148/2025

Question Booklet Alpha Code: **A**

Question Booklet Serial Number:

Total No. of questions : 100 Time : 1 Hour 30 Minutes

Maximum : 100 Marks

INSTRUCTIONS TO CANDIDATES

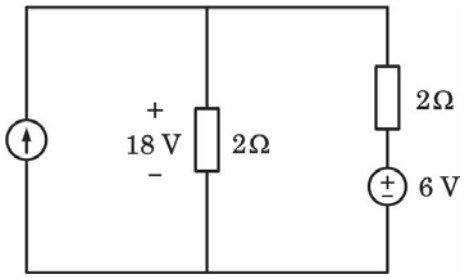
1. The question paper will be given in the form of a Question Booklet. There will be four versions of question booklets with question booklet alpha code viz. A, B, C & D.
2. The Question Booklet Alpha Code will be printed on the top left margin of the facing sheet of the question booklet.
3. The Question Booklet Alpha Code allotted to you will be noted in your seating position in the Examination Hall.
4. If you get a question booklet where the alpha code does not match to the allotted alpha code in the seating position, please draw the attention of the Invigilator IMMEDIATELY.
5. The Question Booklet Serial Number is printed on the top right margin of the facing sheet. If your question booklet is un-numbered, please get it replaced by new question booklet with same alpha code.
6. The question booklet will be sealed at the middle of the right margin. Candidate should not open the question booklet, until the indication is given to start answering.
7. Immediately after the commencement of the examination, the candidate should check that the question booklet supplied to him contains all the 100 questions in serial order. The question booklet does not have unprinted or torn or missing pages and if so he/she should bring it to the notice of the Invigilator and get it replaced by a complete booklet with same alpha code. This is most important.
8. A blank sheet of paper is attached to the question booklet. This may be used for rough work.
9. **Please read carefully all the instructions on the reverse of the Answer Sheet before marking your answers.**
10. Each question is provided with four choices (A), (B), (C) and (D) having one correct answer. Choose the correct answer and darken the bubble corresponding to the question number using Blue or Black Ball-Point Pen in the OMR Answer Sheet.
11. **Each correct answer carries 1 mark and for each wrong answer 1/3 mark will be deducted. No negative mark for unattended questions.**
12. No candidate will be allowed to leave the examination hall till the end of the session and without handing over his/her Answer Sheet to the Invigilator. Candidates should ensure that the Invigilator has verified all the entries in the Register Number Coding Sheet and that the Invigilator has affixed his/her signature in the space provided.
13. Strict compliance of instructions is essential. Any malpractice or attempt to commit any kind of malpractice in the Examination will result in the disqualification of the candidate.

148/2025

Maximum : 100 marks

Time : 1 hour and 30 minutes

1. If the voltage across 2 Ω resistance is 18V as shown. Assuming ideal sources, what is the strength of the current source :



(A) 3 A (B) 18 A

(C) 9 A (D) None of the above

2. What is the phase of $v(t) = 8\sqrt{3}\sin wt + 8\sin(wt + 90^\circ)$ with respect to $v_1(t) = 4\sin(wt - \pi/4)$?

(A) 75° lag (B) 75° lead

(C) 65° lead (D) 65° lag

3. An inductor with resistance of 10 ohm is connected in series with a pure capacitor across an AC source of variable frequency. The Q factor of the coil when the circuit is at resonance is 0.5. What is the reactance of the inductor at $\frac{1}{2}$ of the resonance frequency?

(A) 2.5 Ω (B) 2 Ω

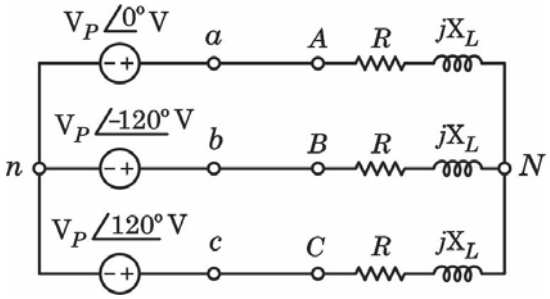
(C) 5 Ω lead (D) 20 Ω

4. The line currents of a star connected load connected to a 3 Phase 4 wire balanced system are $I_R = 42 + j0.55A$, $I_Y = -20.7 - j8.8A$, $I_B = -21.3 + j9.70A$. The current flowing from load neutral to source neutral is :

(A) $1.45\angle 90^\circ$ (B) $84.01\angle -90^\circ$

(C) $84.01\angle 0^\circ$ (D) None of the above

5. What is the potential difference between the points N and $n(V_{Nn})$ if $V_P = 415V$?



(A) 830 V

(B) 1245 V

(C) $0V$

(D) $239.6V$

6. An electric stove with four burners and an oven is used in preparing a meal as follows.

Burner 1 : 10 minutes, Burner 2 : 50 minutes, Burner 3 : 25 minutes, Burner 4 : 35 minutes and Oven : 30 minutes

If each burner is rated at 1.8 kW and the oven at 1.2 kW, and electricity costs 6 rupees per kWh,

What is the cost of electricity used in preparing the meal?

