IARE
INSTITUTE OF
AERONAUTICAL ENGINEERING
(An Autonomous Institute affiliated to JNTUH, Hyderabad)
Dundigal, Hyderabad - 500 043

LABORATORY WORK SHEET

Name of the Student : Abdul Basith Khan

Class (CSM-A) 1st Year Semester 1st

Roll Number									
2	3	9	5	1	A	6	6	0	1

Course Code : AEE001 Course Name : EEE Laboratory

Name of the Course Faculty Dr. L. Rajashekhar Goud Faculty ID : IARE11067

Exercise Number : 04 Week Number : 04 Date :

DAY TO DAY EVALUATION:

Marks	Aim / Preparation	Algorithm / Procedure	Source Code	Program Execution	Viva-Voce	Total
		Performance in the Lab	Calculations and Graphs	Results and Error Analysis		
Max. Marks	4	4	4	4	4	20
Obtained	4	4	4	04	4	19

Signature of Faculty

START WRITING FROM HERE : Nodal Analysis :-

Aim :-

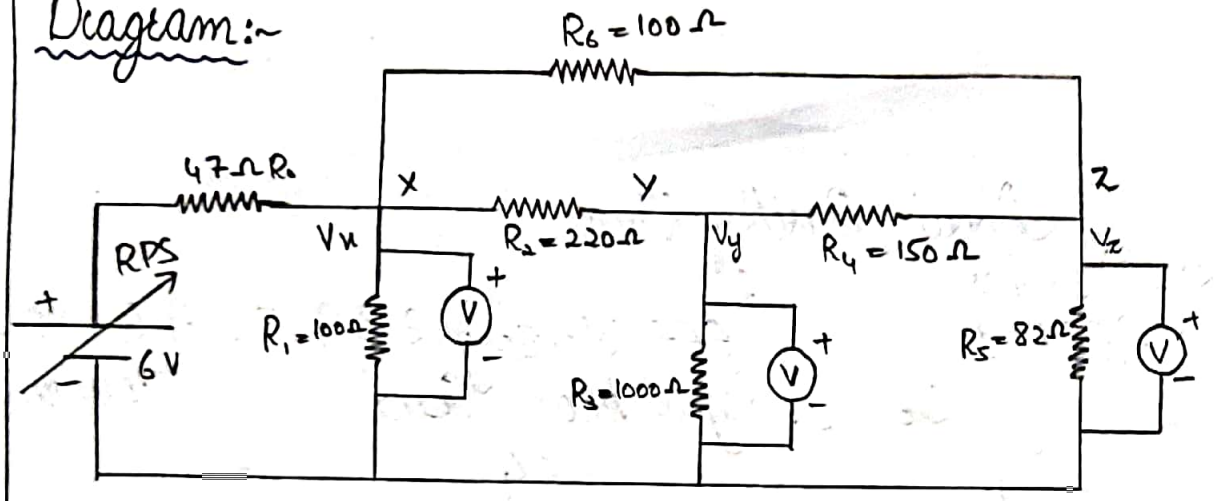
The study of nodal analysis is the objectives of this exercise specifically its usage in multi-source DC circuits. Its application in finding circuit node voltage will be investigate

Apparatus :-

S. No.	Equipment	Range	Type	Quantity
1.	Resistor	1kΩ, 470Ω, 220Ω, 150Ω, 100Ω	Carbon	6
2.	Voltmeter	0-20 V	Digital	01
3.	RPS	0-30 V	Digital	01
4.	Breadboard	-	-	01
5.	Connecting wires	-	-	As required

ROLL NUMBER :

Diagram:-



Observation:-

Applied Voltage V (volts)	Node Voltage V_1 (Volts)		Node Voltage (V_2) (volts)		Node Voltage (V_3) (Volts)	
	Theoritical	Practical	Theoritical	Practical	Theoritical	Practical
6 V	3.7	3.6	2.5	2.4	1.7	1.5

Procedure:-

1. Connect the circuit diagram as shown in figure.
2. Switch on the supply to RPS.
3. Apply the voltage (say 15 V) and note the volt meter readings.
4. Gradually increases the supply voltage in steps.
5. Note the readings of volt meter.
6. Verify the practical results obtained with theoritical results.

Precautions:-

ROLL NUMBER :

→ To check for proper connections before switching on the power supply.
→ Make sure of proper colour coding of resistors.
→ The terminal of the resistance should be properly connected.

Calculations:-

Apply KCL at node 'x'.

$$I_1 + I_2 + I_3 + I_4 = 0$$

$$\frac{V_x - 6}{47} + \frac{V_x - 0}{100} + \frac{V_x - V_y}{220} + \frac{V_x - V_z}{100} = 0$$

$$V_x \left[\frac{1}{47} + \frac{1}{100} + \frac{1}{220} + \frac{1}{100}\right] - \frac{6}{47} - \frac{V_y}{220} - \frac{V_z}{100} = 0$$

$$V_x (0.04) - 0.12 - 0.004 V_y - 0.01 V_z = 0$$

$$0.04 V_x - 0.004 V_y - 0.01 V_z = 0.12 \quad \text{—— (1)}$$

Apply KCL at mode 'y':-

$$I_3 + I_5 + I_6 = 0$$

$$\frac{V_y - V_x}{220} + \frac{V_y - V_z}{150} + \frac{V_y - 0}{1000} = 0.$$

$$V_y \left[\frac{1}{220} + \frac{1}{150} + \frac{1}{1000}\right] - \frac{V_x}{220} - \frac{V_z}{150} = 0$$

$$0.01 V_y - 0.004 V_x - 0.006 V_z = 0$$

$$-0.004 V_x + 0.01 V_y - 0.06 V_z = 0 \quad \text{—— (2)}$$

Apply KCL at mode 'z':-

$$I_5 + I_4 + I_7 = 0$$

$$\frac{V_z - V_y}{150} + \frac{V_z - V_x}{100} + \frac{V_z - 0}{82} = 0$$

$$V_z \left[\frac{1}{150} + \frac{1}{100} + \frac{1}{82}\right] - \frac{V_y}{150} - \frac{V_x}{100} = 0$$

$$0.03 V_z - 0.06 V_y - 0.01 V_x = 0$$

$$-0.01 V_x - 0.006 V_y + 0.03 V_z = 0 \quad \text{— (3)}$$

By solving equations (1), (2) & (3)

$V_x = 3.7V$

$V_y = 2.5V$

$V_z = 1.7V$

Result :-

Hence nodal analysis is verified both theoritically and practically