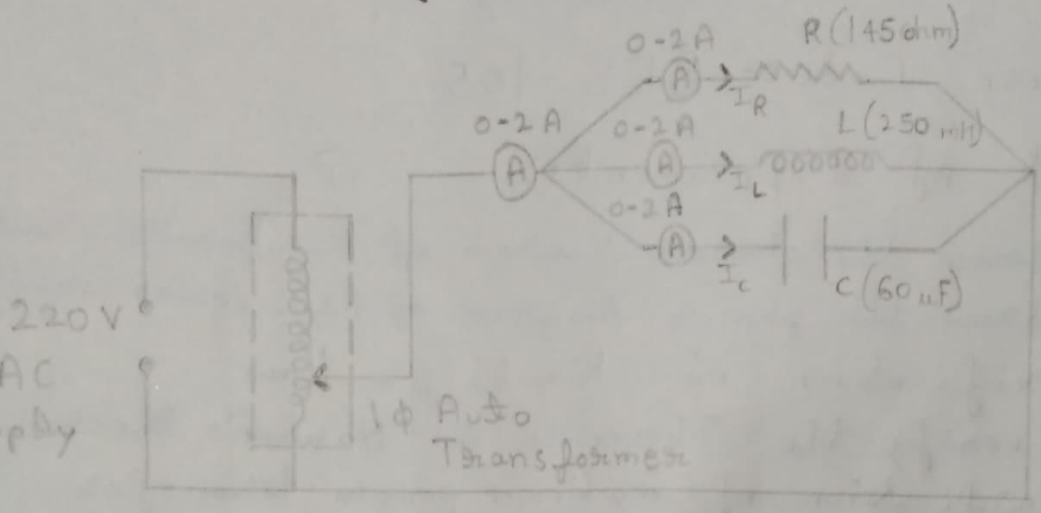
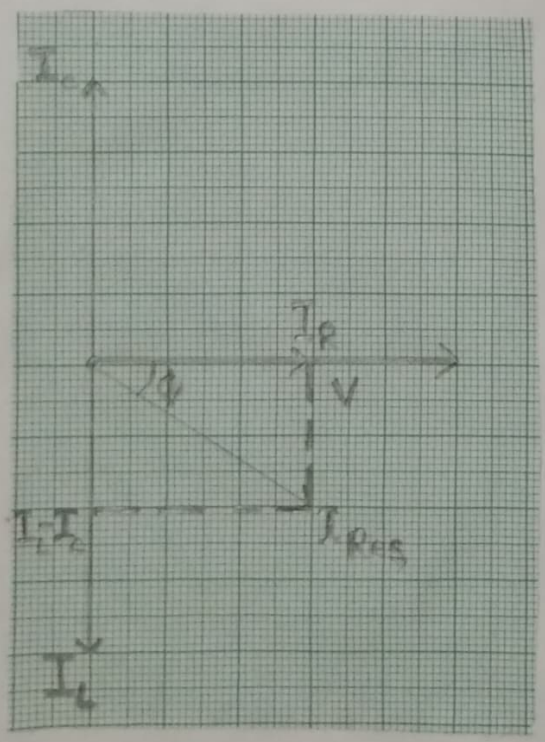
Circuit Diagram :-



Phasor Diagram :-



$$I_{RES} = \sqrt{I_R^2 + (I_L - I_C)^2}$$

where $\boxed{I_M = I_{RES}}$

I_M = Main current

I_{RES} = Resultant current

I_P = Current via resistance

I_L = Current via inductor

I_C = Current via capacitor

Experiment No. - 1

Object :- To draw the phasor diagram of R.L.C. parallel circuit.

Apparatus Used :-

• A.C. Ammeter	0-2 Amp.	2 No.
• A.C. Ammeter	0-1 Amp.	2 No.
• Resistance	145 Ohms	1 No.
• Inductance	250 mH	1 No.
• Capacitance	60 μf	1 No.
• 1 ϕ Auto Transformer	220V/0-260V	1 No.
• Connecting Leads		

Theory :- Consider an AC circuit, containing resistance R Ω, inductance L Henry, capacitance C Farads connected in parallel. Let V to be voltage drop across RLC circuit across resistance R is in phase with V. Current across L is lagging with V by 90°.
Current across C is ~~lagging~~ leading with V by 90°.

Req. current : $(I_{req}) = \sqrt{I_R^2 + (I_L - I_C)^2}$

Formula :- $I_{req.} = \sqrt{I_R^2 + (I_L - I_C)^2}$.

Phasor Diagram :- Left side on graph paper.

Observation Table:-

S.No.	I_M (A)	I_R (A)	I_L (A)	I_c (A)
1.	0.80	0.48	0.80	1.40
2.	0.95	0.54	0.95	1.60
3.	1.10	0.62	1.10	1.80

Calculations :-

① $I_{RES} = \sqrt{(0.48)^2 + (0.80 - 1.40)^2} = \sqrt{0.23 + 0.36} = \sqrt{0.59} = 0.77$

% error $= \frac{|0.77 - 0.80|}{0.80} \times 100 = 3.75\ \%$

$I_{RES} = \sqrt{(0.54)^2 + (0.95 - 1.60)^2} = \sqrt{0.29 + 0.42} = \sqrt{0.71} = 0.84$

% error $= \frac{|0.84 - 0.95|}{0.95} \times 100 = 11.58\ \%$

$I_{RES} = \sqrt{(0.62)^2 + (1.10 - 1.80)^2} = \sqrt{0.38 + 0.49} = \sqrt{0.87} = 0.93$

% error $= \frac{|0.93 - 1.10|}{1.10} \times 100 = 15.45\ \%$

Average error $= \frac{3.75 + 11.58 + 15.45}{3}$

$= \frac{30.78}{3}$

$= 10.26\ \%$

Result :- The phasor diagram of parallel RLC circuit is shown in the diagram (graph) with error of approx. 10.26 %.

Precautions :- ① All the connections should be tight.
② Proper care should be taken while connecting the terminal of voltmeter and ammeter.
③ All apparatus should be taken of suitable range and rating.
④ Reading should be taken carefully.

9/3/22