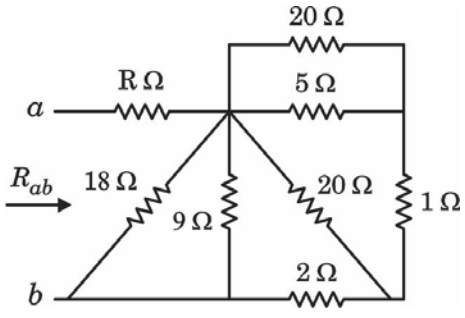
(A) 25.2 rupees

(B) 22.5 rupees

(C) 52.2 rupees

(D) 20 rupees

7. If R_{ab} is given to be 20Ω, what is the value of R:



(A) 71Ω

(B) 18Ω

(C) 19Ω

(D) 17Ω

8. The Thevenin and Norton equivalents of circuit in Fig. 1 is given to be Fig. 2 and Fig. 3 respectively:

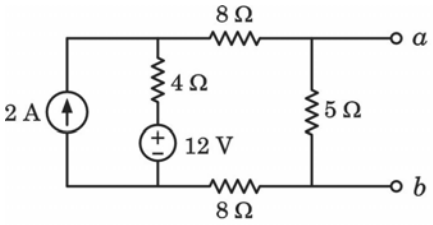


Fig. 1

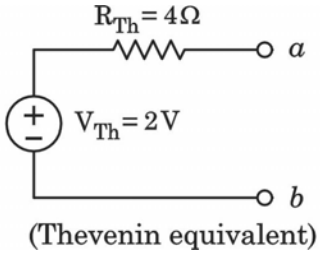


Fig. 2

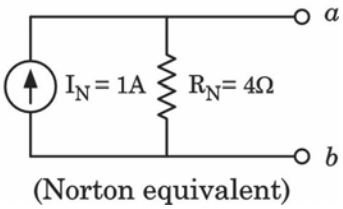


Fig. 3

Which of the statement is correct?

(A) V_{th} is correct and I_{th} is correct

(B) V_{th} is correct and I_N is wrong

(C) R_{th} is correct and R_N is wrong

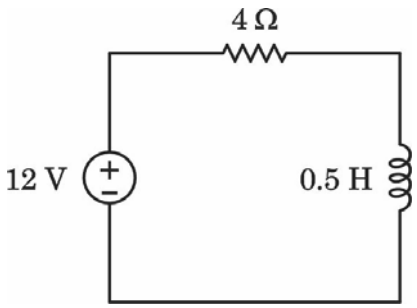
(D) V_{th} is wrong and I_{th} is correct

9. The RMS value of the phase to neutral voltage of a 415V, 3Phase, 50 Hz, 4 wire system is :

(A) 338.85 V (B) 293.5 V

(C) 239.6 V (D) 415 V

10. Assuming ideal elements, Current through the inductor at steady state is :



(A) 2.66 A (B) 3.0 A

(C) 27 A (D) 24 A

11. The reluctance, S of a magnetic circuit with flux, Φ and magneto motive force, F is :

(A) $S = F / \Phi$ (B) $S = \Phi / F$

(C) $S = F\Phi$ (D) None of these

12. The ability of a material to conduct magnetic flux through it is referred to as :

(A) permeance (B) reluctance

(C) permeability (D) none of these

13. A particle of charge q and mass m moves in a circular orbit of radius r with angular speed ω. The ratio of magnitude of its magnetic moment with its angular momentum depends on :

(A) ω and q (B) ω, q and m

(C) q and m (D) ω and m

14. A flat coil carrying current has a magnetic moment P_m. It is placed in a magnetic field B, such that P_m is antiparallel to B. The coil is :

(A) in stable equilibrium (B) in unstable equilibrium

(C) in neutral equilibrium (D) none of these

15. Consider an iron ring with a small air gap, with a coil wound on a portion of it. The portion of the flux in the air gap that diverges outside the main air gap is referred to as :

(A) Leakage flux (B) Fringing flux

(C) Demagnetising flux (D) None of these

16. When placed in a non-uniform magnetic field, this material tends to move from high field region to low field region. This material is :

