Experiment Details

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| Department Name | Department of Basic Science and Humanities |
| Class | FYBTech |
| Semester | 1 |
| Subject Name | Basic Electrical Engineering Lab |
| Experiment No. | 01 |
| Experiment Name | RLC circuit with variable inductance and capacitance |

Version History

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| Sr. No. | Version Number | Created By | Approved By | Date |
| 1 | v1.0 | Siddhi Patil | Faculty Name | DD/MM/YYYY |
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AIM:

To analyze a series RLC circuit

THEORY:

Impedance of a series RLC circuit is given by Z =

When XL XC, the current lags the applied voltage and when XL XC , the current leads the applied voltage.

When XL=XC, current is in phase with the applied voltage. Also impedance Z is minimum & equal to R. Hence magnitude of the current is maximum. This state is called as resonance in series RLC circuit.

PRE TEST:

1. What does RLC circuit consists of

i)Resistor, Diode and Ammeter

ii)Resistor, Inductor and Potentiometer

iii)Resistor, Inductor and Capacitor

iv)None of the above

1. The insulating medium between the two plates of capacitor is known as \_\_\_\_\_\_\_\_\_\_  
    a) Electrode  
    b) Capacitive medium  
    c) Conducting medium  
    d) Dielectric
2. The maximum current will pass through

i)Inductor

ii)Capacitor

iii)Resistor

iv)Same current will pass through all

1. The least current will pass through

i)Inductor

ii)Capacitor

iii)Resistor

iv)Same current will pass through all

1. Unit of Frequency is

i)Ohm

ii)Ampere

iii)Hertz

iv)Volt

PROCEDURE:

1. Connect the circuit as shown. Initially, keep the capacitance at minimum value.

2. Switch on the supply. Take the readings for lagging, leading and resonant

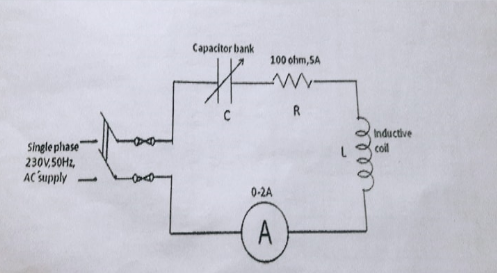
current by changing the capacitance. Measure the current and voltage across each component.

3. For the first reading and the last reading also note the voltage across RL branch and the voltage across RC branch.

4. Draw graphs I v/s pf, VR v/s pf, VL v/s pf VC v/s pf (All on same graph paper)

5. For the first reading and the last reading, draw phasor diagram as follows. Taking VR as reference, draw phasor diagram by forming a triangle for VR, VL, VRL and another triangle for VR, Vc, VRc. Taking phasors for VL and VC from the above two triangles, add VR, VL and VC.

DIAGRAM:



POST TEST:

1. Impedance of RLC circuit is given by
2. Z =
3. Z =
4. Z =
5. Z =
6. What is condition for resonance?
7. Inductance in circuit is minimum
8. Capacitance in circuit is minimum
9. Impedance in circuit is minimum and equal to Resistance
10. None of the above
11. Unit of Capacitance and Capacitive Reactance is

i)Ampere and Volts respectively

ii)Farads and Ohms respectively

iii)Ohms and Hertz respectively

iv)Henry and Weber respectively

1. Which of the following condition is true for resonance

i) Xc **>** XL

ii)Xc **<** XL

iii)Xc **=** XL

iv)None of the above

1. When Xc **<** XL

i)current leads applied voltage

ii)applied voltage leads current

iii)both are in same phase

iv)none of the above

REFERENCES:

1] Laboratory courses in Electrical Engineering, S G Tarnekar and P. K Kharbanda, S. Chand

Publications.

2] D.P. Kothari, I.J. Nagrath, “Basic Electrical Engineering”, (TMH Publishing Co. Ltd.,

New Delhi), 3rd edition