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VIDYAVIHAR UNIVERSITY

K J Somaiya College of Engineering

K. J. Somaiya College of Engineering, Mumbai-77

(A Constituent Collge of Somaiya Vidyavihar University)



Department of Sciences and Humanities

Course Name:	Elements of Electrical and Electronics Engineering	Semester:	I/II
D a t e o f Performance:	19 Jan 2022	Batch No:	B2
Faculty Name:		Roll No:	16010121110
Faculty Sign & Date:		Grade/Marks:	/ 25

Aatmaj 16010121110

Experiment No: 9

Title: Measurement of Power using Two Wattmeter Method

Aim and Objective of the Experiment:

- To measure the power of three phase power using Two Wattmeter Method

COs to be achieved:

CO1: Analyze resistive networks excited by DC sources using various network theorems.

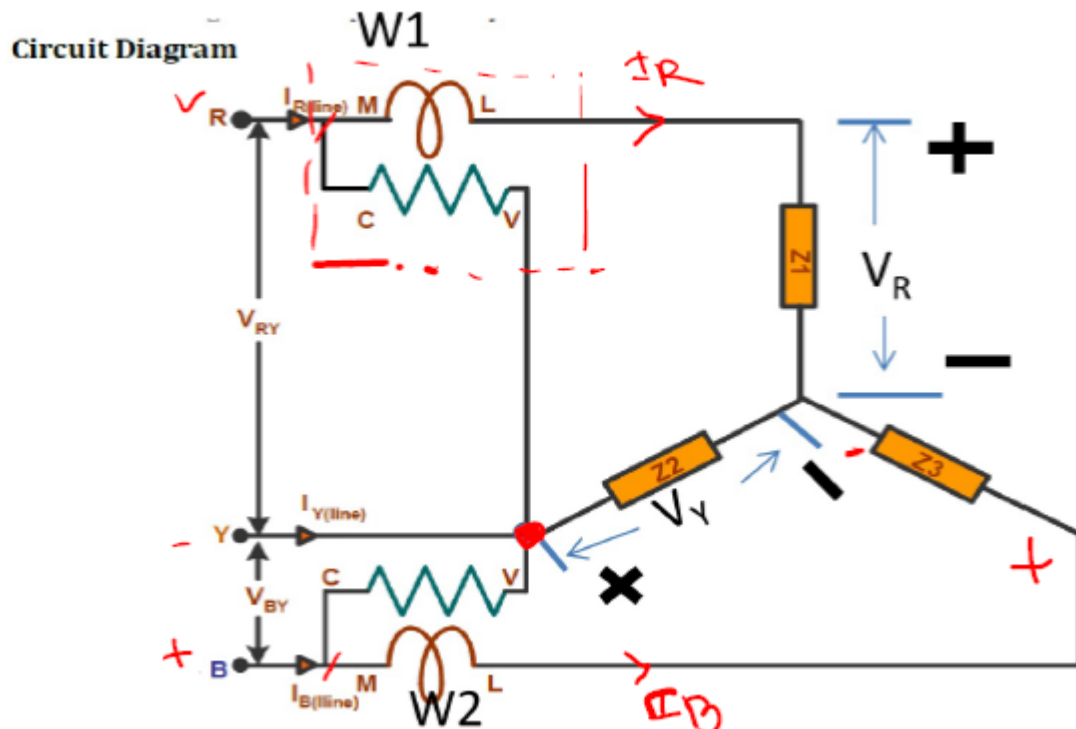
Circuit Diagram/ Block Diagram:

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Circuit Diagram



Stepwise-Procedure:

1. Connect the circuit as shown in circuit diagram
2. Increase the load and note down the reading $V_L, I_L, W1$ and $W2$
3. Practically you will obtain total power $W = W1 + W2$
4. Theoretically power is measured by using formula $P = \sqrt{3} V_L I_L \cos\phi$, using $\cos\phi = 1$ (unity) for resistive load.
- 5.