(i) Diamagnetic

(ii) Paramagnetic

(iii) Ferromagnetic

(A) (i) (B) (ii)

(C) (iii) (D) (ii) or (iii)

17. A magnetic needle is kept in a non-uniform magnetic field. It experiences :

(A) a force and a torque (B) a force but not a torque

(C) a torque but no force (D) neither a force nor a torque

18. A charged particle is released from rest in a region or steady and uniform electric and magnetic field which are parallel to each other. The particle will move in a :

(A) a straight line (B) a circle

(C) a helix (D) a cuboid

19. Which among the following material have linear B-H characteristics?

(i) Air

(ii) Vacuum

(iii) Ferromagnetic

(iv) Ferrimagnetic

(A) (i) and (ii) (B) (ii) and (iii)

(C) (iii) and (iv) (D) All the above

20. A magnetic saturation is observed by varying Voltage. Then current will be :

(A) constant (B) linearly varying

(C) drastically varying (D) none of the above

21. The load current corresponding to maximum efficiency of a 4 pole, 250 V, 10 kW dc shunt generator with an armature resistance of $1\,\Omega$ and core loss of 900 W is :

(A) 40 A (B) 30 A

(C) 50 A (D) 25 A

22. A 250 V dc shunt motor has full load armature current of 50 A at a speed of 1000 rpm. The resistance of the armature is $0.2\,\Omega$. Assuming constant field flux, the resistance that must be added in series with the armature in order to reduce the speed by 25% for the same load torque is :

(A) $1\,\Omega$ (B) $1.3\,\Omega$

(C) $1.2\,\Omega$ (D) $1.4\,\Omega$

23. The phase sequence of a three phase alternator is reversed if :

(A) the field current is reversed keeping the direction of rotation same

(B) the field current remains same but the direction of rotation is reversed

(C) the field current is reversed and the number of poles is doubled

(D) the number of poles is doubled without reversing the field current

24. The range of slip for operation of an induction machine during plugging in motor mode is from :

(A) 0 to 1 (B) 1 to 2

(C) –1 to 0 (D) –2 to –1

25. A 3 phase, 500 hp, 440 V, 50 Hz, 6 pole induction motor is running at 950 rpm. The frequency of rotor emf is :

(A) 1.5 Hz (B) 2.0 Hz

(C) 2.5 Hz (D) 50 Hz

26. A 5 kVA, 50 V/100 V, single phase transformer has a secondary terminal voltage of 95 V when loaded. The regulation of the transformer is :

(A) 5% (B) 10%

(C) 7.5% (D) 2.5%

27. In Scott connected transformers, the voltage rating of primary winding of main transformer is 100 V. Then the voltage rating of primary winding of teaser transformer is :

(A) 57.7 V (B) 100 V

(C) 50 V (D) 86.6 V

28. An over excited synchronous motor is called :

(A) Synchronous generator (B) Induction generator

(C) Synchronous condenser (D) Induction motor

29. In salient pole synchronous motor, the developed reluctance torque attains maximum value when the load angle in electrical degree is :

(A) 0 (B) 45^o

(C) 60^o (D) 90^o

30. The power delivered to the rotor of a 3-phase, 400 V, 50 Hz, 6 pole squirrel cage induction motor running at 950 rpm is 2500 W. Then the rotor copper loss is :

(A) 125 W (B) 150 W

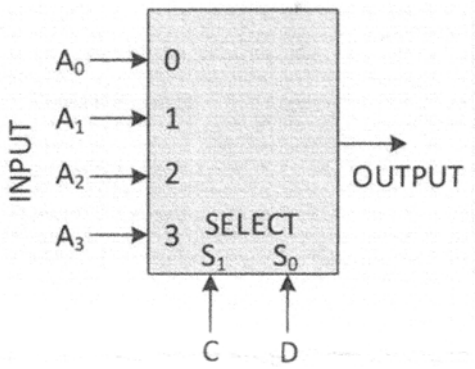
(C) 1250 W (D) 2375 W

31. If $(123)_x = (043)_y$, where x and y represent the bases of the corresponding numbers then :

(A) $x = 4$ and $y = 6$ (B) $x = 5$ and $y = 2$

(C) $x = 6$ and $y = 10$ (D) $x = 7$ and $y = 8$

32. For the 4 × 1 multiplexer shown in figure, if the output is to be the AND of inputs at S_1 and S_0, the values of A_0, A_1, A_2 and A_3 are :



