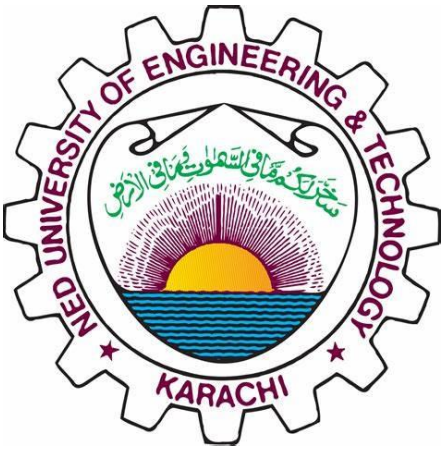
# OPEN-ENDED LAB(OEL)

COURSE TITLE:

Applied Physics(PH-122)

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## OBJECT:

To study the characteristics of a rejector circuit and determine unknown capacitance.

## APPARATUS:

Resistance, capacitors, an inductor, an oscillator, and an oscilloscope connecting wires.

## THEORYREJECTOR CIRCUIT:

If an inductor and a capacitor are connected in parallel and an A.C. voltage is applied across them, then in this case it is the voltage rather than current, which is the same on each element of the circuit. The current in this case at resonance is minimum. This is so because the current in the capacitive branch is in the opposite phase to the current in the inductive branch.

Since the current is rejected by the parallel combination of LC at resonance, it is termed the rejecter circuit. In this case, the impedance is maximum at resonance.

If there is no resistance in the circuit.

Then the resonance frequency is given by:

$$f = 1/ (2\pi \sqrt{LC})$$

And the current is given by:

$$I=E/Z$$

Where Z is the total impedance of the circuit.

Since at resonance, impedance is infinite, so the current almost reduces to zero.

## FORMULA:

Capacitance is given by:

$$C=1/4\pi^2 f^2L$$

## PROCUDURE:

1. Make the circuit connections as shown in circuit diagram i.e. connect an inductor, a capacitor and a resistor of suitable values in parallel to each other, then connect an oscillator and a CRO (cathode ray oscilloscope) across this combination of LRC.

2. Apply a certain voltage by the oscillator at a certain frequency and note down the amplitude of the output signal.

3. Increase the frequency of the applied voltage (the voltage is kept constant) step by step each time note down the amplitude of the output signal. Take a number of observations. We will see that at first the amplitude of the signal decreases as the frequency increases, it finally attains its' minimum value and then again rises. At the resonant frequency the amplitude is minimum.

4. Plot a graph between frequency ‘ f ’ and the corresponding amplitude 'A' of the output signal.

5. Calculate the inductance with the help of resonate frequency obtained through graph.

## OBSERVATIONS:

Inductance of Inductor L= H

| S.NO | Frequency f Hz | Amplitude of Output Signal division |
|---|---|---|
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |
| 6 | | |
| 7 | | |
| 8 | | |
| 9 | | |
| 10 | | |
| 11 | | |
| 12 | | |
| 13 | | |
| 14 | | |
| 15 | | |
| 16 | | |
| 17 | | |
| 18 | | |
| 19 | | |
| 20 | | |

## CALCULATION:

### From Grapgh:

1-Value of resonance frequency f= Hz

$C=1/4\pi^2 f^2L$

## RESULT:

1. Characteristics of a rejector circuit studied.It is seen that at resonance frequency the output signal is minimum.
2. The value of conductance is found L= Henry