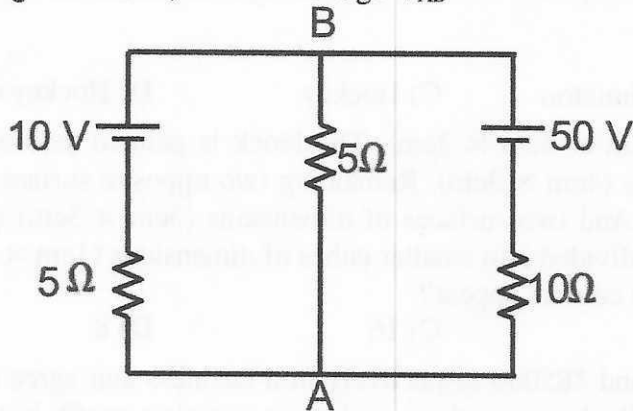


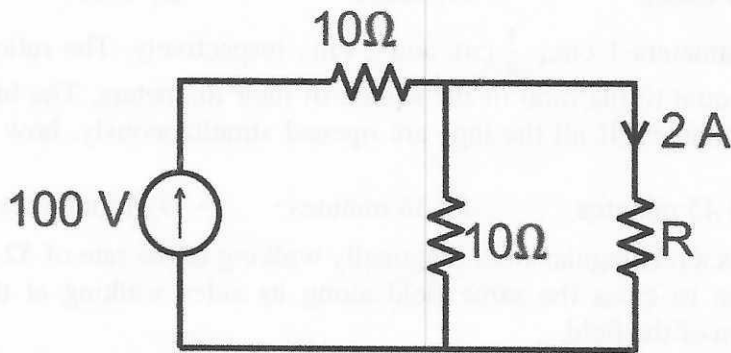
CHANDIGARH HOUSING BOARD
POST: SDE (ELECTRICAL)
Question Booklet & Answer Key
29.01.2023 (MORNING)

26. Two sinusoidal currents are given by $i_1 = 100 \sin \left(\omega t + \frac{\pi}{4} \right)$ and $i_2 = 150 \sin \left(\omega t - \frac{\pi}{6} \right)$. The phase difference between them is _____
 A) 15 degree B) 75 degree C) 90 degree D) 60 degree

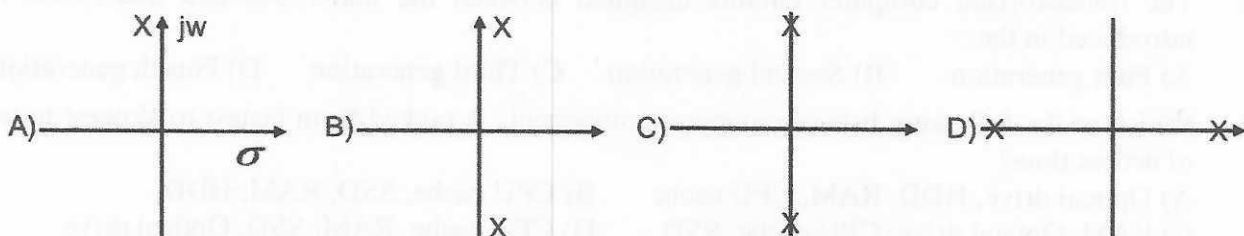
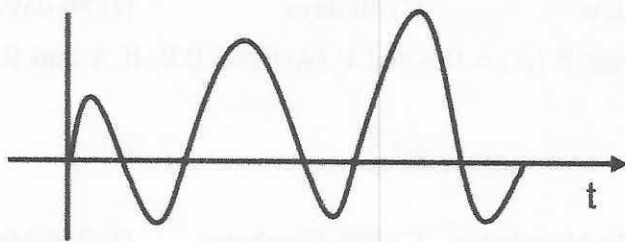
27. In a circuit given below, find the voltage V_{AB}