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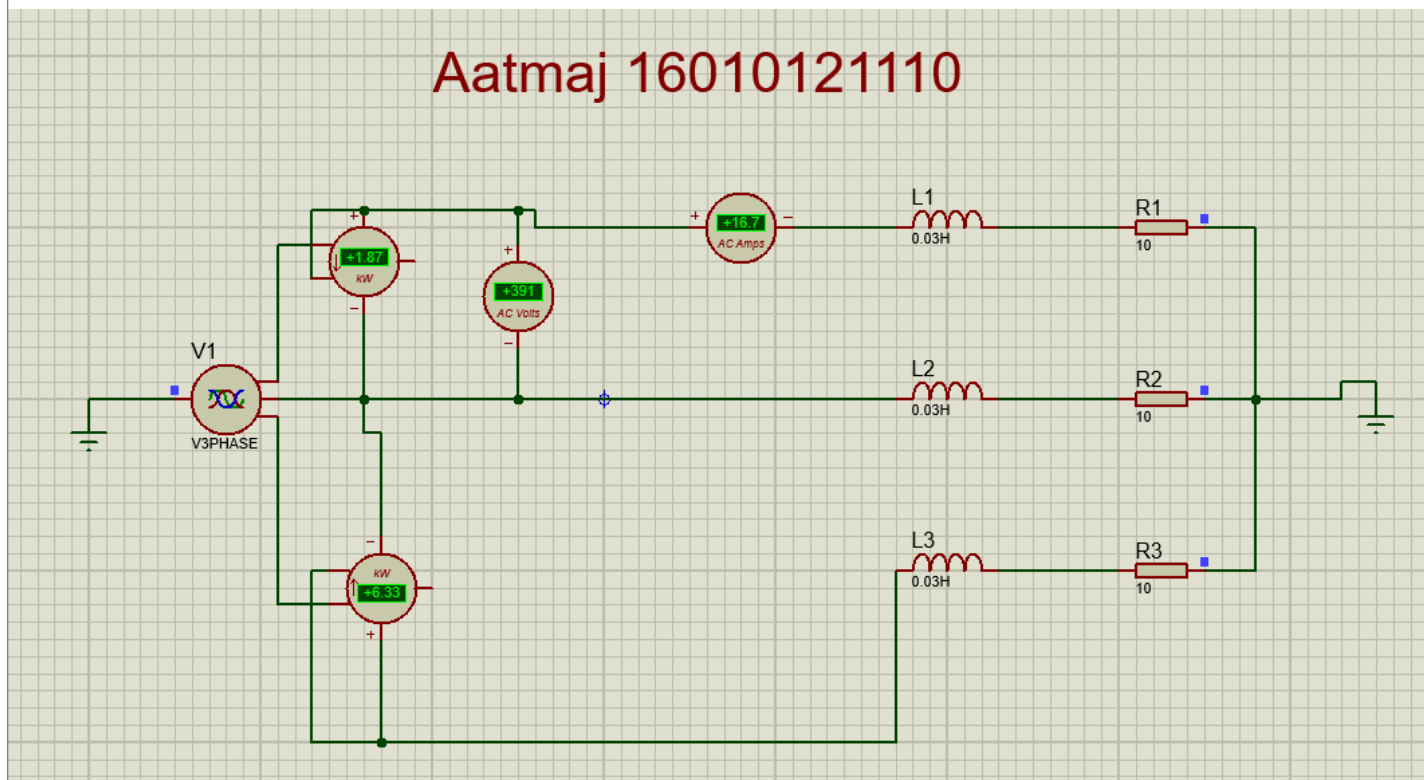
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Screenshot of Output:





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Observation table

Star:

sr. No	VI	I L	W1	W2	W=W1+W2	$\sqrt{3} \cdot V_L \cdot \cos \phi$	Load
1	391	1,67	1,87	6,33	8,2	1130,9772	Star connected

Calculations:

$$R=10$$

$$X_L=10$$

$$L=0.03$$

$$V=V_L/\sqrt{3}$$

$$Z=r+jx=10+j10=14.14 \text{ angle } 45^\circ$$

$$I_L=I_{ph}=16.33$$

$$P=\sqrt{3} \cdot I_L \cdot V_L \cdot \cos \phi$$

$$\phi=45^\circ$$

$$\tan \phi = \frac{W_1 - W_2}{W_1 + W_2}$$

$$W_1 - W_2 = 4618.13$$

$$W_1 = 6308.48 \text{ W}$$

$$W_2 = 1690.5 \text{ W}$$



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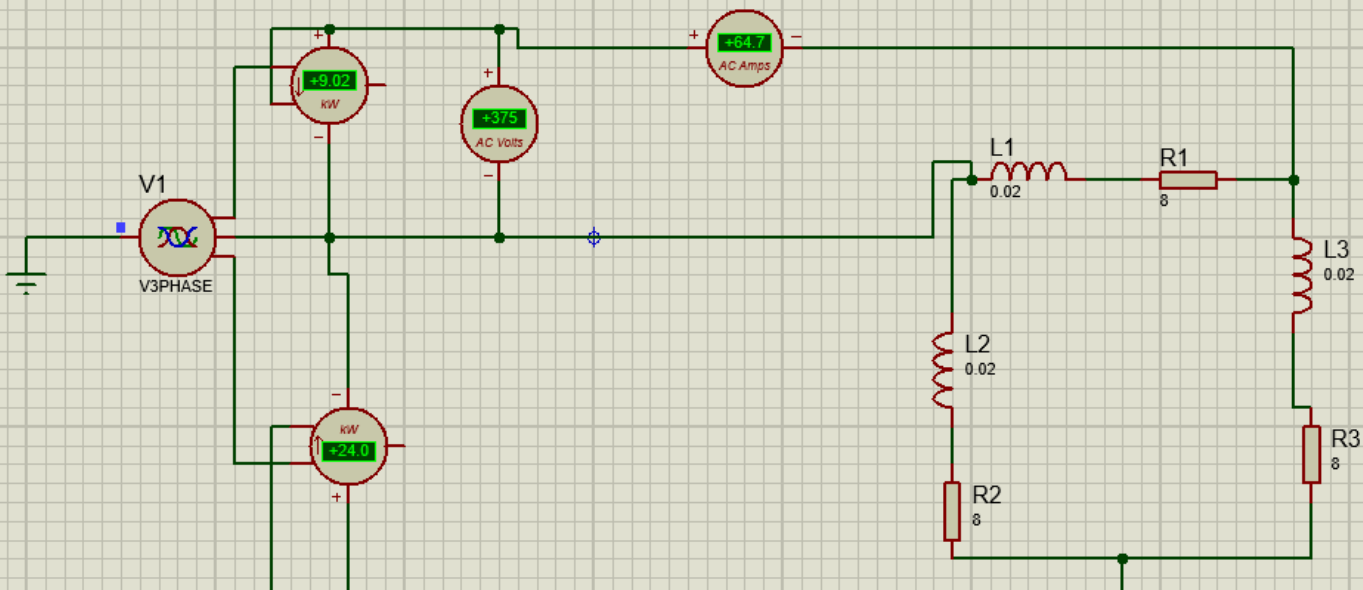


