IARE

INSTITUTE OF AERONAUTICAL ENGINEERING

(An Autonomous Institute affiliated to JNTUH, Hyderabad)

Dundigal, Hyderabad - 500 043

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: AEE003 Course Name: Electrical and Electronics Engineering Laboratory

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

Exercise Number: 03 Week Number: 03 Date: 17 November 20

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 :

NODAL ANALYSIS

Aim : The study of nodal analysis is the objective of this exercise specifically its usage in multi source DC - circuits. Its application in finding circuit node voltages will be investigated.

Apparatus :

① Resistors (1000Ω, 100Ω, 47Ω, 10Ω, 220Ω, 150Ω, 82Ω).

② Voltmeter (6V)

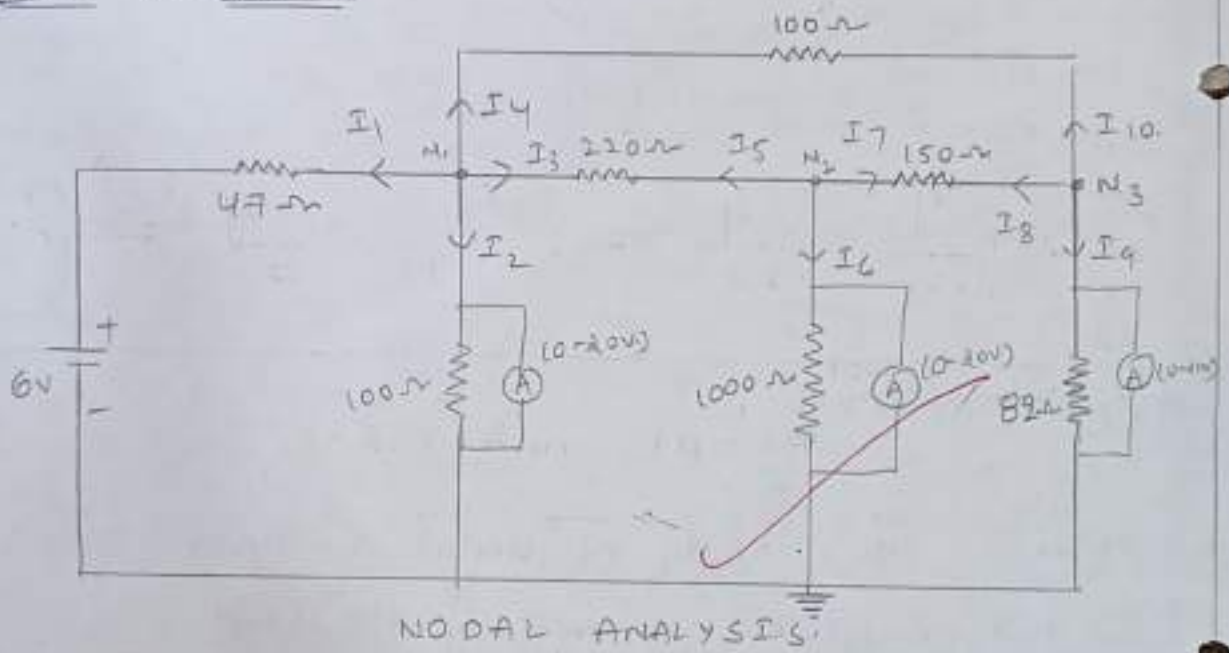
③ Regulated Power Supply units

④ Bread Board ⑤ Connecting wires

ROLL NUMBER: 2395A66F2

Theory : In electric circuit analysis, Nodal analysis, node - voltage analysis (or) the branch current method is a method of determining the voltage (potential difference) between "nodes" (points where the elements or branches connect) in an electrical circuit in terms of the branch currents.

Circuit diagram:



NODAL ANALYSIS

Procedure : ① Connect the circuit diagram as shown in figure.

② Switch ON the supply to RPS.

③ Apply the voltage and note the voltmeter readings.

④ Gradually increase the supply voltage in steps.

⑤ Note the readings of voltmeter.

⑥ Verify with the theoritical results obtained with practice results.

