

Common to EEE, ECE, Mechanical, Mechatronics and CSE

SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamilnadu

Academic Year: 2021-22 (EVEN)

SET-C
Test: CLAT-1
Date: 21/04/2022
Course Code & Title: 18EES101J – Basic Electrical and Electronics Engineering

Duration: 50 Mins

Year & Sem: I & II

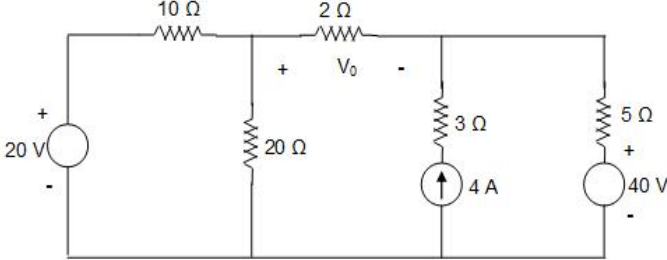
Max. Marks: 25

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
1	Ohm's law states that the current through a conductor is proportional to the voltage across the conductor. Limitations: Ohm's law is not applicable for unilateral electrical elements like diodes and transistors as they allow the current to flow through in one direction only. For non-linear electrical elements with parameters like capacitance, resistance, etc the voltage and current won't be constant with respect to time making it difficult to use Ohm's law.	4	1	1	1	1.2.1
2	$4\ \Omega \parallel 6\ \Omega = \frac{24}{10} = 2.4\ \Omega$ $2.4\ \Omega \parallel 3\ \Omega = \frac{7.2}{5.4} = 1.3333\ \Omega$ <div style="text-align: right;">1M</div> Total circuit resistance = $4 + 6 + 1.3333 = 11.3333\ \Omega$ <div style="text-align: right;">1M</div> Circuit current = $12/11.3333 = 1.0588\ \text{A}$ <div style="text-align: right;">1M</div> Terminal voltage across the battery = $12 - (6 \times 1.0588) = 5.6472\ \text{V}$ <div style="text-align: right;">1M</div>	4	2	1	1,2	1.3.1

3	<p>Star</p> <p>Line current $I_L = I_{ph} = 30 \text{ A}$ 1M</p> <p>Line voltage $E_L = \sqrt{3} E_{ph} = 6600 \text{ V}$ 1M</p> <p>Total kVA $= \sqrt{3} E_L I_L$</p> <p>$= \sqrt{3} \times 6600 \times 30 \times 10^{-3}$ 2M</p> <p>$= 342.95$</p>	4	1	1	1	1.4.1
<p align="center">Part – B (1 x 13 Marks = 13 Marks)</p>						
4(a)	<p>Three loops equations are:</p> <p>$6 (I_1 - I_3) + 4 (I_1 - I_2) - 25 = 0$</p> <p>$4 (I_2 - I_1) + 3 (I_2 - I_3) - 45 = 0$</p> <p>$5 I_3 + 3 (I_3 - I_2) + 6 (I_3 - I_1) = 0$</p> <p>On solving</p> <p>$\Delta = 270; \Delta_1 = 5555; \Delta_2 = 6530; \Delta_3 = 3780$ 3M</p> <p>$I_1 = 20.57\text{A}; I_2 = 24.18\text{A}; I_3 = 14\text{A}$ 7M</p> <p>3M</p>	13	2	1	1,2	1.4.1
(or)						
4(b)	 <p>Step-1: 20V is kept in active other two sources are disabled $V_1 = 1.9512\text{V}$ 4M</p> <p>Step-2: 4A is kept in active other two sources are disabled $V_2 = -2.9268\text{V}$ 4M</p> <p>Step-3: 40V is kept in active other two sources are disabled $V_3 = -5.8537\text{V}$ 4M</p> <p>$V = V_1 + V_2 + V_3$ $= -6.8293\text{V}$ 1M</p>	13	2	1	1,2	1.4.1