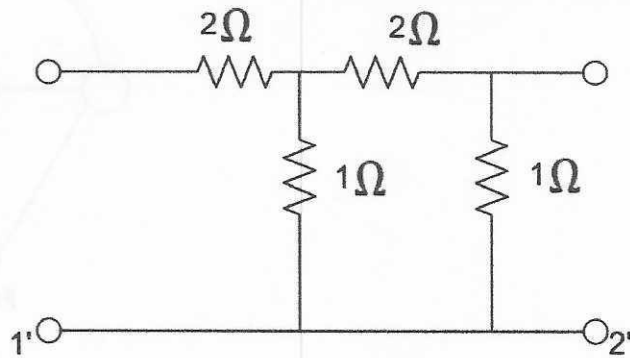
- A) 10 V B) 8 V C) 4 V D) 6 V
28. The value of resistance R in Ω is _____ for given circuit below:



- A) 10 Ω B) 15 Ω C) 20 Ω D) 5 Ω
29. A network has response with time as shown in figure below. Which diagram show location of poles?



30. The value of h- parameter h_{12} is equal to _____

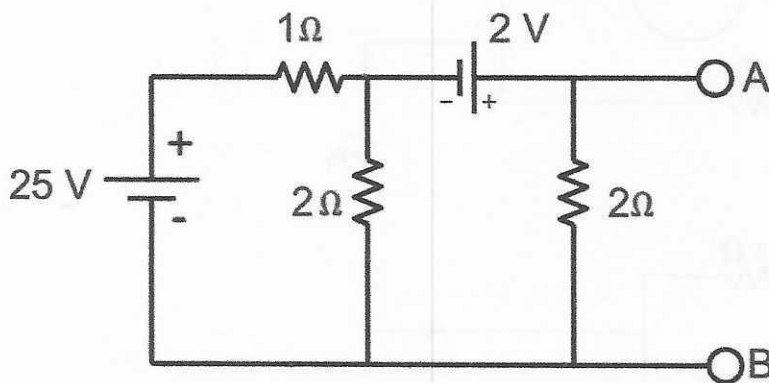


- A) $\frac{1}{2}$ B) 1 C) $\frac{1}{3}$ D) $\frac{3}{2}$

31. Why $Z(s) = \frac{s(s^2+1)}{s^2+4}$ is not realizable?

- A) number of zeros is more than number of poles
 B) number of zeros equal to number of poles
 C) number of zeros less than number of poles
 D) can be realised

32. The Thevenin equivalent circuit to left of AB has R_{th} given by _____

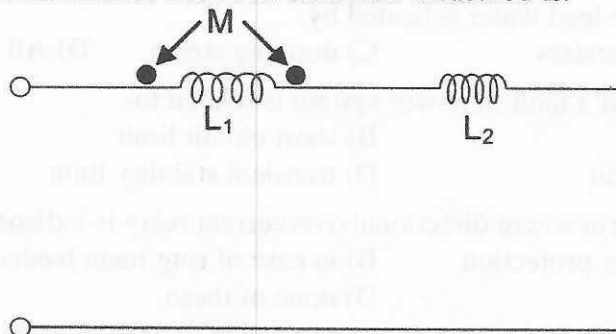


- A) 2 Ω B) 10 Ω C) 1 Ω D) 5.5 Ω

33. The step response of series RC circuit with applied voltage V is of the form:

- A) $i(t) = \frac{V}{R} e^{-t/RC}$ B) $i(t) = \frac{V}{R} [1 - e^{-t/RC}]$
 C) $i(t) = \frac{V}{R} e^{+t/RC}$ D) $i(t) = \frac{V}{R} (1 - e^{+t/RC})$

