Heaven's Light is Our Guide

.

Rajshahi University of Engineering & Technology

Department of Electrical & Computer Engineering

Lab Report

Course Code : ECE 1202

Course Title : Circuits and Systems- II

Experiment no :01

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Submitted To:	Submitted By:
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Name of The Experiment: Study the relationship between phase and line voltages of wye connected 3-φ balanced system.

Theory: In a wye-connected three-phase balanced system, there is a specific relationship between the phase voltages and the line voltages. The phase voltage (V_p) is the voltage between any phase and the neutral point, while the line voltage (V_L) is the voltage between any two phases.In a balanced three-phase system, the three-phase voltages have the same magnitude and are displaced by 120 degrees from each other. Due to the wye-connection, where the neutral point of the three-phase system is connected to the common point, the line voltage is equal to the phase voltage multiplied by the square root of 3 (√3). Mathematically, this relationship can be expressed as,

$$v_p = \frac{v_L}{\sqrt{3}}$$

$$I_P = I_L$$

Circuit:

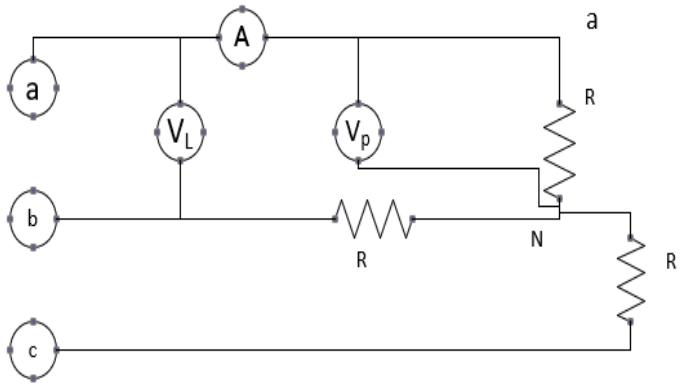


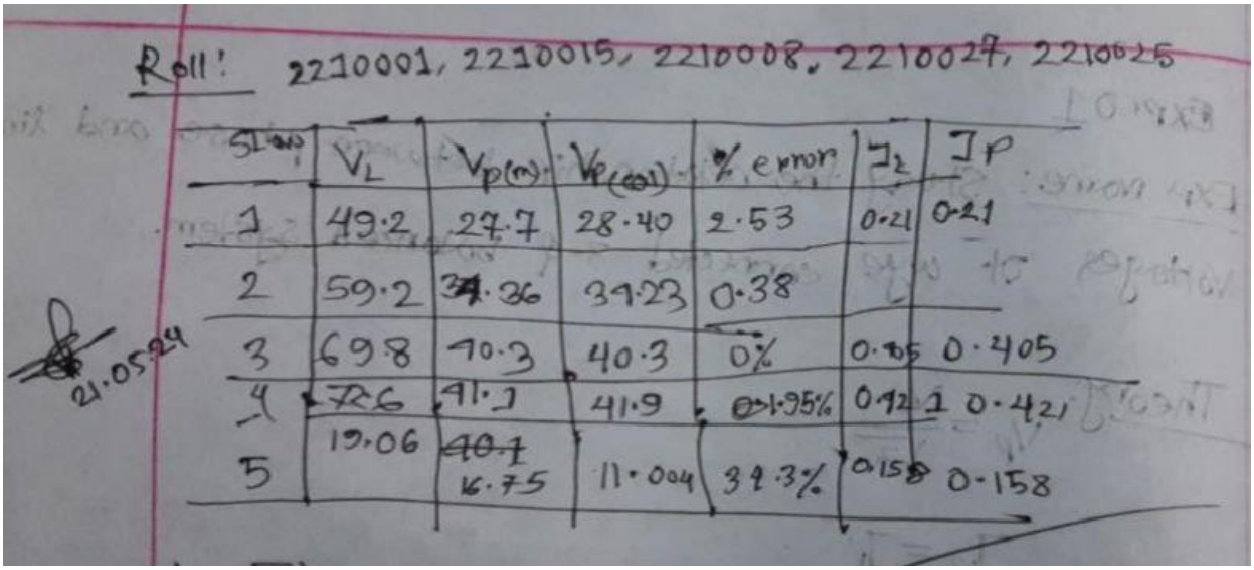
Fig. Circuit Diagram

Required Apparatus:

- **I.** Source
- **II.** Ammeter
- **III.** Resistor
- **IV.** Multimeter
- **V.** Connecting Wire

Data Table:

Sl No.	V_L	V_p (m)	V_p(Cal)	%Error	I_L	I_P
1	49.2	27.7	28.40	2.53	0.21	0.21
2	69.8	40.3	40.3	0%	0.405	0.405
3	72.6	41.1	41.9	1.95%	0.421	0.421
4	19.06	16.75	11.004	34.3%	0.158	0.158



Calculation:

For 1st calculation,

V_L=49.2 V, V_P(Cal) = $\frac{VL}{\sqrt{3}}$ =28.40 V, V_P(m) =27.7 V, Error=$\left|\frac{VL-VP}{VL}\right|$=2.53%

For 2nd calculation,

V_L=69.8 V, V_P(Cal) = $\frac{VL}{\sqrt{3}}$ =40.3 V, V_P(m) =40.3 V, Error=$\left|\frac{VL-VP}{VL}\right|$=0%

For 3rd calculation,

V_L=72.6 V, V_P(Cal) = $\frac{VL}{\sqrt{3}}$ =41.9 V, V_P(m) =41.1 V, Error=$\left|\frac{VL-VP}{VL}\right|$=1.95%

For 4th[t] calculation,

V_L=19.06 V, V_P(Cal) = $\frac{VL}{\sqrt{3}}$ =11.004 V, V_P(m) =16.75 V, Error=$\left|\frac{VL-VP}{VL}\right|$=34.3%

Conclusion:

The experiment investigated the relationship between phase and line voltages in a balanced wye-connected three-phase system. The results confirmed (or discussed deviations from) the theoretical

relationship ($V_L = \sqrt{3} * V_{ph}$). This experiment demonstrates the fundamental concept of voltage relationships in a common three-phase system configuration.