

CSE 122 Experiment 4: Verification of KCL & Current Divider Rule

North East University Bangladesh

Department of CSE

Course no: CSE 122

Experiment no: 04

Experiment Name: Verification of KCL & Current Divider Rule

CAUTIONS:

- 1. Don't switch on the supply of the circuit until you have verified the circuit carefully**
- 2. Take readings of apparatus carefully**
- 3. Take care of any bare circuit elements in energized condition**
- 4. Never try to touch bare live wires**

Objective

This experiment is intended to verify Kirchhoff's current law (KCL) & current divider rule with the help of parallel circuit and derive equivalent resistance of the circuit both experimentally and analytically.

Theory

KCL states that the sum of the currents entering any node equals the sum of the currents leaving the node.

$$\Sigma i_{entering} = \Sigma i_{leaving}$$

The current divider Rule is given by

$$I_X = \frac{R_P}{R_x} \times I_S$$

Where $X = 1, 2, \& 3$.

The equivalent (total) resistance of a parallel circuit is given by the formula

$$R_P = \frac{1}{\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}}$$

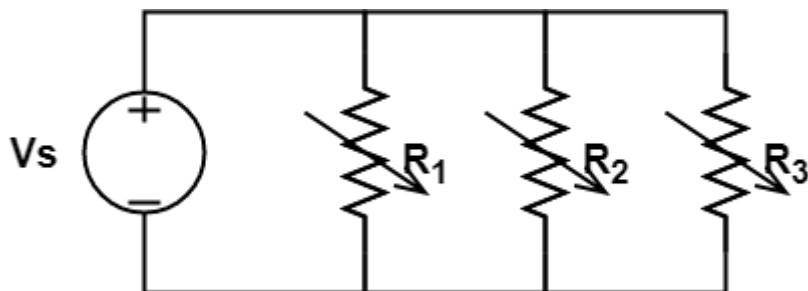
Apparatus Needed

- Trainer Board (Bread board)
- DC Power Supply
- DC Voltmeter
- DC Ammeter
- Three Variable Resistors
- Multimeter
- Connecting wires

Procedure

1. Connect three rheostats in parallel across the power supply as shown in figure.
2. Apply 30 V dc from dc power supply.
3. Set the rheostats $R_1, R_2 \& R_3$ above 20Ω and measure $V_s, I, I_1, I_2, I_3, R_1, R_2, \& R_3$.

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- Verify KCL (i.e. $I = I_1 + I_2 + I_3$) for each set of data. Find total resistance of the parallel circuit using the formula. Compare this with experimentally obtained value $R_P = V_S / I$. Verify the current divider rule for each set of data.
- Repeat steps 3 to 4 by changing R_1 , R_2 , R_3 and take five sets of readings

Table/Result

No of Obs.	V_S (Volts)	I (Amps)	I_1 (Amps)	I_2 (Amps)	I_3 (Amps)	$I_1 + I_2 + I_3$	R_P (Ohms)	$R_P = \frac{V_S}{I}$ (Ohms)

Report

- Show the results in tabular form.
- Comment on the results obtained and discrepancies (if any)

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Data Table (To be filled by students)

Date of experiment

Group No

Group Members

Reg	Name

Experiment Circuit

Table 1

No of Obs.	V_S (Volts)	I (Amps)	I_1 (Amps)	I_2 (Amps)	I_3 (Amps)	$I_1 + I_2 + I_3$	R_P Ohms	$R_P = \frac{V_S}{I}$ Ohms
1								
2								
3								
4								
5								

This page needs to be filled by each group and signed by the teacher.
Photocopy of this page must be attached with the lab report.