INSTITUTE OF ENGINEERING

ADVANCED COLLEGE OF ENGINEERING & MANAGEMENT

KUPONDOLE , LALITPUR

(AFFILATED TO TRIBHUVAN UNIVERSITRY)

ESTD. 2000

LAB REPORT

EXP. No - 03 .

SUBMITTED BY

NAME – ASHWANI KUMAR CHAUDHARY

ROLL NO. – 020

DATE - 2078/07/05

SUBMITTED TO

DEPARTMENT OF Electrical.

TITTLE : To Calculate & Verify AC Parameters.

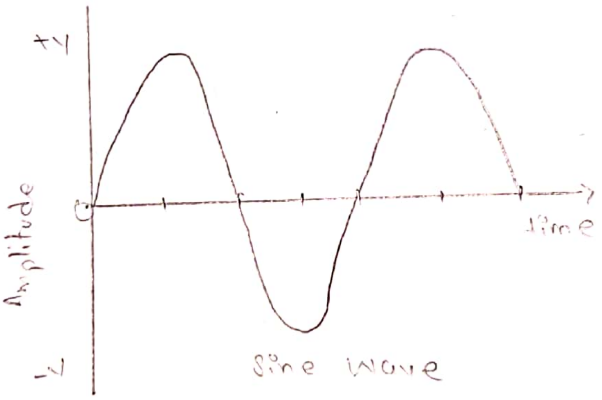
OBJECTIVE:

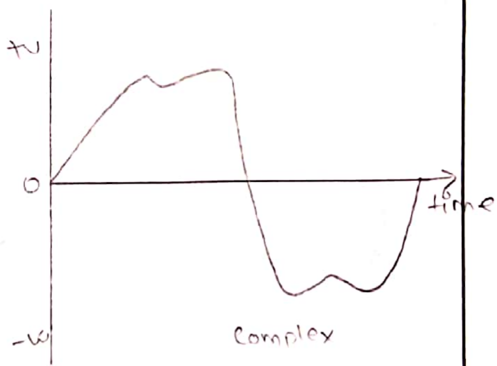
To calculate & verify AC parameters.

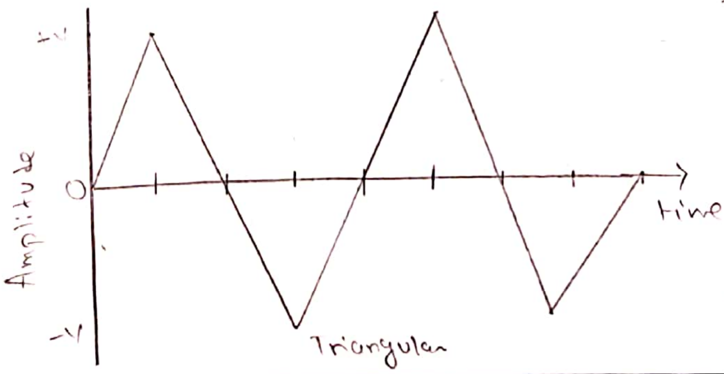
THEORY:

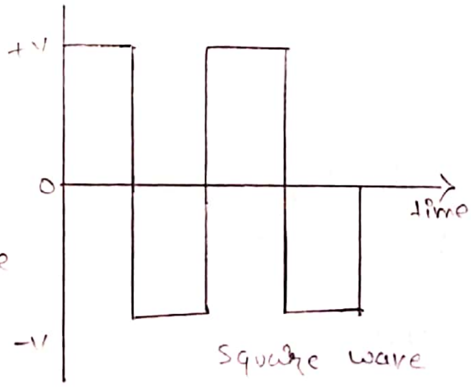
An Alternating quantity (Current or Voltage) is one whose magnitude change continously with time betn zero & a maximum value & whose direction reverse periodically. Some graphical representation for alternating quantities.

As shown in the image below, AC wave form can be sinusoidal (sine wave), complex, square or triangle.









1) **Amplitude**: The maximum value of attained by alternating quantity is called amplitude.

2) **frequency**: Total no. of cycles per second.

3) **Time period**: Time (in sec) required by an alternating quantity to complete its one cycle is known as time period.

