



Common to EEE, ECE, Mechanical, Mechatronics and CSE

SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamilnadu

Academic Year: 2021-22 (EVEN)

SET-B

Test: CLAT-1

Date: 21/04/2022

Course Code & Title: 18EES101J – Basic Electrical and Electronics Engineering

Duration: 50 Mins

Year & Sem: I & II

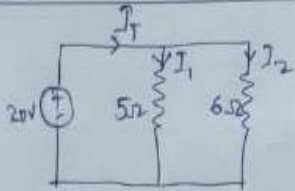
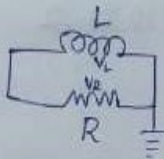
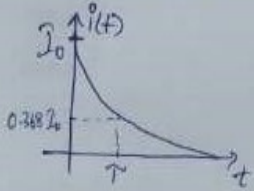
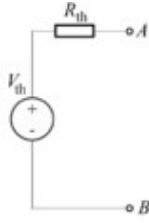
Max. Marks: 25

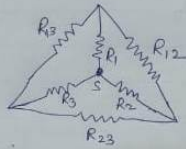
Course Articulation Matrix:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	H	M	L	L	M	-	M	M	M	M	-	M	-	-	-
CO2	H	M	L	L	M	-	M	M	M	M	-	M	-	-	-
CO3	H	-	L	L	M	-	M	M	M	M	-	M	-	-	-
CO4	H	-	L	M	M	-	M	M	M	M	-	M	-	-	-
CO5	H	M	M	M	M	-	M	M	M	M	-	M	-	-	-
CO6	-	-	L	2	M	-	M	M	M	M	-	M	-	-	-

Part - A
(3 x 4 Marks = 12 Marks)

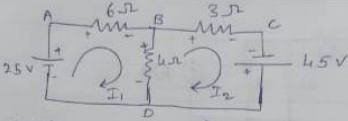
Q. No	Answer all the questions	Marks	BL	CO	PO	PI Code
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1	<p>① (a)</p>  $R_{eq} = \frac{(5 \times 6)}{5+6} = \frac{30}{11} \Omega$ $I_T = \frac{V}{R_{eq}} = 11 A \quad [2 \text{ Marks}]$ $I_1 = \frac{(I_T)(R_2)}{R_1 + R_2} = 6 A$ $I_2 = \frac{(I_T)(R_1)}{R_1 + R_2} = 5 A$ <p>(b)</p>  $i(t) = I_0 e^{-Rt/L} \quad [1 \text{ Mark}]$  <p>[1 Mark]</p>	4		1	
2	<p>For any linear electrical network containing only voltage sources, current sources and resistances can be replaced at terminals A-B by an equivalent combination of a voltage source V_{th} in a series connection with a resistance R_{th}. – 1 mark</p> <p>The equivalent voltage V_{th} is the voltage obtained at terminals A-B of the network with terminals A-B open circuited. – 1 mark</p> <p>The equivalent resistance R_{th} is the resistance that the circuit between terminals A and B would have if all ideal voltage sources in the circuit were replaced by a short circuit and all ideal current sources were replaced by an open circuit – 1 mark</p>  <p style="text-align: right;">- 1 mark</p>	4		1	

3	<p>3.</p>  $R_{12} = \frac{R_1 R_2 + R_2 R_3 + R_3 R_1}{R_3} = 6.2 \Omega$ $R_{23} = \frac{R_1 R_2 + R_2 R_3 + R_3 R_1}{R_1} = 15.5 \Omega \quad [4 \text{ marks}]$ $R_{31} = \frac{R_1 R_2 + R_2 R_3 + R_3 R_1}{R_2} = 10.33 \Omega$	4		1		
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1Mark for circuit and each value 1 Mark each

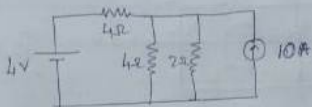
Part – B
(1 x 13 Marks = 13 Marks)

4(a)	<p>4a.</p>  <p>Consider mesh 1 [loop ABDA]</p> $6I_1 + 4(I_1 - I_2) - 25 = 0$ $10I_1 - 4I_2 = 25 \quad (1) \quad [2 \text{ marks}]$ <p>Consider mesh 2 [loop BCDB]</p> $3I_2 - 45 + 4(I_2 - I_1) = 0$ $-4I_1 + 7I_2 = 45 \quad (2) \quad [2 \text{ Marks}]$ <p>Solving equations (1) & (2)</p> $I_1 = 6.97 \text{ A}, I_2 = 10.185 \text{ A} \quad [3 \text{ Marks}]$ <p>Hence,</p> <p>Current in 6Ω, $I_{6\Omega} = I_1 = 6.97 \text{ A}$</p> <p>Current in 3Ω, $I_{3\Omega} = I_2 = 10.185 \text{ A}$</p> <p>Current in 4Ω, $I_{4\Omega} = (I_1 - I_2) = -3.61 \text{ A}$ (or 3.61 from D to B) } [3 marks]</p> <p>power dissipated through 4Ω resistor is</p> $P_{4\Omega} = (I_{4\Omega}^2)R = 52.128 \text{ W} \quad [1 \text{ Mark}]$	13		1		
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(or)

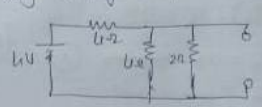
4(b)

(b)



(1 Mark)

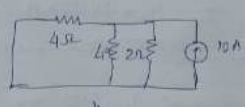
using voltage source



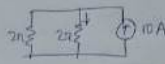
$R_{eq} = 4 + 4 \parallel 2$
 $= 5.33 \Omega$
 $I = \frac{V}{R_{eq}} = \frac{4}{5.33} = 0.75 A$
 $I_{2\Omega} = \frac{(I)(2)}{4+2} = 0.5 A \quad \text{--- (1)}$

(6 Marks)

using current source



(5 marks)



$I_{2\Omega} = \frac{10}{2} = 5 A \quad \text{--- (2)}$

using superposition theorem $I_{total} = I_1 + I_2 = 5.5 A$ (1 Mark)

13

1

Question Paper Setter

Approved by Audit Professor/
Course Coordinator