

EXP NO: 02

DATE: 11/9/25

## DETERMINATION OF CURRENT IN CIRCUIT USING MESH ANALYSIS

AIM:

To determine the current in circuit using mesh analysis both theoretically and practically for a given DC circuit.

### APPARATUS REQUIRED:-

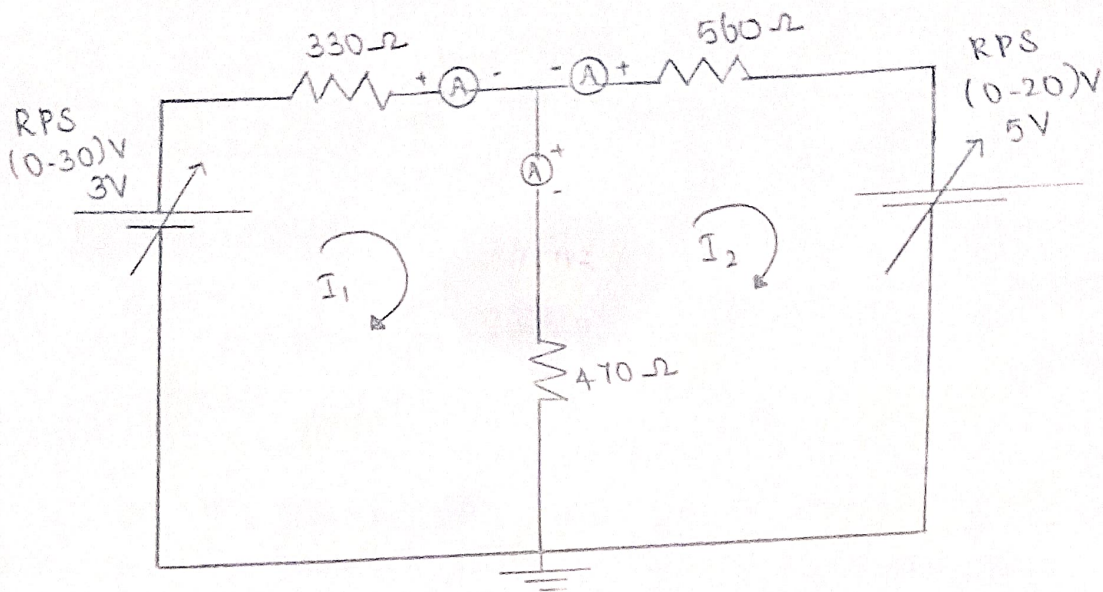
SL-NO	APPARATUS	SPECIFICATION	QUANTITY
1	Regulated Power Supply [RPS]	(0-30)V	1
2	Ammeter	(0-10 mA) MC	3
3	Resistors	330 $\Omega$ , 470 $\Omega$ , 560 $\Omega$	Each 1
4	Bread board	-	

### PROCEDURE:-

- 1) Give connections as per the circuit diagram.
- 2) Switch ON the supply, vary the RPS (Regulated Power Supply) and set a particular input voltage.
- 3) Note down the readings of ammeters and voltmeters and tabulate them.
- 4) Vary the RPS for different input voltages and note down the readings of all the meters.
- 5) Reduce the RPS to its minimum value and switch OFF the supply.
- 6) Using the tabulated value, and switch OFF the supply verify Kirchhoff's laws practically, and verify it theoretically.



### CIRCUIT DIAGRAM:-



### TABULAR COLUMN:-

Parameters	Theoretical	Practical
$I_1$	0.0090 A	0.089 A
$I_2$	0.0089 A	0.076 A
$I_1 - I_2$	0.00012 A	0.0012 A

loop 1

$$\begin{aligned} -30 + 330 I_1 + 470 (I_1 - I_2) &= 0 \\ 800 I_1 - 470 I_2 &= 30 \rightarrow (1) \end{aligned}$$

loop 2

$$\begin{aligned} -50 + 560 I_2 + 470 (I_2 - I_1) &= 0 \\ -470 I_1 + 1030 I_2 &= 50 \rightarrow (2) \end{aligned}$$

$$103 \times 1 \Rightarrow 82400 I_1 - 48410 I_2 = 309$$

$$47 \times 2 \Rightarrow -22090 I_1 + 48410 I_2 = 235$$

$$\underline{60310 I_1 = 544}$$

$$I_1 = \frac{544}{60310} = \underline{9.02 \times 10^{-3}}$$

Sub eq  $I_1$  in equation (1)

$$800[0.009] - 470 I_2 = 3$$

$$7.2 - 470 I_2 = 3$$

$$-470 I_2 = 3 - 7.2$$

$$-470 I_2 = -4.2$$

$$I_2 = \frac{4.2}{470} = 0.0089$$

$$\boxed{I_2 = 8.97 \text{ mA}}$$

$$I_1 - I_2 = 9.02 - 8.97$$

$$= \underline{0.05 \text{ mA}}$$



### RESULT :

Thus the mesh Analysis is verified practically and theoretically the resultant current for 5V 3V V supply are

- a) The current across  $330\Omega$  resistor is 0.0090 A
- b) The current across  $560\Omega$  resistor is 0.0089 A
- c) The current across  $470\Omega$  resistor is 0.0062 A