

Experiment No. 2

VERIFICATION OF SUPERPOSITION THEOREM

Date :

**Aim:**

To verify the superposition theorem for the given circuit.

**Apparatus Required:**

Sl.No.	Apparatus	Range	Quantity
1	RPS (regulated power supply)	(0-30V)	2
2	Ammeter	(0-10mA)	1
3	Resistors	1k $\Omega$ , 330 $\Omega$ , 220 $\Omega$	3
4	Bread Board	--	--
5	Wires	--	Required

**Statement:**

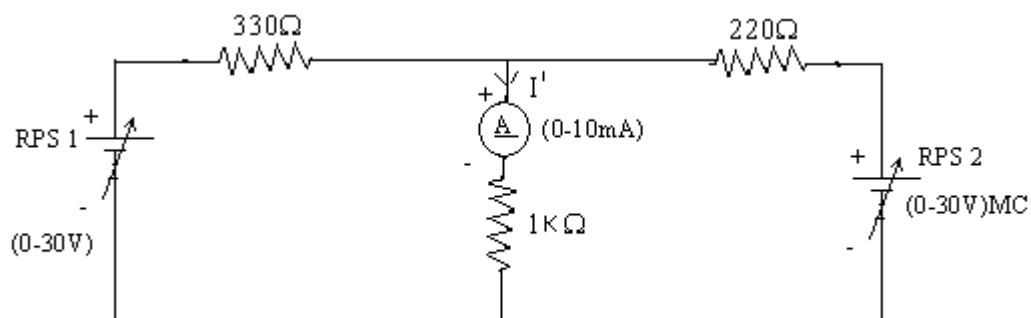
Superposition theorem states that in a linear bilateral network containing more than one source, the current flowing through the branch is the algebraic sum of the current flowing through that branch when sources are considered one at a time and replacing other sources by their respective internal resistances.

**Precautions:**

1. Voltage control knob should be kept at minimum position
2. current control knob of RPS should be kept at maximum position

**Procedure:**

1. Give the connections as per the diagram.
2. Set a particular voltage value using RPS<sub>1</sub> and RPS<sub>2</sub> & note down the ammeter reading
3. Set the same voltage in circuit I using RPS<sub>1</sub> alone and short circuit the terminals and note the ammeter reading.
4. Set the same voltage in RPS<sub>2</sub> alone as in circuit I and note down the ammeter reading.
5. Verify superposition theorem.



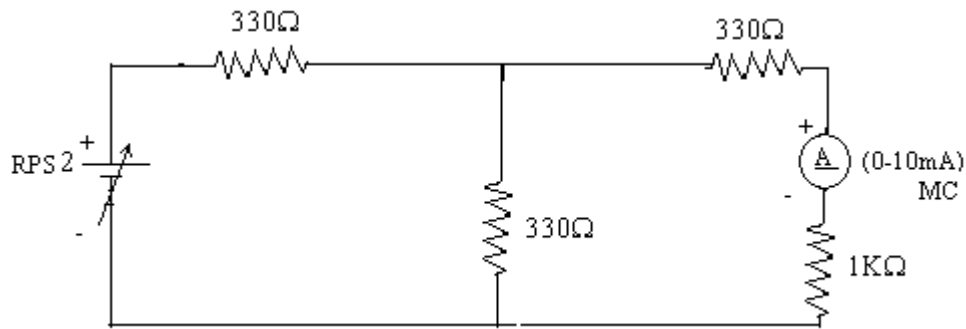
**Model Calculations:**

**Preview from Notesale.co.uk**  
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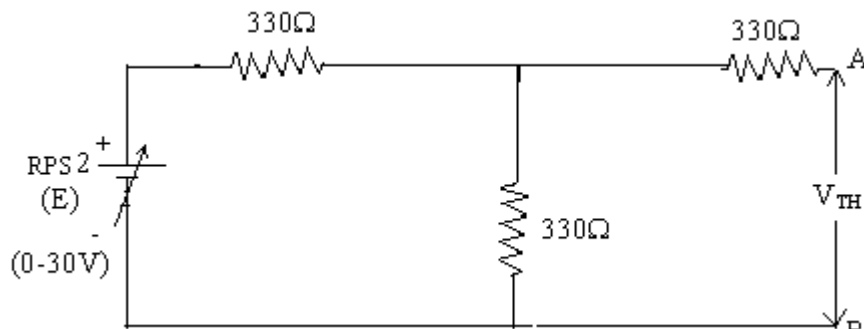
**Result:**