4) **Angular Velocity**: The frequency of an alternating quantity expressed in electrical radians per second is known as Angular velocity.

5) **Peak voltage (V_p)**: The maximum instantaneous value of function as measured from the zero volts level.

6) **Peak to peak voltage (V_{p-p})**:
The full voltage both positive & negative peaks of waveform that is the sum of the magnitude of the positive & negative peaks.

7) **RMS voltage (V_{rms})**
The root mean-square are effective value of a wave form.

8) **Average Voltage (V_{avg})**.
The level of waveform defined by the condition that the area enclosed by the curve above this level is exactly equal to the area enclosed by the curve below this level.

OBSERVATION 1 : AC Signal.

Vertical deflection (p-p) = 6.8 cm

Volt / cm = 2 v/cm

V_{p-p} = 13.6 V

$V_{rms} = \frac{V_{p-p}}{2\sqrt{2}}$ = 4.8 V

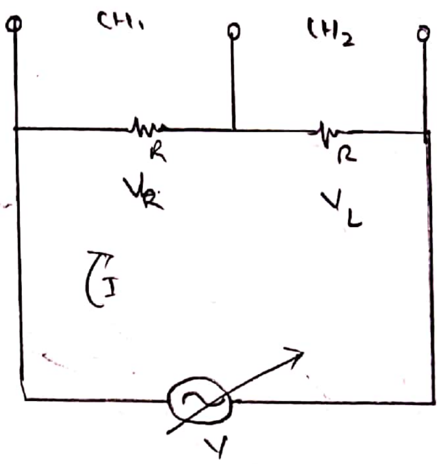
$V_{avg} = \frac{2V_p}{\pi}$ or $\frac{V_{p-p}}{\pi}$ = 4.32 V

for 50Hz.	for 100 Hz.
Horizontal deflection (p-p) = 4 cm	Horizontal deflection = 4 cm
Time / cm = 5 ms	Time / cm = 2.4 ms
Total time period (T) = 20 ms	Total time period (T) = 10 ms
frequency (F) = $\frac{1}{T}$ Hz = 50Hz	frequency (F) = $\frac{1}{T}$ Hz = $\frac{1000}{10}$ = 100 Hz

Scanned with CamScanner

OBSERVATION 2.

R-C series circuit



frequency (f) = 100Hz

$\Delta t = \frac{2.5}{5} \times 2.5$

$= 1.25$ ms

$= 1.25 \times 10^{-3}$

$\phi = 360 \times f \times \Delta t$

$= 360 \times 100 \times 1.25 \times 10^{-3}$

$= 45^{0}$

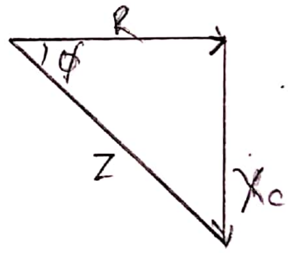
$C = 1 + 0.1$

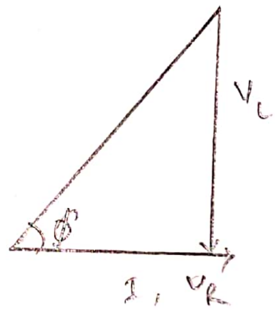
$= 1.1 \mu f$

$= 1.1 \times 10^{-6} f$

$X_C = \frac{1}{2\pi f c}$

$= 1446.28$ C.





$\tan\theta = \frac{X_C}{R}$

$R = 1446.28$

R-L Series

$f = 100\,Hz$

$\Delta t = \frac{2.5}{5} \times 1$

$= 0.5$

$= 0.5 \times 10^{-3}$

$L = 602\ MH$

$= 602 \times 10^{-6} H$

$\phi = 360 \times f \times \Delta t$

$= 360 \times 100 \times 0.5 \times 10^{-3}$

$= 18^{\circ}$

$X_L = 2\pi f L$

$= 2 \times \frac{22}{7} \times 100 \times 602 \times 10^{-6}$

$= 3.78 \times 10^{-3} H$

$R = 0.0116\,\Omega$

Discussion & Conclusion

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EXP. No - 04.

