

EXPERIMENT NO. 3

Objective: To verify Superposition Theorem.

Apparatus Required:

S/N	Apparatus	Quantity	Range/ Remark
1	D.C. Supply	2	(.....) V, (.....)A and (.....) V, (.....)A
2	D.C Voltmeter	2	Power Supply Voltmeter-2 ,
3	DC Ammeter	1	(.....)mA
4	Rheostate	3	R1=....., R2=....., R3=.....
5	Multimeter	1	To Measure Resistance
6	Connecting wires	--	--

Circuit Diagram:

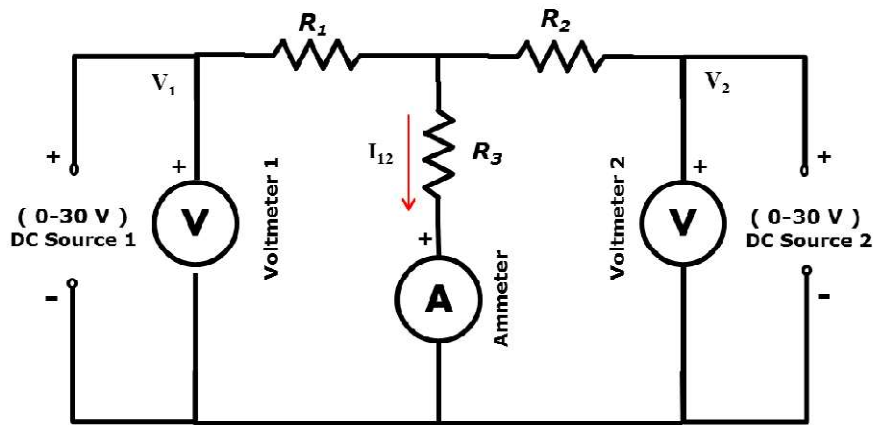


Fig. 1 - Superposition Theorem

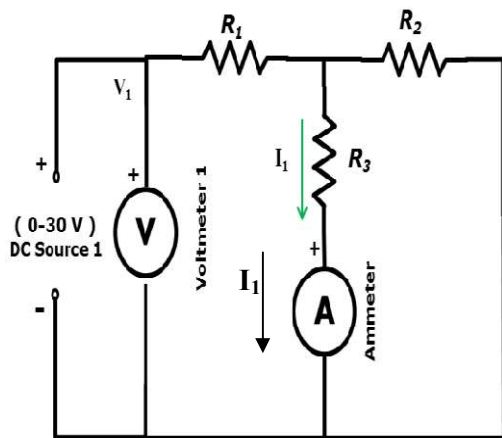


Fig 2 – Superposition Theorem

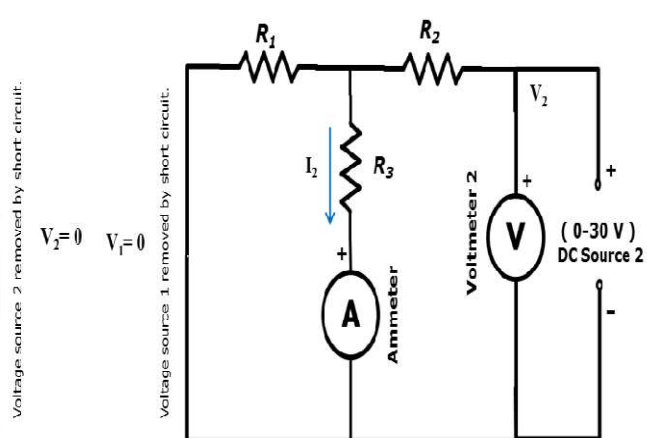


Fig 3 – Superposition Theorem

Observation Table:

$$R_1 = \text{_____} \Omega, R_2 = \text{_____} \Omega, R_3 = \text{_____} \Omega$$

Sr.No.	V ₁ (Volts)	V ₂ (Volts)	I ₁₂ (mA)	I ₁ (mA)	I ₂ (mA)	I _{1+I₂} (mA)	%Error = $\left \frac{I_{12} - (I_1 + I_2)}{I_{12}} \right \times 100$

Theory: According to superposition Theorem: ‘In a network of linear resistances containing more than one generator, the current which flows at any point is the sum of all the current which would flow at that point if the each generator were considered separately and all the other generators replaced for the time being by resistance equal to their internal resistances’

$$I = I_1 + I_2 \text{ mA}$$

I₁ = Current due to one source, mA

I₂ = Current due to one source, mA

I = Total current at that point, mA

Procedure:

1. Connect the circuit as shown in the circuit diagram Fig.1.
2. Switch On the DC power supply
3. By varying the voltage supply V₁&V₂ in steps of 5 and record the corresponding reading of I
4. Now connect the circuit according to Fig2 and record the values of I₁ for the corresponding values of V₁
5. Repeat the step 3 as per Fig3 and take the reading of I₂ by varying V₂
6. Measure the values of R₁, R₂ and R₃ using multimeter
7. Calculate percentage error.

Result: The Super position Theorem has been verified.

Precaution:

1. Make the connections properly.
2. Note the readings of voltmeters and ammeters properly avoid parallax
3. Connect the DC supply and ammeter with correct polarity.
4. Avoid loose connections and don't touch wire with wet hand.