ROLL NUMBER : 2395/A66F2

Theoritical Calculations:

At node - ① Apply KCL

$$\Rightarrow \frac{V_1 - 6}{47} + \frac{V_1 - V_0}{100} + \frac{V_1 - V_2}{220} + \frac{V_1 - V_3}{150} = 0$$

$$\Rightarrow V_1\left(\frac{1}{47} + \frac{1}{100} + \frac{1}{220} + \frac{1}{100}\right) - \frac{6}{47} - \frac{V_2}{220} - \frac{V_3}{100} = 0 \quad - (1)$$

At node - ② Apply KCL

$$\Rightarrow \frac{V_2 - V_1}{220} + \frac{V_2 - V_0}{1000} + \frac{V_2 - V_3}{150} = 0$$

$$\Rightarrow V_2\left(\frac{1}{220} + \frac{1}{1000} + \frac{1}{150}\right) - \frac{V_1}{220} - \frac{V_0}{1000} - \frac{V_3}{150} = 0 \quad - (2)$$

At node - ③ Apply KCL

$$\Rightarrow \frac{V_3 - V_2}{150} + \frac{V_3 - V_1}{100} + \frac{V_3 - V_0}{82} = 0$$

$$\Rightarrow V_3\left(\frac{1}{150} + \frac{1}{100} + \frac{1}{82}\right) - \frac{V_2}{150} - \frac{V_1}{100} - \frac{V_0}{82} = 0 \quad - (3)$$

Solving ①, ② and ③, we get

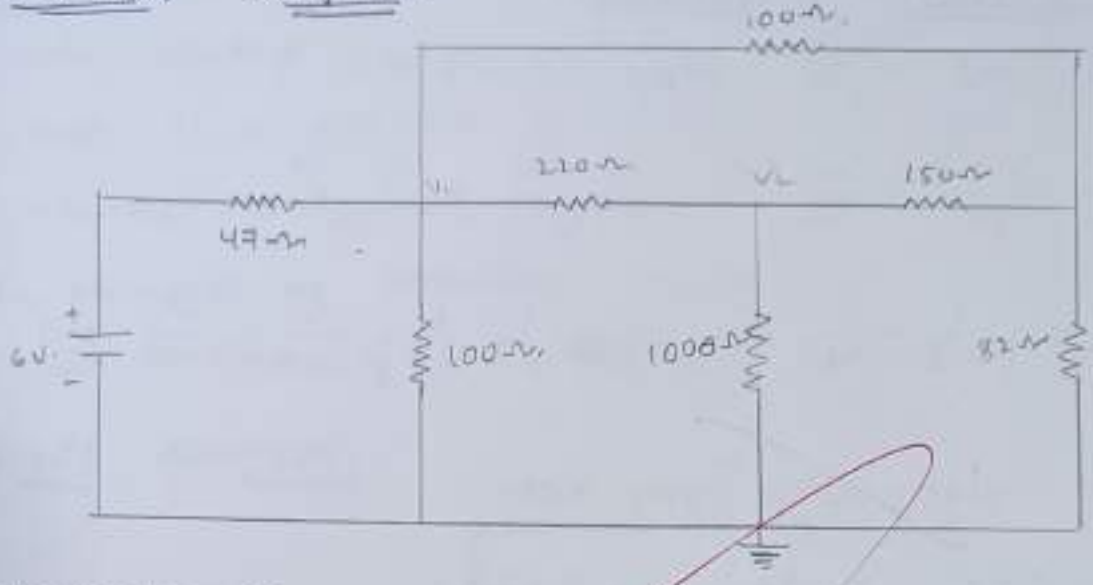
$V_1 = 3.428\ V$

$V_2 = 2.24\ V$

$V_3 = 1.17\ V$

ROLL NUMBER : 2395 1A66F2

Theoritical Diagram :



Observations :

Applied voltage V (volts)	Node Analysis voltage (V_1)		Node Analysis voltage (V_2)		Node voltage (V_3)	
	Theoritical	Practical	Theoritical	practical	Theoritical	practical
6V	3.42	3.43	2.24	2.21	1.17	1.70

Precautions :

① Check for proper connection before switching ON the supply.

② Make sure of proper color coding of resistors.

③ The terminal of the resistance should be properly connect.

Result : Nodal analysis is verified.