34. The equivalent inductance between terminals measured is:



- A) $L_1 + L_2$ B) $L_1 + L_2 + 2M$ C) $L_1 + L_2 - 2M$ D) $L_1 - L_2$

35. Which one of the following is not a tree of graph shown as fig. X

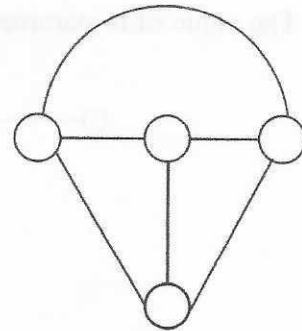
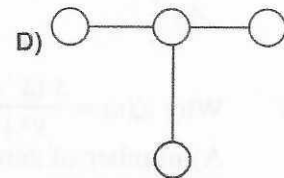
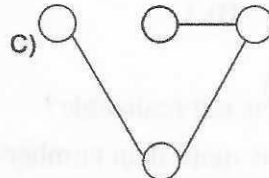
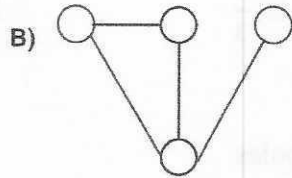
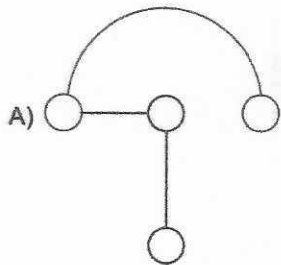
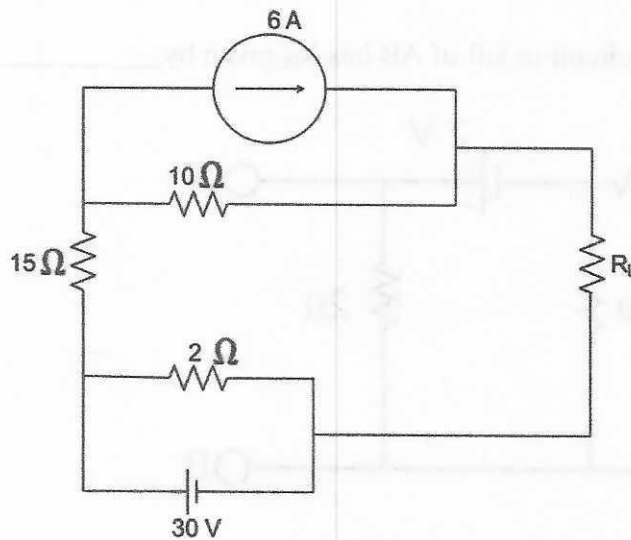


Fig. X



36. In figure shown, at what value of R_L , the circuit will absorb maximum power:



- A) 25Ω B) 35Ω C) 20Ω D) 30Ω

37. The air gap is inserted in the magnetic circuit in order to:

- A) increase mmf B) increase flux C) prevent saturation D) None of these

38. The maximum value of torque angle in a synchronous motor is _____

- A) 45° B) 90° C) 30° D) 60°

39. _____ is most commonly used input signal in control systems.

- A) Accelerating function B) Ramp function C) Step function D) All of the above

40. In a regenerative cycle, the feed water is heated by:

- A) exhaust gas B) heaters C) draining steam D) All of the above

41. The critical clearing time of a fault in power system is related to-

- A) reactive power limit B) short circuit limit
C) steady state stability limit D) transient stability limit

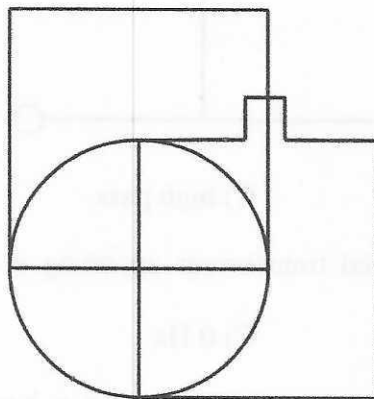
42. The domain of power system where directional overcurrent relay is indispensable are:

- A) in case of parallel feeder protection B) in case of ring main feeder protection
C) both (A) & (B) D) none of these

43. The load power factor of transformer with negative voltage regulation is:

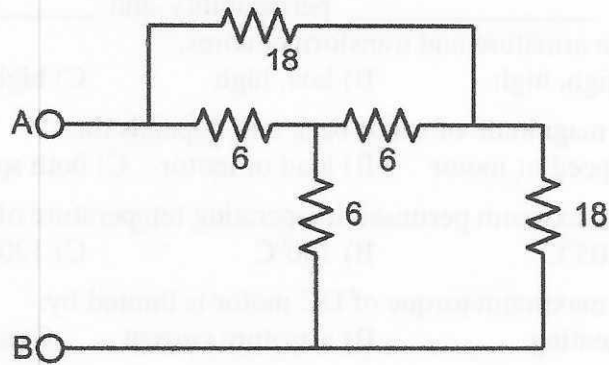
- A) zero B) unity C) lagging D) leading