(A) $A_0 = 0$ $A_1 = 0$ $A_2 = 1$ and $A_3 = 0$

(B) $A_0 = 0$ $A_1 = 1$ $A_2 = 0$ and $A_3 = 0$

(C) $A_0 = 1$ $A_1 = 0$ $A_2 = 0$ and $A_3 = 0$

(D) $A_0 = 0$ $A_1 = 0$ $A_2 = 0$ and $A_3 = 1$

33. To build a mod 8 counter, you need to cascade a mod 4 counter with another

(A) mod 4 counter (B) mod 8 counter

(C) mod 2 counter (D) mod 3 counter

34. An 8 bit DAC has a full scale voltage range from 0 V to 16 V. If the digital input is 1000 0000, the analog voltage output of the DAC (rounded to one decimal place is) is :

(A) 4 V (B) 6 V

(C) 8 V (D) 12 V

35. A decoder is used for addressing a 1024 K × 32 memory. If the decoder is realized using AND gates, then the number of minimum AND gates required to implement the decoder is :

(A) 1024 (B) 2^{20}

(C) 32 (D) 20

36. While executing a nested 'CALL' instruction, the address of the return instruction is stored in :

(A) Link register

(B) Memory

(C) Stack

(D) Internal registers

37. In 8085 processor, the register contents are as follows A = 10_H, B = 20_H, C = 30_H, D = 40_H, E = 50_H, H = 60_H, L = 70_H, SP = 20 FA_H. After execution of the following lines of code

PUSH D
PUSH B
POP H

The contents of the HL pair will be

(A) H = 20_H, L = 30_H (B) H = 40_H, L = 50_H

(C) H = 50_H, L = 40_H (D) H = 60_H, L = 70_H

38. In 8085 microprocessor, let the register contents be A = 10_H, B = 20_H, C = 30_H, D = 40_H, E = 50_H, H = 60_H, L = 70_H. Executing the following code :

MVIA 88_H
MVIB 38_H
ADD B

will result in the following flags set

(A) Sign, Auxiliary carry, Parity, Carry
(B) Sign, Parity, Carry
(C) Sign, Auxiliary carry, Parity
(D) Sign, Zero, Auxiliary carry, Parity

39. The number of T states during the execution of LDA instruction in 8085 is :

(A) 4 T states (B) 7 T states

(C) 10 T states (D) 13 T states

40. Daisy chaining is a :

(A) Bus arbitration technique for processing interrupts
(B) Bus arrangement technique
(C) A chaining technique for interrupt masking
(D) A chaining technique for disabling interrupts

41. For a 3 ϕ transmission line, the capacitance between two conductors is 3 μF. The capacitance of each conductor to neutral is:

(A) 6 μF (B) 1.5 μF

(C) 3 μF (D) 4.2 μF

42. Shackle insulators are used as strain insulators for voltages :

(A) > 33 kV (B) < 11 kV

(C) > 110 kV (D) > 400 kV

43. A 66 kV overhead transmission line having six units in the string of insulators. The voltage across string is :

(A) 66 kV (B) 11 kV

(C) 38.1 kV (D) 114.3 kV

44. The rate of rise of restriking voltage is _____ when the short circuit occurs near the power station busbar.

(A) high (B) low

(C) zero (D) none of these

45. The primary and secondary of current transformer used to protect delta (primary)/star(secondary) transformer is :

(A) delta, delta (B) delta, star

(C) star, star (D) star, delta

46. A 3 ϕ transmission line operating at 33 kV connected through a 500 kVA transformer with 5% reactance to a generating station busbar 1000 kVA with 10% reactance. What will be the reactance of transformer at 1000 kVA base?

(A) 10% (B) 20%

(C) 2.5% (D) 5%

47. In a 3 ϕ, 4 wire unbalanced system, the magnitude of current in the neutral wire is _____ of the magnitude of zero sequence current.