SUBMITTED BY

NAME – ASHWANI KUMAR CHAUDHARY

ROLL NO. – 020

DATE - 2078/07/05

SUBMITTED TO

DEPARTMENT OF Electrical.

TITTLE: Three - phase AC circuit

OBJECTIVE:

1. To measure current & voltage in three phase AC circuit.
2. To prove star-delta transformation.

THEORY:

A balance three phase network is one is which the impedance in the three phase are identical with such a balanced load, if a balanced three-phase supply is applied the current will also be balanced.

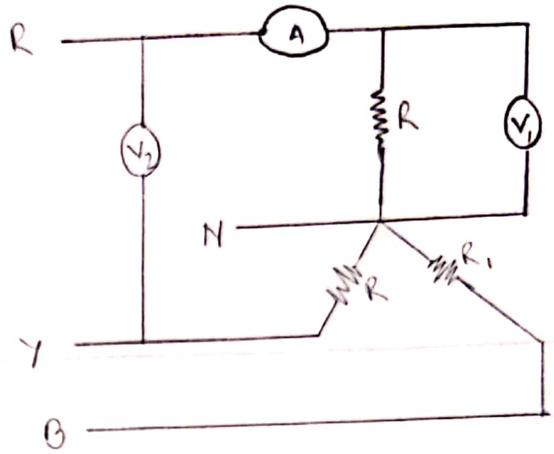
A balanced three phase voltage or current is one is one in which the size of each phase is the same & the phase angle of the three phase differ from each other by 120 degrees.

In three phase circuit connections can be given in two types.

(a) Star - connection

(b) delta - connection

1. star- Connection.



$V_{ph} = \frac{V_L}{\sqrt{3}}$

$I_{PH} = I_L$

~~Readings~~:

Table :- 1.

S.N	V_L	V_p	$I_L = I_P$	$V' = \sqrt{3} V_p$	$P = \sqrt{3} V_L I_L$
1	50	29.5	0.09	51.095	7.794
2	75	42.8	0.13	74.131	16.887
3	100	57.8	0.18	99.246	31.176

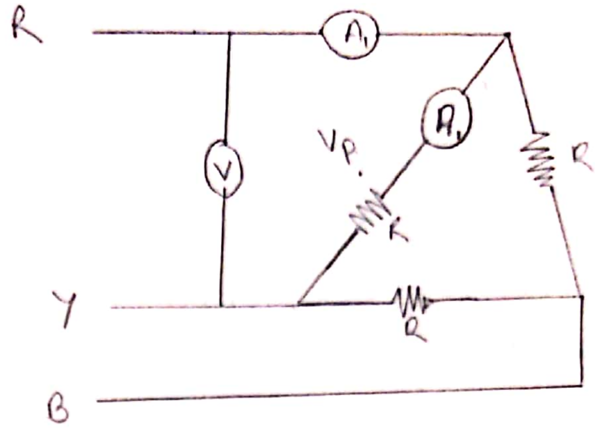
→ In star-connection, the line voltage is $\sqrt{3}$ times of phase voltage.

$E_{line} = \sqrt{3}\ E_{phase}$ & $I_{line} = I_{phase}$

2. Delta - Connection.

$I_{PH} = \frac{I_L}{\sqrt{3}}$

$V_{ph} = V_L$



S.N	$V_{PH} = V_L$	I_P	I_L	$I_L' = \sqrt{3}\, I_P$	$P = \sqrt{3}\, V_L I_L$
1	50	0.3	0.47	0.519	40.73
2	75	0.45	0.7	0.779	90.93
3	100	0.61	0.93	1.056.	161.08

In delta connection, the line voltage is the same as that of phase voltage & the line current is $\sqrt{3}$ times of phase current. It is shown as below.

$V_{line} = V_{phase}$ & $I_{line} = \sqrt{3}\, I_{phase}$.

Discussion & Conclusion.

Thus, We verified the current & voltage in three phase AC circuit & Star-delta transformation of AC circuits.

Hence, current & voltage source were measured in three phase AC circuit & star-delta transformation was proved.

Precautions.

1) The instruments should be handled with care.
2) The connection should be tight.
3) Error should be minimized.