44. The _____ permeability and _____ hysteresis loss are required to make armature and transformer cores.
 A) high, high B) low, high C) high, low D) low, low
45. The magnitude of stator back emf depends on:
 A) speed of motor B) load of motor C) both speed and rotor flux D) rotor excitation
46. The maximum permissible operating temperature of class E insulating material is:
 A) 105°C B) 180°C C) 130°C D) 120°C
47. The maximum torque of DC motor is limited by:
 A) heating B) armature current C) speed D) commutation
48. Unidirectional torque is produced in DC motor with the help of:
 A) brushes B) commutator C) both (A) & (B) D) end plates
49. Internal heating of a capacitor is usually attributed to:
 A) electron movement B) leakage resistance C) dielectric charge D) plate vibrations
50. Two ideal voltage source of unequal output voltage cannot be placed in:
 A) series B) parallel C) both (A) & (B) D) none of these
51. A voltage source $V_s = 200 \cos \omega t$ has an impedance across it. The reactive power is 200 VARs and power factor is 0.866. The power (P_{av}) drawn from source is:
 A) 430 W B) 400 W C) 344 W D) 288 W
52. A planar graph has four nodes and five branches. The number of meshes in dual graph is:
 A) 5 B) 4 C) 3 D) 2
53. A parallel RLC circuit has $W_0 = 10^8$ and $Q = 20$. Given $C = 20 \text{ pF}$, the value of R is:
 A) $\frac{1}{2} \times 10^4$ B) 10^4 C) 2×10^4 D) 25
54. The maximum power from source having internal resistance R_i is delivered to a resistive load R_L if:
 A) $R_i = R_L$ B) $R_i > R_L$ C) $R_i < R_L$ D) $R_i = R_L^2$
55. A function $f(x)$ is linear if:
 A) $f(x_1 + x_2) = f(x_1) + f(x_2)$ B) $f(kx) = kf(x)$
 C) both (A) & (B) D) none of these
56. If a capacitor is charged by a square wave current source, the voltage across capacitor is:
 A) square wave B) triangular wave C) step function D) zero
57. The number of branches and nodes in graph are:

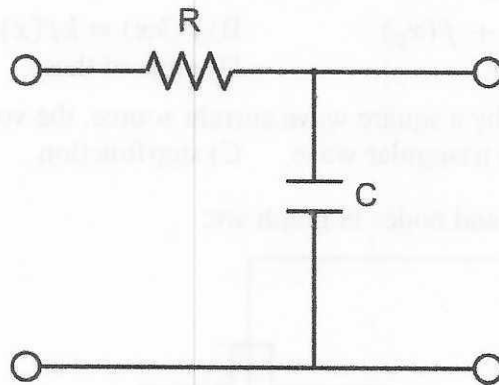


- A) 5, 10 B) 10, 5 C) 10, 10 D) 6, 10

58. The resistance R_{AB} in circuit is:

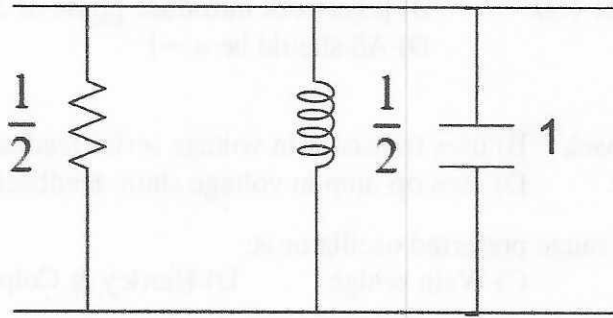


- A) 12Ω B) 10.8Ω C) 6.75Ω D) 9Ω
59. A loudspeaker transformer has 20:1 turns ratio. The speaker impedance is 12Ω . The primary impedance of transformer is:
 A) 4800Ω B) 0.03Ω C) 240Ω D) 0.004Ω
60. The Laplace transform of $1 - e^{-10t}$ is:
 A) $\frac{10}{s(s+10)}$ B) $\frac{1}{s(s+10)}$ C) $\frac{1}{10s(s+10)}$ D) $\frac{s}{10(s+10)}$
61. The frequency multiplication by a resistor is achieved if it's a:
 A) carbon B) wire wound C) diode D) nichrome
62. The graph of a network has six branches with three tree branches. The minimum number of equations required for the solution of the network is :
 A) 4 B) 2 C) 1 D) 3
63. The condition $AD - BC = 1$ for a two-port network implies that network is a
 A) reciprocal network B) lumped element network
 C) loseless network D) unilateral element network
64. Which type of filter circuit is shown in the following figure:



- A) low pass B) band pass C) high pass D) band reject
65. When we walk past a pole mounted transformer operating at 50 Hz, we hear a hum. The frequency of hum is:
 A) 50 Hz B) 100 Hz C) 0 Hz D) 25 Hz
66. The unique feature of ABCD parameters as compared to z, y, h parameters is:
 A) none B) short circuit fluctuations
 C) open circuit fluctuations D) reverse transverse function

67. For the circuit shown below, ω_0 and α are given by:



- A) $\sqrt{2}$ and 2 B) 1 and 2 C) 1 and 1 D) $\sqrt{2}$ and 1

68. Among the common active filters, which filter give rise to ripples:

- A) Butterworth B) Bessel C) 1.06 Chebyshev D) 0.767 Chebyshev

69. Does the following polynomial satisfy the Hurwitz property?

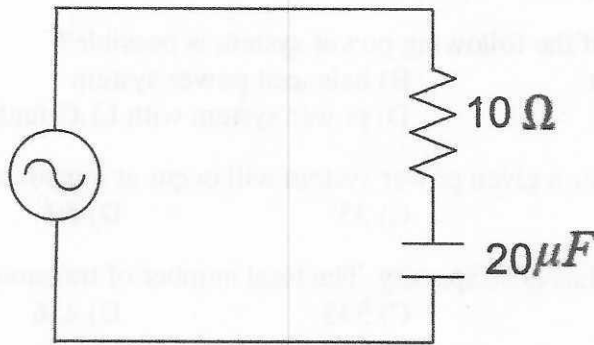
$$2s^6 + s^5 + 13s^4 + 6s^3 + 56s^2 + 25s + 25$$

- A) yes B) no C) satisfied Routh D) satisfy Nyquist

70. For an ideal voltage controlled voltage source, the value of R_i and R_o tend to

- A) 0, 0 B) 0, ∞ C) ∞ , 0 D) ∞ , ∞

71. The applied voltage for a given RC network if current $i(t) = 10 \cos(500t)$ A is:



- A) $144.4 \cos(5000t - 45^\circ)$ B) $141.4 \cos(5000t - 45^\circ)$
 C) $141.4 \cos(500t - 45^\circ)$ D) $144.4 \cos(500t - 45^\circ)$

72. The graph of network has six branches with three tree branches. The minimum number of equations required for solution of network is:

- A) 3 B) 2 C) 9 D) 6

73. The current and voltage of ideal transformer does not depend on:

- A) load B) frequency C) both (A) & (B) D) none

74. The ratio between capacitor voltage at resonance to supply voltage is called;

- A) resonant frequency B) quality factor C) power frequency D) none of the above

75. A capacitor behaves to DC as:

- A) short circuit B) open circuit C) it behaves to AC D) none of the above

76. In a pure resistive circuit:

- A) current lags voltage by 90° B) current leads voltage by 90°
 C) current can lead/lag voltage by 90° D) current is in phase with voltage