(A) $1/3^{rd}$ (B) $\sqrt{3}$ times

(C) 2 times (D) 3 times

48. The steady state stability of a two machine system depends on :

(A) inertia (B) input power

(C) per unit reactance of the system (D) none of these

49. The inertia constant H of a machine of 200 MVA is 2 pu. Its value corresponding to 400 MVA is _____ pu.

(A) 4 (B) 0.5

(C) 1 (D) 0.25

50. The corona effect is reduced when the spacing between conductors :

(A) increased (B) decreased

(C) not affected (D) none of these

51. For a third order type 1 system which of the following statement is correct?

(A) Steady state error for unit step input is not zero

(B) Steady state error for unit ramp input is not zero

(C) Steady state error for unit parabolic input is zero

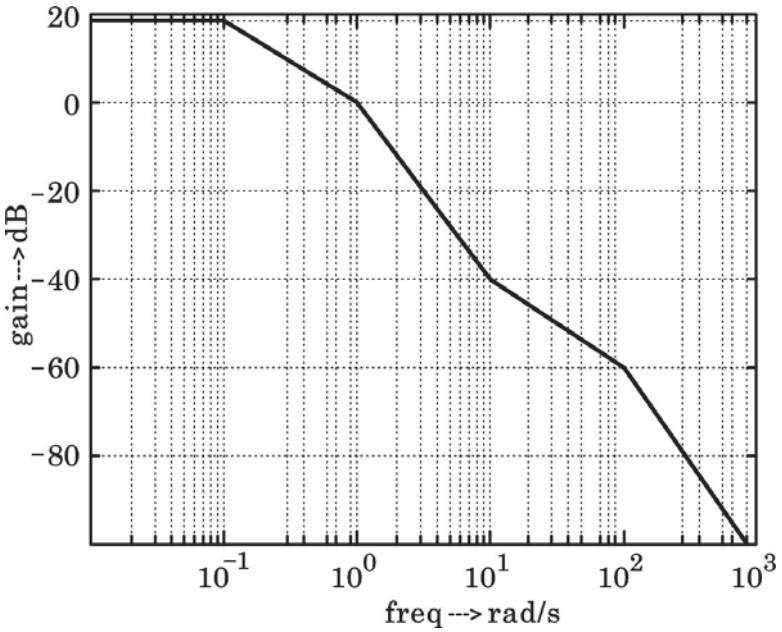
(D) Steady state error for all standard test signals is zero

52. Identify the number of roots of the equation that are on the imaginary axis : $s^7 + 6s^6 + 11s^5 + 6s^4 + s^3 + 6s^2 + 11s + 6 = 0$

(A) 0 (B) 2

(C) 4 (D) 6

53. Identify the transfer function of the system with the following asymptotic bode gain plot :



(A) $\dfrac{100(s+10)}{s(s+1)(s+100)}$ (B) $\dfrac{(0.1s+1)}{s(s+1)(0.01s+1)}$

(C) $\dfrac{100(s+10)}{(s+1)(10s+1)(s+100)}$ (D) $\dfrac{10(s+10)}{s(s+1)(s+100)}$

54. Cascading the plant in a closed loop system, with a controller having transfer function $C(s) = \dfrac{(1+0.1s)}{s}$ could cause :

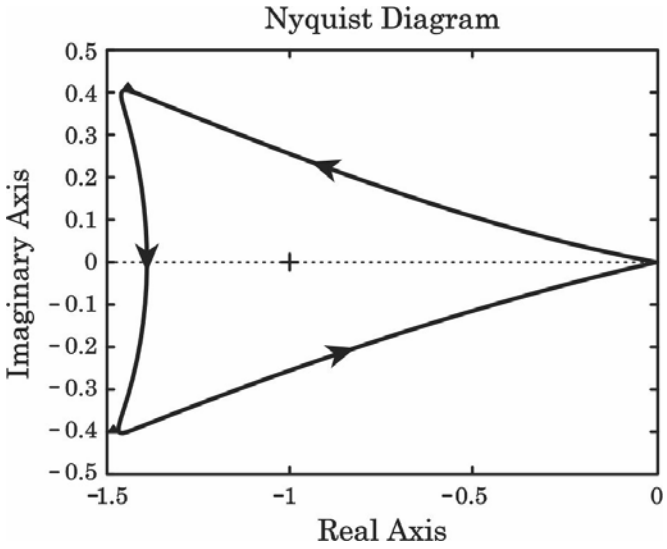
(A) increase in the bandwidth of closed loop the system

(B) reduction in the bandwidth of closed loop the system

(C) changes the transient behaviour

(D) changes both transient and steady state behaviour

55. The Nyquist plot shown below represent a stable system in closed loop. Which of the following statement is correct?



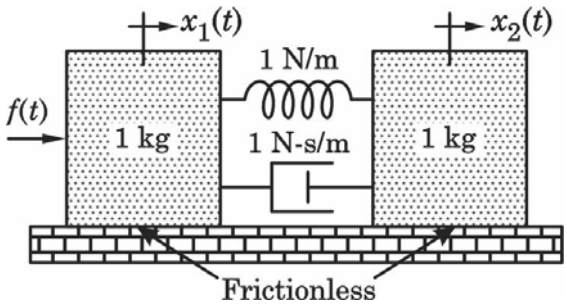
(A) Open loop system has one zero to the right of imaginary axis

