IARE

INSTITUTE OF AERONAUTICAL ENGINEERING

(An Autonomous Institute affiliated to JNTUH, Hyderabad)
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LABORATORY WORK SHEET

Name of the Student: MADKI SAI CHARAN

Class: CSM-'c' Semester: I ST

Roll Number									
2	3	9	5	1	A	6	6	F	2

Course Code: AEE D03 Course Name: Electrical and Electronics Engineering Laboratory.

Name of the Course Faculty: M.S. M. VARALAKSHMI. Faculty ID: IARE 11072

Exercise Number: 02 Week Number: 02 Date: 3 November 2023

DAY TO DAY EVALUATION:

Marks	Aim / Preparation	Algorithm / Procedure / Performance in the Lab	Source Code / Calculations and Graphs	Program Execution / Results and Error Analysis	Viva - Voce	Total
Max. Marks	4	4	4	4	4	20
Obtained	4	4	4	4	4	20

Signature of Faculty

START WRITING FROM HERE: MESH ANALYSIS

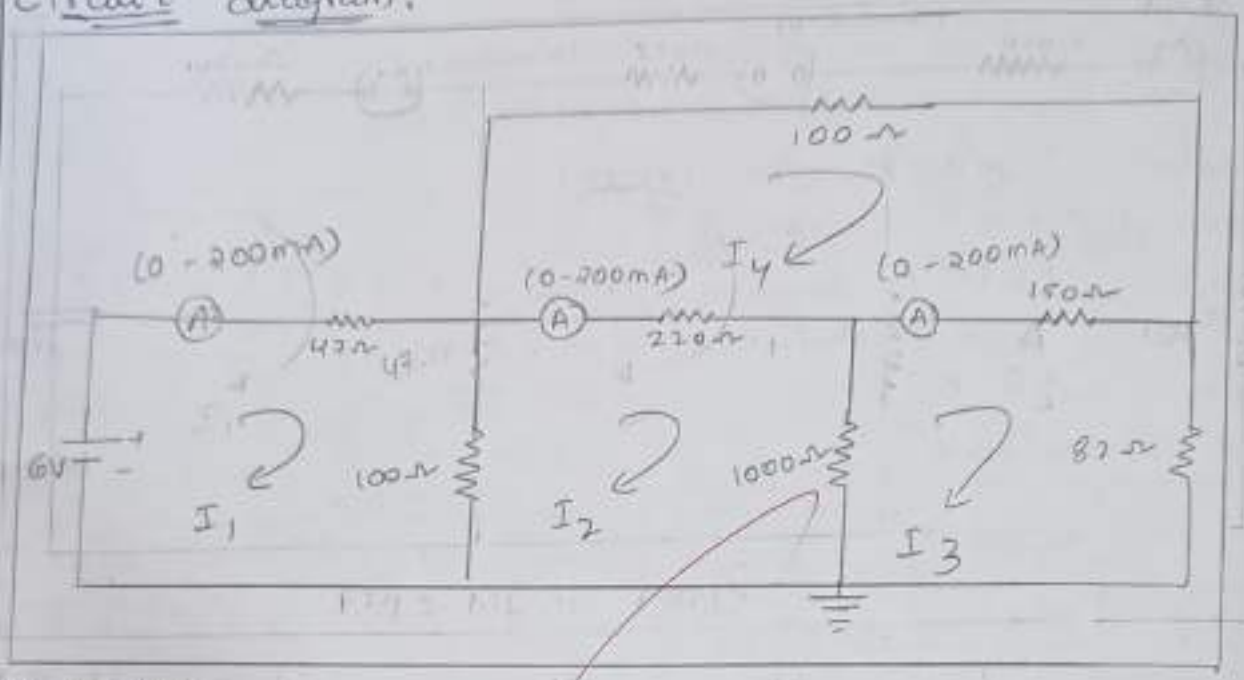
Aim : To study of mesh analysis is the objective of this exercise, specifically its usage in multi-source DC circuits. It's applications finding Circuit currents and voltages will be investigated.

Apparatus:

S.NO	EQUIPMENT	RANGE	TYPE	QUANTITY
01.	Resistors	(0-100Ω)	-	03.
02.	Ammeter	(0-200mA)	Digital	03.
03.	R.P.S	(0-30V)	Digital	01.
04.	Bread Board	-	-	01.
05.	Connecting wires	-	-	As required.

ROLL NUMBER : 23951A66F2

Circuit diagram:



Procedure:

① Connect the circuit diagram as shown in figure.

