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-2 Sessional

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Submitted To:	Submitted By:
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Experiment No :01

Experiment Name: Study the relationship between phase and line voltages of wye connected 3-phase balanced system.

Objective:

i. To determine phase and line voltage and current of a balanced 3-phase wye connection

ii. To verify the relation between phase voltage and line voltage.

Theory:

3-Phase balanced system is a polyphase system where three voltage sources produce voltages with same magnitude but the phases differ from one another by 120 degrees. There are two configurations for connecting loads with the same impedance to a three-phase balanced system. Wye (Y) as well as Delta. The wye arrangement is seen in this experiment. The potential difference between two lines in a polyphase system is known as line voltage, while the potential difference between a phase and the neutral junction is known as phase voltage. Line current is the current running through the line, while phase current is the current flowing through one of the generator's windings.. The relationship between line voltage, phase voltage and line current and phase current is,

$$I_p = I_L$$

$$\text{And, } V_p = \frac{VL}{\sqrt{3}}$$

Diagram:

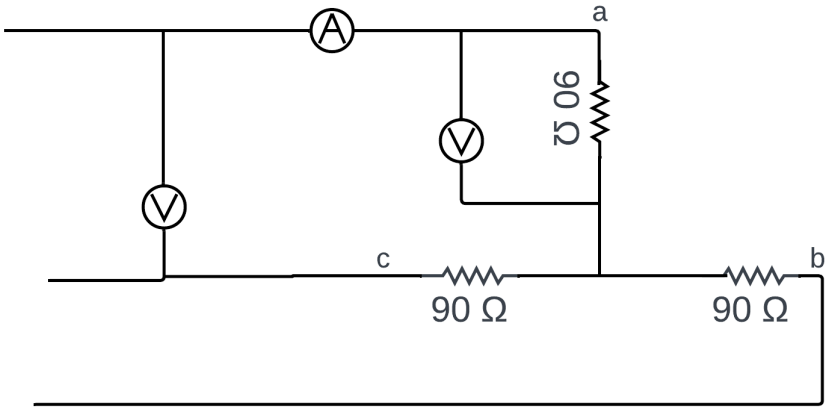


Fig.1: Wye connection of a 3-phase system.

Required Apparatus:

1.Source

2. Ammeter

3.Resistor (Three)

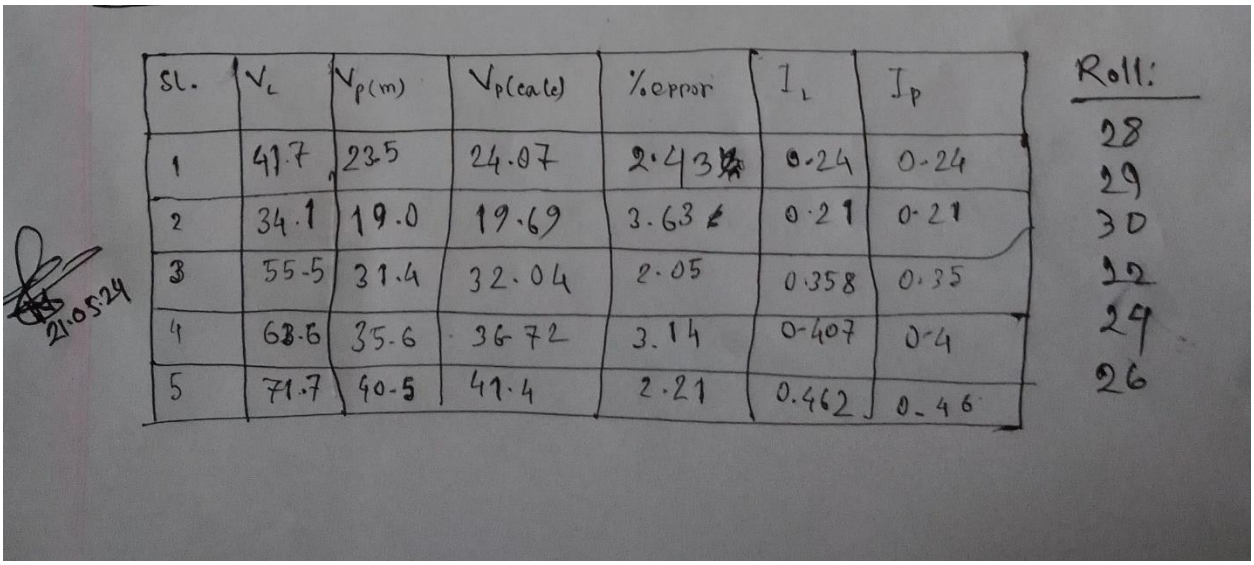
4.Connecting Wire

5.Multimeter

Data Table:

SL	V_L	V_P(m)	V_p(cal)	Error	I_P	I_L
1	41.7	23.5	24.07	2.43	0.24	0.24
2	34.1	19	19.69	3.63	0.21	0.21
3	55.5	31.4	32.04	2.05	0.358	0.35
4	68.6	35.6	36.72	3.14	0.407	0.4
5	71.7	40.5	41.4	2.21	0.462	0.46

Fig.02: Table from lab



Calculation:

For phase voltage,

$V_P = \frac{VL}{\sqrt{3}}$

for phase current, $I_P = I_L$

error $= \frac{2.43+3.63+2.05+3.14+2.21}{5}$

$=2.692\%$

Result:

The phase current and the line current were equal according to the theory. But there was 2.692% error in relation of phase voltage and line voltage.