	(b, d)	**15.**	(a, b, c, d)
16.	(a, c, d)	**17.**	(a, d)	**18.**	(a, b, c)	**19.**	(a, c, d)	**20.**	(a, b)
21.	(a, c)	**22.**	(b)	**23.**	(c, d)	**24.**	(a, d)	**25.**	(a, b, c, d)
26.	(a, b)	**27.**	(a, b)	**28.**	(a, b)	**29.**	(b, c)	**30.**	(a, b)
31.	(a, b)	**32.**	(*)	**33.**	(a, b)	**34.**	(a, b, c)	**35.**	(a, c, d)
36.	(a, b)	**37.**	(b, c, d)	**38.**	(a, b, c, d)	**39.**	(b, c)	**40.**	(b, d)
41.	(a, d)	**42.**	(a, b, d)	**43.**	(b, d)	**44.**	(a, b)	**45.**	(a, b, c)
46.	(a, d)	**47.**	(b, c)	**48.**	(a, b, c, d)	**49.**	(a, b, c)	**50.**	(a, b)
51.	(a, c)	**52.**	(a, b, c)	**53.**	(a, b, c, d)	**54.**	(b, d)	**55.**	(a, b, c, d)
56.	(a, b)	**57.**	(a, c)	**58.**	(c)	**59.**	(a, b, c)	**60.**	(a, b, c)
61.	(a)	**62.**	(b, c)	**63.**	(a, b, c, d)	**64.**	(a, b)	**65.**	(a, d)
66.	(b, c, d)	**67.**	(a, b)	**68.**	(b, c, d)	**69.**	(d)	**70.**	(b, c)
71.	(a, c)	**72.**	(b, c, d)	**73.**	(a, c, d)	**74.**	(b, d)	**75.**	(a, b, d)
76.	(a, c, d)	**77.**	(a, b, d)	**78.**	(a, b, c)	**79.**	(a, c)	**80.**	(a, b, c, d)
81.	(a, c, d)	**82.**	(a, b, d)	**83.**	(a, d)	**84.**	(b, d)	**85.**	(a, b, d)
86.	(a, b, c)	**87.**	(a, b, c)	**88.**	(a, c)	**89.**	(b, d)	**90.**	(a, b, d)
91.	(a)	**92.**	(a, d)	**93.**	(a, b, c)	**94.**	(a, c)	**95.**	(a, c)
96.	(b, c, d)	**97.**	(c, d)	**98.**	(a, b, c, d)	**99.**	(a, c, d)	**100.**	(a, c, d)
101.	(a, b, c)	**102.**	(a, c, d)	**103.**	(a, c, d)	**104.**	(a, d)	**105.**	(a, b, c, d)
106.	(a, d)	**107.**	(a, d)	**108.**	(a, c, d)	**109.**	(b, d)	**110.**	(a, b, c, d)
111.	(a, c, d)	**112.**	(a, b, c, d)	**113.**	(a, b, c)	**114.**	(a, d)	**115.**	(a, c, d)
116.	(a, c)	**117.**	(a, b, d)	**118.**	(a, b, d)	**119.**	(a, b, c)	**120.**	(a, b, c)
121.	(a, b, d)	**122.**	(a, b, d)	**123.**	(a, b, c)	**124.**	(a, b, d)	**125.**	(a, b, c, d)
126.	(a, b, d)	**127.**	(a, c)	**128.**	(a, b)	**129.**	(a, b, c)	**130.**	(a, c, d)

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