(B) Closed loop system has one zero to the right of imaginary axis

(C) Open loop system has one pole to the right of imaginary axis

(D) Open loop system has no poles to the right of imaginary axis

56. Identify the transfer function for the system $\frac{X_1(s)}{F(s)}$:



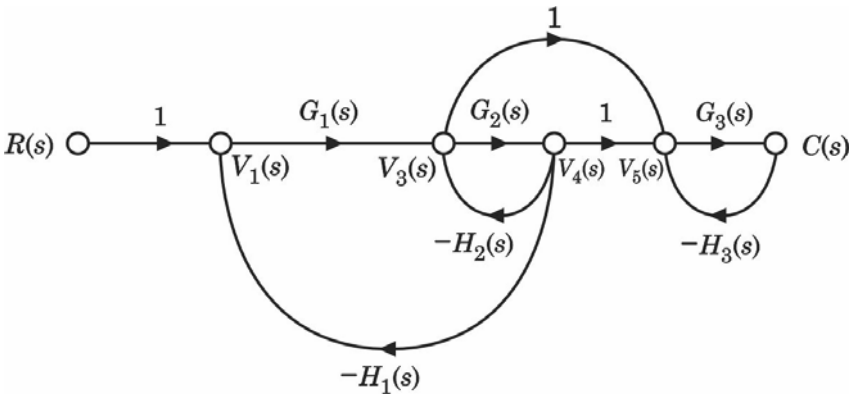
(A) $\frac{s^2+s+1}{s^2\left(s^2+2s+2\right)}$

(B) $\frac{s+1}{s^2\left(s^2+2s+2\right)}$

(C) $\frac{s+1}{\left(s^2+s+1\right)\left(s^2+2s+2\right)}$

(D) $\frac{s^2+s+1}{s(s+1)\left(s^2+2s+2\right)}$

57. Identify the transfer function $\frac{C(s)}{R(s)}$ for the system shown below :



(A) $\frac{G_1(s)G_3(s)[1+G_2(s)]}{1+G_2(s)H_2(s)+G_1(s)G_2(s)H_1(s)+G_3(s)H_3(s)}$

(B) $\frac{G_1(s)G_2(s)G_3(s)}{1+G_2(s)H_2(s)+G_1(s)G_2(s)H_1(s)+G_3(s)H_3(s)}$

(C) $\frac{G_1(s)G_2(s)G_3(s)}{[1+G_2(s)H_2(s)+G_1(s)G_2(s)H_1(s)][1+G_3(s)H_3(s)]}$

(D) $\frac{G_1(s)G_3(s)[1+G_2(s)]}{[1+G_2(s)H_2(s)+G_1(s)G_2(s)H_1(s)][1+G_3(s)H_3(s)]}$

58. The closed loop transfer function of a system $\frac{C(s)}{R(s)}=\frac{1}{s^2+0.8s+1}$. Identify the correct statement :

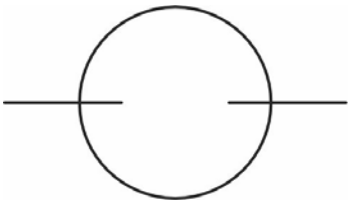
(A) Phase difference between input and output for a sinusoidal input of frequency 1 rad/s is 45 degree

(B) Settling time is 10s for unit step input

(C) Steady state error for unit step input is 0.5

(D) The system has a damping ratio of 0.8

59. Identify the possible open loop transfer function of a system whose characteristic equation have the root locus as shown below :



(A) $\frac{k(s+1)(s+5)}{(s+2)(s+4)}$

(B) $\frac{k(s+1)(s+4)}{(s+2)(s+5)}$

(C) $\frac{k(s+4)(s+5)}{(s+1)(s+2)}$

(D) $\frac{k(s+2)(s+5)}{(s+1)(s+4)}$

60. Closed loop transfer function of a unity feedback system is $\frac{2}{s^2+s+4}$. Open loop system is :

(A) Order 2 and type unknown

(B) Type 2 and Order 2

(C) Type 1 and Order 2

(D) Type 0 and Order 2

61. An SCR with a latching current of 50mA is used to control an inductive RL load. If the load inductance is increased, the minimum duration of the gate pulse necessary to ensure turn on of the SCR:

(A) Decreases

(B) Increases

(C) May increase or decrease depending on the holding current

(D) Remains the same

62. The advantage of a half-controlled rectifier over a fully controller rectifier is that :

(A) It has better dynamics

(B) It avoids discontinuous conduction

(C) It has regenerative braking action

(D) It has better power factor

63. The forward voltage drop of SCR during on-state :

(A) Increases slightly with load current

(B) Decreases slightly with load current

(C) Varies linearly with load current

(D) Remains unchanged

64. The anode current through a conducting SCR is 10A. If its gate current is reduced to half, the anode current will be :

(A) 1.25A (B) 2.5A

(C) 5A (D) 10A

65. For continuous conduction with a firing angle of alpha (α) radian, in single phase full converter, each pair of thyristor conducts for :

(A) $\pi - \alpha$ (B) π

(C) 2π (D) $\pi + \alpha$

66. Forward break over voltage of a thyristor decreases with increase in :

(A) Load current (B) Anode Current

(C) Gate current (D) Reverse voltage

67. A DC motor with 100 A rated current is controlled by a two quadrant chopper fed from a 200V DC supply. The motor circuit has a resistance of 0.2 Ω and inductance of 0.2mH. When operating at a particular speed, the motor develops a back emf of 100V. What is the value of the duty cycle for rated motor current?

(A) 0.75 (B) 0.6

(C) 0.5 (D) 0.4

68. Of the four characteristics given below, which is <u>not</u> a desirable property of differential amplifier?

(A) High output impedance

(B) High input impedance

(C) High slew rate

(D) High common mode rejection ratio

69. A single-phase half-bridge inverter is connected to a 400 V dc source which is feeding an RL load. Determine the RMS output voltage :

(A) 400 V (B) 360 V

(C) 200 V (D) 180V

70. CMRR of an OP-AMP should be :

(A) Close to zero (B) As large as possible

(C) Less than Slew rate (D) Close to unity

71. Specifications of three different ammeters are given in the table below. Which meter has least error?

Ammeter	Full scale value	% accuracy of full scale
M1	20A	±0.10
M2	10A	±0.20
M3	1A	±1.00

(A) M1 (B) M2

(C) M3 (D) All of the above

72. Torque-weight ratio of an instrument indicates :

(A) Accuracy

(B) Sensitivity

(C) Selectivity

(D) Fidelity

73. Assertion (A) : Permanent magnet moving coil type of indicating instruments are always critically damped.

Reason (R) : A critically damped system directly moves to its steady state without oscillation.

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

(B) Both (A) and (R) are true and (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. A 100 μA ammeter has an internal resistance of 100 Ω. For extending the range to measure 500 μA, the shunt resistance required is :

(A) 25 Ω

(B) 400 Ω

(C) 600 Ω

(D) None of the above

75. A water boiler is switched ON to the ac supply of 230 V at 50 Hz. The frequency of instantaneous power consumed by the boiler is :

(A) 0 Hz (B) 25 Hz

(C) 50 Hz (D) 100 Hz

76. Identify the correct statement :

(i) TOD meter is designed to track the demand, time and energy consumption of electricity

(ii) TOD metering involves dividing the day into tariff slots with higher rates at peak load periods and low tariff rates at off peak hours.

(A) (i) only

(B) (ii) only

(C) both (i) and (ii) are true

(D) None of the above

77. Power consumed by a balanced 3-phase, 3-wire load is measured by two wattmeter method. One wattmeter reads twice the other. Then load impedance angle in radians is :

(A) $\frac{\pi}{6}$ (B) $\frac{\pi}{4}$

(C) $\frac{\pi}{3}$ (D) $\frac{\pi}{2}$

78. An energy meter having meter constant of 1200 rev/kWh makes 20 revolutions in 30 seconds for a constant load. Then the load is :

(A) 2 W (B) 200 W

(C) 2000 W (D) None of the above

79. In an oscilloscope screen, linear sweep is applied at the :

(A) origin

(B) vertical axis

(C) horizontal axis

(D) both horizontal and vertical axis

80. A CRO screen has ten divisions on the horizontal axis. If a voltage signal $5\sin(314t + 45^\circ)$ is measured with a time base setting of 5 ms/div. the number of cycles of the signal displayed on the screen :

(A) 0.5 cycles (B) 2.5 cycles

(C) 5 cycles (D) 10 cycles

81. A unit impulse response of a linear time invariant system is a unit step function $u(t)$. The response of the system to an excitation function $e^{-at}u(t), a > 0$ for a time $t > 0$ will be :