② Switch ON the supply to RPS

③ Apply the voltage.

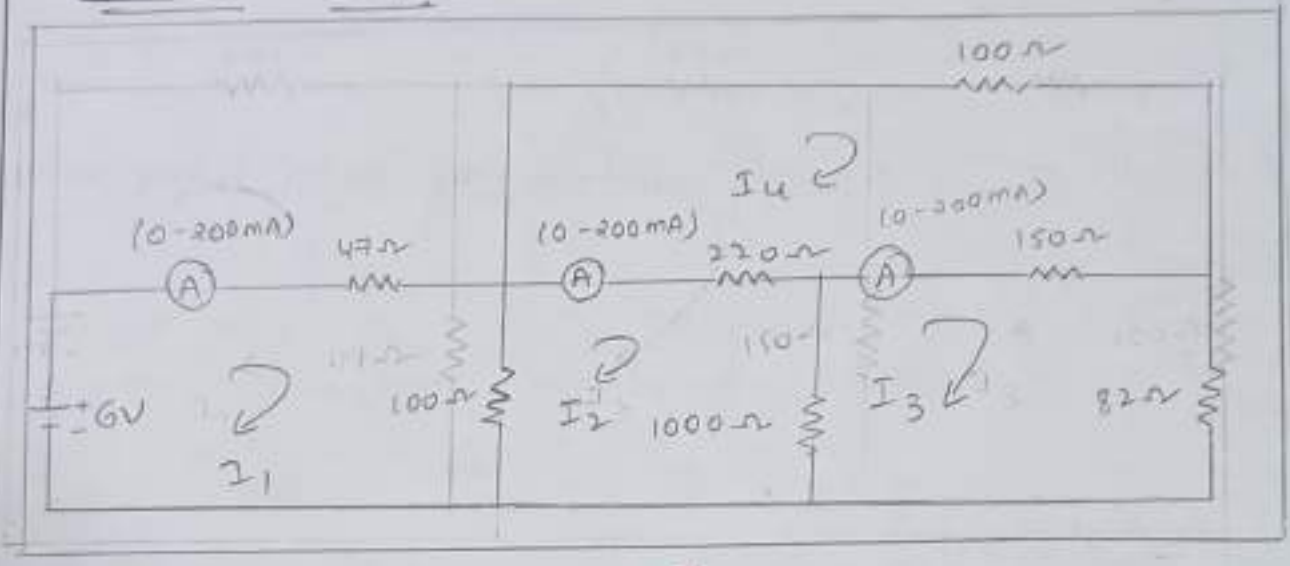
④ Gradually increase the supply voltage in steps.

⑤ Connect Ammeter in the loop and find the currents I_1, I_2.

⑥ Verify with theoretical result obtained with practical result.

ROLL NUMBER: 23951A6672

Theoritical Diagram:



Theoritical Calculations:

Apply KVL in Mesh-I

$6 - 47I_1 - 100(I_1 - I_2) = 0$

$147I_1 - 100I_2 = 6$ — (1)

Apply KVL in Mesh-II

$-220(I_2 - I_4) - 1000(I_2 - I_3) - 100(I_2 - I_1) = 0$

$100I_1 - 1320I_2 + 1000I_3 + 220I_4 = 0$ — (2)

Apply KVL in Mesh-III

$-82I_3 - 1000(I_3 - I_2) - 150(I_3 - I_4) = 0$

$1000I_2 - 1232I_3 + 150I_4 = 0$ — (3)

Apply KVL in Mesh-IV

$-100I_4 - 150(I_4 - I_3) - 220(I_4 - I_2) = 0$

$220I_2 + 150I_3 - 470I_4 = 0$ — (4)

Solving (1), (2), (3) and (4) equations, we get;

$I_1 = 0.03864\ A = 38.64\ mA$

$I_2 = 0.00203\ A = 2\ mA$

$I_3 = 0.0017\ A = 1.7\ mA$

$I_4 = 0.3629\ A = 362.9\ mA$

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Observations :-

Applied voltage 'V' (volts)	Loop current (I_1)		loop current (I_2)		loop current (I_3)	
	Theoritical	practical	Theoritical	practical	Theoritical	practical
6 V	38.64 mA	56.7mA	2 mA	5.5mA	1.7 mA	3.4mA

Precautions :-

1. Check for proper connections before switching ON the supply.
2. Make sure of proper colour coding of resistors.
3. The terminal of the resistance should be properly connected.

Result : $\sum V_k = 0$.

Mesh analysis is verified both theoritically and practically.