Superposition theorem have been verified theoretically and practically.

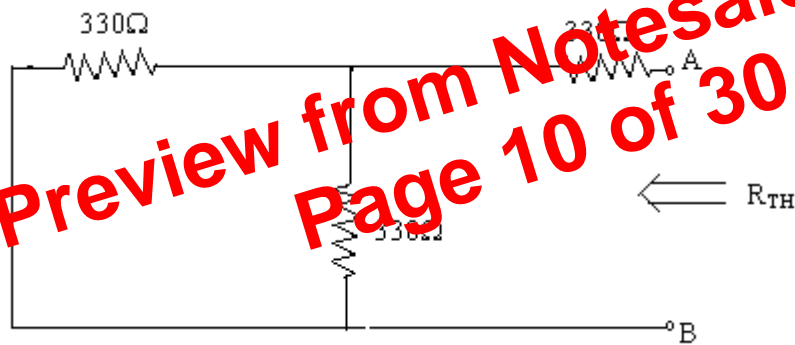
**Circuit - 1 : To find load current**



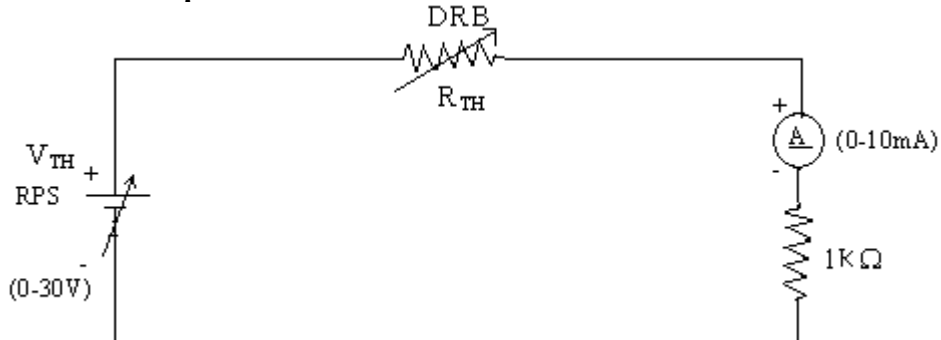
**To find  $V_{TH}$**



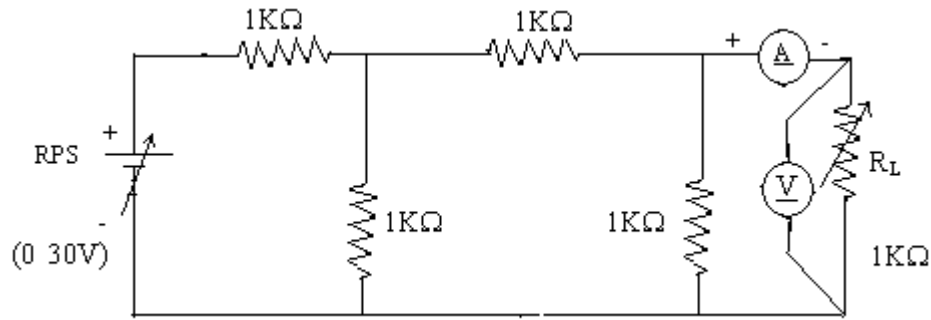
**To find  $R_{TH}$**



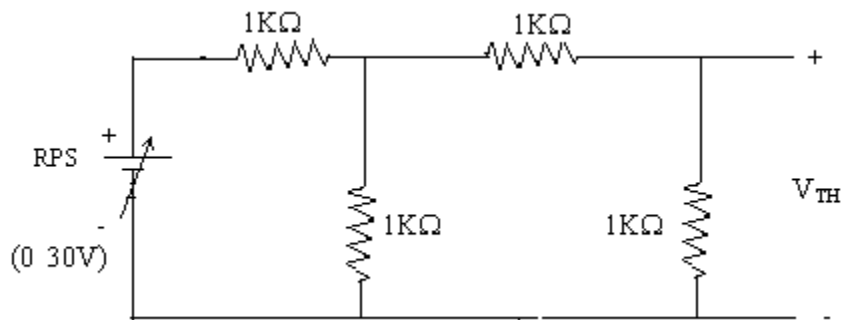
**Thevenin's Equivalent circuit:**



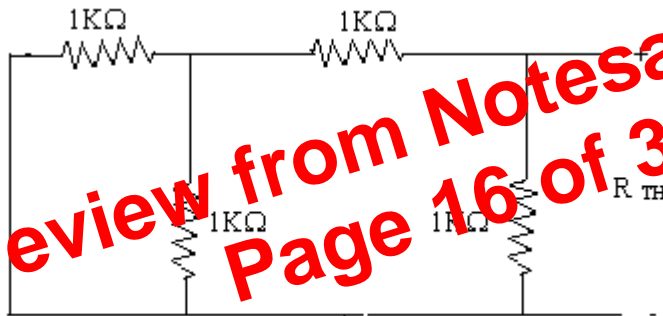
**Circuit - 1**



**To find  $V_{TH}$**

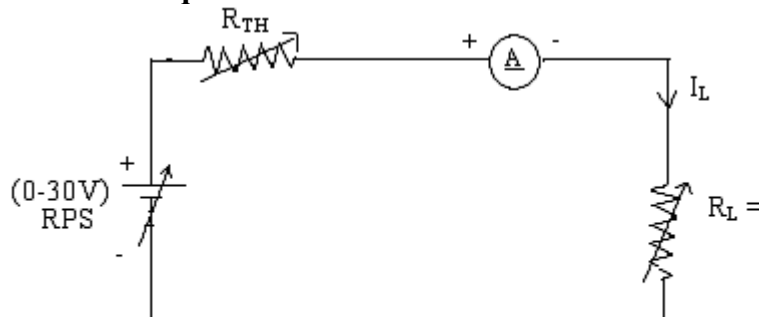


**To find  $R_{TH}$**



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**Thevenin's Equation Circuit**



**Aim:**

To study series and parallel resource in AC circuit

**Series Resource:**

An RLC circuit is said to be at re source when voltage and current are in phase with each other and power factor is unity.

$$Z = \sqrt{R + j(X_L - X_C)^2}$$

At series resource

$$X_L = X_C$$

$$Z = R$$

$$X_L = X_C$$

$$\omega_L = \frac{1}{\omega_C}$$

$$\omega^2 = \frac{1}{LC}$$

$$(2\pi fr)^2 = \frac{1}{LC}$$

$$f_r = \frac{1}{2\pi\sqrt{LC}}$$

Power factor  $\cos \phi = \frac{R}{Z}$

Q - factor  $= \frac{V_L}{V} = \frac{V_L}{V}$

**Parallel Resonance:**

Parallel AC circuit is said to be at resource when voltage and current are in phase with each other and power factor is unity.

(i) ideal parallel circuit  $f_0 = \frac{1}{2\pi\sqrt{LC}}$

(ii) Practical circuit - I  $f_0 = \frac{1}{2\pi} \sqrt{\frac{1}{LC} - \frac{R^2}{L^2}}$

(iii) Practical circuit - II  $f_0 = \frac{1}{2\pi\sqrt{LC}} \left( \sqrt{\frac{(R_L)^2 - L/C}{(R_L)^2 - L/C}} \right)$