

Laboratory Manual

Electrical Circuit Analysis Laboratory
(100603P)

3rd Semester (EE)



Department of Electrical Engineering
Government Engineering College, Khagaria,
Raun, Alauli, Khagaria, Bihar – 848203, India
<https://www.geckhagaria.org.in/>

Experiment 1

Aim: Verification of Superposition Theorem.

Apparatus Required: Basic Network Theorems Trainer Kit with Regulated Power Supply (RPS), Connecting Wires

Theory

Superposition theorem states that in a linear bilateral network containing more than one source, the current flowing through the branch is equal to the algebraic sum of all the currents flowing through that branch when sources are considered one at a time and replacing other sources by their respective internal resistances.

Circuit Diagram

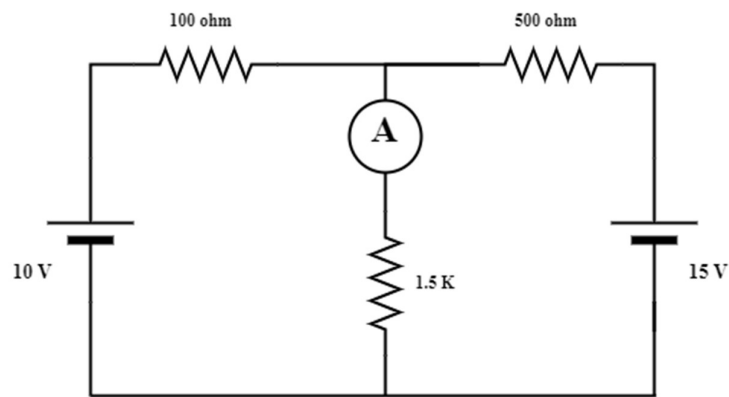


Fig. (i)

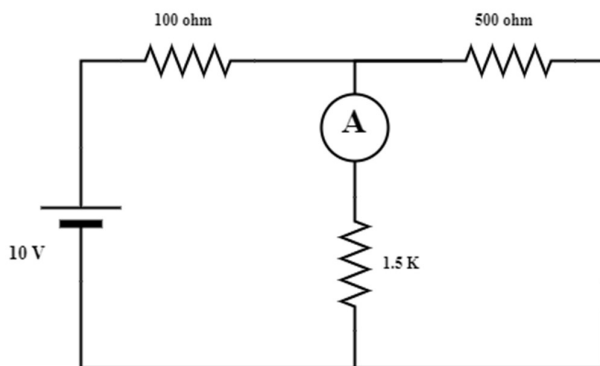


Fig. (ii)

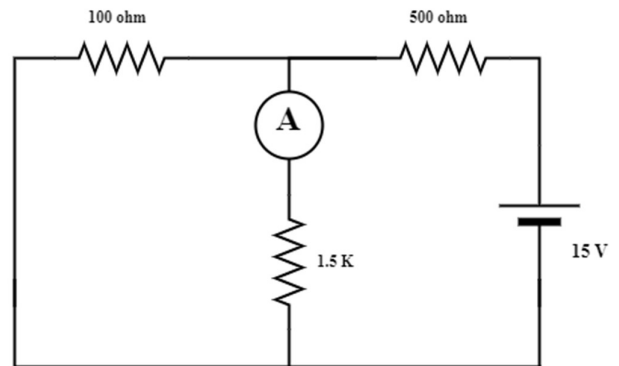


Fig. (iii)

Procedure

1. Connect the circuit as per the diagram.
2. Set a voltage value of 10V and 15V using RPS_1 and RPS_2 & note down the ammeter reading.
3. Set the voltage as 10V using RPS_1 alone and disconnect 15V source RPS_2 and short circuit the terminals as shown in Fig. (ii) and note the ammeter reading (say I_1)
4. Repeat the same procedure with RPS_2 (15V) and note down the ammeter reading (say I_2).
5. Verify superposition theorem.

$$I = I_1 + I_2$$

Precautions

1. Voltage control knob of RPS should be kept at minimum position initially.
2. Power supply should be turned off while connecting circuits.
3. Make sure that mode select of Voltmeter/Ammeter is on Ammeter (A) side while measuring current.

Observation Table

	Voltage Source (RPS)		Ammeter Reading
	RPS1	RPS2	
Circuit (i)			$I =$
Circuit (ii)			$I_1 =$
Circuit (iii)			$I_2 =$

Calculations

$$I(\text{Observed}) = I_1 + I_2$$

$$I(\text{Calculated}) = (\text{by solving using KVL})$$

$$\% \text{ Error} = \frac{\text{Observed Value} - \text{Calculated Value}}{\text{Calculated Value}}$$

Result:

The Superposition theorem has been verified both theoretically and practically and the % error is found to be _____ %.

Trainer Kit Connection Diagram