(A) $\frac{1}{a}(1 - e^{-at})$ (B) $a(1 - e^{-at})$

(C) $1 - e^{-at}$ (D) $a e^{-at}$

82. The condition for a system to be BIBO stable for an impulse response of system $h(n) = a^n u(n)$ is:

(A) $|a| > 1$

(B) $|a| < 1$

(C) a is real and positive

(D) a is real and negative

83. Which of the following is true for the system represented by $y(n) = x(-n)$?

(A) Linear (B) Time invariant

(C) Causal (D) Non linear

84. A system characterized by the equation $y(t) = ax(t) + b$ is :

(A) Linear for any value of b (B) Linear if $b > 0$

(C) Linear if $b < 0$ (D) Non Linear

85. A LTI system has an impulse response e^{2t} for $t > 0$. If initial conditions are 0 and input is e^{3t}, the output for $t > 0$ is :

(A) $e^{2t} - e^{3t}$ (B) $e^{3t} - e^{2t}$

(C) $e^{2t} + e^{3t}$ (D) e^{5t}

86. An aliasing effect is caused in s system when :

(A) Sampling frequency equal to the message signal

(B) Sampling frequency greater to the message signal

(C) Sampling frequency less to the message signal

(D) Sampling frequency greater than or equal to the message signal

87. Which of the following statements is correct for a system with gain margin close to unity or a phase margin close to zero?

(A) The system is relatively stable

(B) The system is highly stable

(C) The system is highly oscillators

(D) The system is stable

88. How many minimum number of samples are required to exactly describe the signal $x(t) = 10\cos(6\pi t) + 4\sin(8\pi t)$?

(A) 4 samples per second (B) 6 samples per second

(C) 8 samples per second (D) 2 samples per second

89. The impulse response of a continuous time LTI system is $H(t) = \left(2e^{-2t} - e^{\frac{t-100}{100}}\right)u(t)$.

Then the system is:

(A) Causal and stable

(B) Causal but not stable

(C) Stable but not Causal

(D) Neither causal nor stable

90. The impulse response of a LTI system is represented as $h(n)=\left(\frac{-1}{4}\right)^n u(n)$, then the step response of the system is :

(A) $\frac{1}{5}\left[4-\left(\frac{-1}{5}\right)^n\right]$

(B) $\frac{1}{4}\left[5+\left(\frac{-1}{5}\right)^n\right]$

(C) $\frac{1}{4}\left[5-\left(\frac{-1}{4}\right)^n\right]$

(D) $\frac{1}{5}\left[4+\left(\frac{-1}{4}\right)^n\right]$

91. The working principle of LVDT is based on :

(A) Hall effect

(B) Electromagnetic induction

(C) Piezoelectric effect

(D) Magnetostriction

92. A LVDT has a stroke length of ± 200 mm and provides a sensitivity of 50 mV per millimetre of displacement. If the output voltage of the LVDT is 2.0 V, determine the position of the core from its central (null) position :

(A) 10 mm

(B) 20 mm

(C) 40 mm

(D) 80 mm

93. The instrument which is used to measure the specific gravity of battery electrolyte?

(A) Hygrometer

(B) Hydrometer

(C) Barometer

(D) Anemometer

94. Determine the charging current for a 50 Ah battery when charged at a 0.2 C rate :

(A) 10 A

(B) 20 A

(C) 40 A

(D) 80 A

95. A 24 V,60 Ah lead-acid battery is charged at a constant current of 0.1 C. If the battery is fully discharged, estimate how long it will take to fully charge it, assuming the charging efficiency is 80%?

(A) 12.5 Hours

(B) 10.0 Hours

(C) 15.0 Hours

(D) 17.5 Hours

96. The main objective of earthing in an electrical installation is :

(A) To provide a return path for current under normal conditions

(B) To increase the voltage level of the system

(C) To reduce the power consumption of the system

(D) To ensure safety against electric shock

97. What is the minimum required length of pipe in a pipe electrode earthing system?

(A) 5.0 m

(B) 1.5 m

(C) 2.0 m

(D) 2.5 m

98. The maximum permissible total connected load for a 15 A power sub-circuit in a domestic installation, as per standard wiring practices, is :

(A) 800 W

(B) 5000 W

(C) 2000 W

(D) 3000 W

99. In plate earthing, the copper plate used should not be less than :

(A) 60 cm × 60 cm × 3.15 mm

(B) 90 cm × 90 cm × 6 mm

(C) 100 cm × 100 cm × 10 mm

(D) 150 cm × 150 cm × 20 mm

100. A room of dimensions 5 m × 5 m is illuminated using four 100 W lamps. Each lamp has a luminous efficiency of 80 lumens/W and the coefficient of utilization is 0.65. Calculate the average illumination in the room :

(A) 264 lux

(B) 100 lux

(C) 832 lux

(D) 524 lux

SPACE FOR ROUGH WORK

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