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Rajshahi University of Engineering & Technology

Department of Electrical & Computer Engineering

Lab report-03

Course Code : **ECE 1202**

Course Title : **Circuits and Systems-II Sessional**

Date of Submission : **23-09-2024**

Submitted To:	Submitted By:
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Experiment no: 03

1. **Experiment name:** Power measurement of balanced three phase system using two wattmeter method.

2. **Objective:** The main objective of this experiment is to measure the power in the balanced three phase circuit using two wattmeter method and to verify total power relation with individual wattmeter reading.

3. **Theory:** In the two wattmeter method, two wattmeter are connected to two phases of the three phase wye connected balanced system. The readings of two wattmeter are compute of total power. The mathematical equation is,

$$P_{total} = W_1 + W_2$$

Here, P_{total} is the total power and W_1 and W_2 are the wattmeter readings.

4. **Required apparatus:**
   i. Source
   ii. VARIAC
   iii. Voltmeter
   iv. Ammeter
   v. Resistors
   vi. Multimeter
   vii. Connecting wires
   viii. Wattmeter

5. **Circuit diagram:**

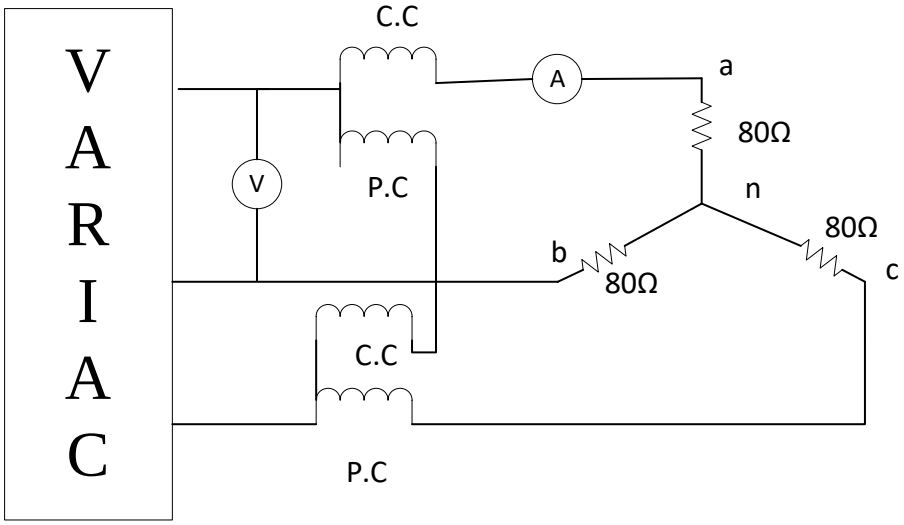

Figure: Y connected 3-phase balanced system

6. **Data table:**

Sl no.	P_1 (W)	P_2 (W)	Measured power, P_{total} (W)	Calculated power, P_{total}(W)	Line voltage, V_L (V)	Line current, I_L(A)	Percentage of error
1	26	24	50	74.8	75.8	0.57	33.15
2	36	28	64	90.57	83	0.629	29.336
3	44	38	82	114	93	0.71	28.07

7. **Discussion:** The experiment successfully demonstrated the two-wattmeter method for measuring power in a balanced three-phase system. The readings from the two wattmeters helped determine the total power consumed, with variations depending on the type of load. For resistive loads, both wattmeters showed positive readings, while inductive loads caused one meter to show a lower or negative reading due to phase shifts between current and voltage.

8. **Precautions:**
   i. Ensured all connections were secured and double checked before powering the circuit to avoid short circuit or any other safety hazard.
   ii. Handled measuring equipment carefully to get accurate reading.
   iii. Been cautious of the power rating of the instruments to avoid overheating.

9. **References:**

   i. Fundamentals of Electric Circuits; Charles K. Alexander and Mathew N. O. Sadiku
   ii. Wikipedia (delta connected three phase balanced system)
   iii. Google