77. The input of AC circuit having power factor of 0.8 lagging is 40 KVA. The power drawn by circuit is:

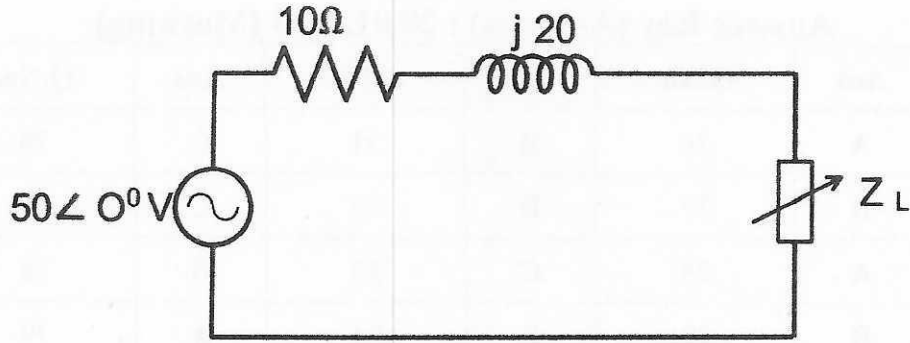
- A) 12 KW B) 22 KW C) 32 KW D) 64 KW

78. Barkhausen criteria gives:

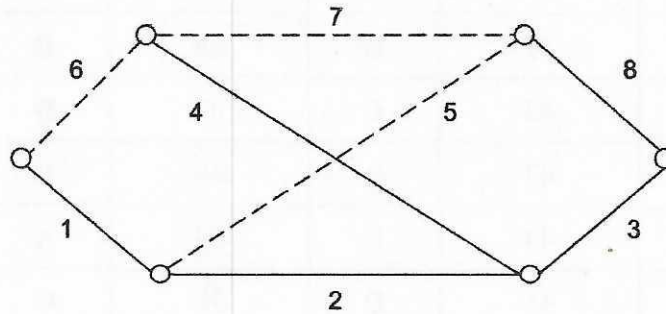
- A) condition for stability B) maximum gain for no oscillation
 C) phase shift required for oscillation D) maximum feedback for stable amplifier

79. In a RC phase shift oscillator:
 A) β network introduce phase change of 180° B) β network introduce phase of 360°
 C) Gain is positive D) $A\beta$ should be = -1
80. Phase shift oscillator:
 A) uses op-amp in voltage series feedback B) uses transistor in voltage series feedback
 C) uses FET in voltage shunt feedback D) uses op-amp in voltage shunt feedback
81. For a wide range of oscillator in audio range preferred oscillator is:
 A) Hartley B) Phase shift C) Wein bridge D) Hartley & Colpitts
82. In regard to various types of oscillators:
 A) LC are more stable than crystal
 B) Crystal has highest Q factor
 C) Phase shift have widest range of frequencies
 D) Wein bridge used with single frequency oscillation.
83. In regard to Wein bridge oscillator:
 A) bridge is unbalanced so that amplifier of oscillator can be stabilised.
 B) at frequency of oscillator bridge is exactly balanced.
 C) in bridge arms containing only resistance, one of resistance is temperature sensitive to stabilize amplitude of oscillation.
 D) at frequency of oscillation, gain is exactly 3.
84. Single line diagram of which of the following power system is possible?
 A) power system with LG fault B) balanced power system
 C) power system with LL fault D) power system with LLG fault
85. Zero or maximum regulation for a given power system will occur at impedance angle of:
 A) 45° B) 60° C) 35° D) 50°
86. A 50 bus power system Y bus has 80% sparsity. The total number of transmission lines will be:
 A) 225 B) 563 C) 345 D) 456
87. A 3 - \emptyset transformer have line voltage ratio of 400/33000 V is connected in star-delta. The CTs on 400 V side have CT ratio of 1000/5. What must be ratio of CT on 33000 side?
 A) 7/5 B) 5/7 C) 3/5 D) 5/2
88. The neutral of 3 - \emptyset , 20 MVA, 11 KV alternator is earthed through a resistance of 5 Ω . The relay is set to operate when there is an out of balance current of 1.5 A. The CTs have ratio of 100/5. What percentage of windings is protected against earth faults?
 A) 76.4 B) 77.8 C) 73 D) none of above
89. Find operating voltage of transmission line if it consist of 9 discs of suspension insulator in each string.
 A) 11 KV B) 33 KV C) 66 KV D) 132 KV
90. The range of armature slot pitch in armature slot design?
 A) 20 - 30 mm B) 25 - 35 mm C) 30 - 35 mm D) > 35 mm
91. A delta connection contains three equal impedances of 60 Ω . The impedance of equivalent star connection is _____
 A) 40 Ω B) 20 Ω C) 80 Ω D) 60 Ω

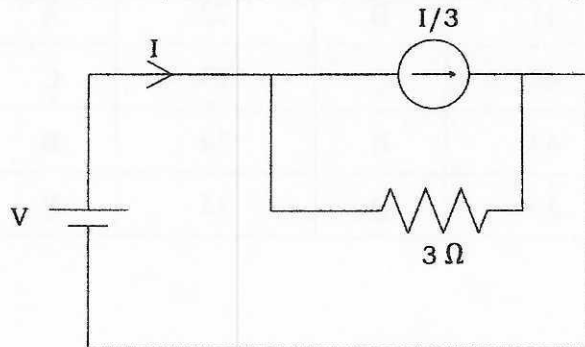
92. The maximum power delivered to load is:



- A) 62 W B) 70 W C) 62.5 W D) 100 W
93. A DC voltage V is applied at time $t = 0$ to a series RC circuit. The voltage across capacitor C at time t is $V_C(t) = ?$
 A) $V(1 - e^{-\frac{t}{RC}})$ B) $V(1 - e^{\frac{t}{RC}})$ C) $V(1 + e^{-\frac{t}{RC}})$ D) $V(1 + e^{\frac{t}{RC}})$
94. The exhaust for a MHD generator is at a temperature of:
 A) 1800°C B) 3900°C C) 100°C D) 2200°C
95. The seeding material in a MHD generator is:
 A) Calcium B) Potassium C) Magnesium D) None of these
96. The input to a MHD duct is the:
 A) fuel B) air C) biogas D) acceraled gas
97. The characteristics of short circuit-current (I_{SC}) and field current (I_f) is:
 A) non-linear B) linear C) no relation exists D) none of these
98. Speed control of induction motors is done by:
 A) controlling slip B) controlling synchronous speed
 C) both (A) & (B) D) none of these
99. In the graph and tree shown below, the fundamental cut set for branch 2 is:



- A) 2, 6, 5 B) 2, 6, 7, 8 C) 2, 1, 3, 4, 5 D) 2, 3, 4
100. In the circuit shown below, the effective resistance faced by voltage source is:



- A) $2\ \Omega$ B) $3\ \Omega$ C) $1\ \Omega$ D) $2.5\ \Omega$

Chandigarh Housing Board
Post: SDE Electrical
Answer Key (A-Series) : 29.01.2023 (Morning)

Q.No.	Ans	Q.No.	Ans	Q.No.	Ans	Q.No.	Ans
1	A	26	B	51	C	76	D
2	D	27	D	52	C	77	C
3	A	28	C	53	B	78	C
4	B	29	B	54	A	79	A
5	C	30	C	55	C	80	A
6	D	31	A	56	B	81	C
7	B	32	C	57	B	82	B
8	B	33	A	58	D	83	C
9	D	34	B	59	A	84	B
10	A	35	B	60	A	85	A
11	A	36	A	61	C	86	A
12	C	37	C	62	D	87	A
13	C	38	B	63	A	88	A
14	A	39	C	64	A	89	D
15	D	40	C	65	B	90	B
16	D	41	D	66	D	91	B
17	C	42	C	67	D	92	C
18	B	43	D	68	D	93	A
19	C	44	C	69	A	94	D
20	A	45	D	70	C	95	B
21	A	46	D	71	B	96	D
22	B	47	D	72	A	97	B
23	D	48	C	73	C	98	C
24	C	49	B	74	B	99	A
25	A	50	B	75	B	100	A