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Delta

sr. No	VI	I L	W1	W2	W=W1+W2	$\sqrt{3} \cdot V_L \cdot \cos \phi$	Load
1	375	64,7	9,02	24	33,02	33,056	Delta

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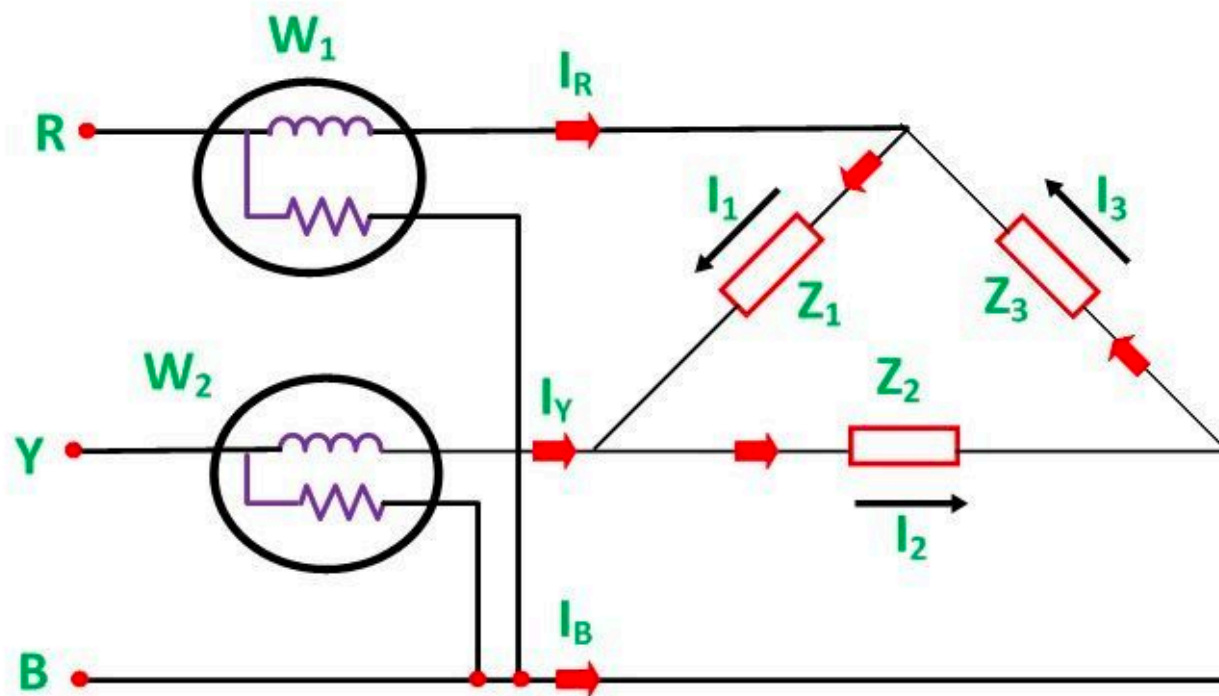


nic Year: 2021-22

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Circuit Globe



Delta:

Delta problem statement-

Three coils, each having a resistance of 8 W

and an inductance of 0.02 H, are connected in delta to a three-phase, 375 V, 50 Hz supply. Calculate the power absorbed.

Calculations:

$$R = 8 \text{ W}$$

$$L = 0.02 \text{ H}$$

$$V_L = 375$$

$$V_f = 50 \text{ Hz}$$

For a delta-connected load,

$$V_L = V_{ph} = 375 \text{ V}$$

$$X_L = 2\pi fL = 2\pi * 50 * 0.02 = 6.28 \text{ W}$$

$$Z = R + jX_L = 10.17 \text{ Ohm}$$

$$\Phi = 38.13^\circ$$

$$I = V/Z = 36.87$$



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$$I_L = \sqrt{3} * I = 63.68$$

$$\text{Power} = \sqrt{3} * I_L * V_L * \cos \phi = 36.34$$

Conclusion:

Thus we have successfully measured the power using the two wattmeter method. We have understood the delta and star inductance circuits.

Signature of faculty in-charge with Date: