

Name: _____ Class No.: _____ Group No.: _____ Date of Experiment: _____

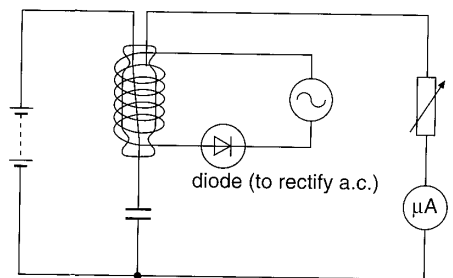
EM12 Experiment: Measurement of capacitance (Reed switch)

Objective: To measure the capacitance of a capacitor using a reed switch.

Apparatus: Reed switch, signal generator (output > 6V), variable resistor (potentiometer), ammeter (0-1mA), battery box (6V), CRO, multimeter (analogy), connecting wires.

Procedure and results:

1. Set the frequency of the signal generator **exactly** at 50Hz and the output voltage to minimum. **Check** the frequency with the CRO.
2. Connect the reed switch directly to the low impedance ($40\ \Omega$) output of the signal generator. **Gradually** increase the output voltage of the signal generator **until** the sound of the vibrating reed is heard. (Hold the reed switch near your ear.)



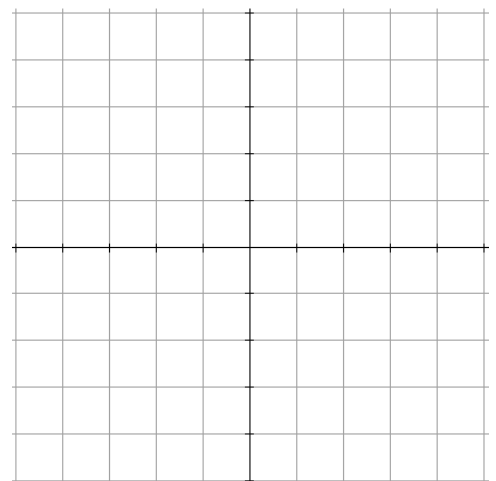
3. Set the resistance of the variable resistor to maximum and connect the circuit as shown in the figure.
4. Connect the CRO across the variable resistor to monitor the potential difference.
5. **Gradually decrease** the resistance of the variable resistor until the capacitor is just **completely** discharge. (Note the variation of the ammeter reading.)
6. Draw the trace in the CRO. Measure the time of fully discharge from the CRO. Disconnect the variable resistor and measure the resistance of the variable resistor by the multimeter.

Resistance of the variable resistor = _____

Time base of CRO: _____

Length of 1cycle in the screen = _____ cm

Time for completely discharge = _____



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7. Connect the multimeter across the battery box to act as a voltmeter.
8. Set the d.c. supply with different voltage. Record the voltage and current flowing in the circuit.

Tabulate the results.

V /V				
I / mA				

Plot a graph of I against V.

PQ1. What is the shape of the graph?

PQ2. What does the shape of the graph show?

Show that $I=fCV$.

Find the capacitance of the capacitor.

To verify that the time for completely discharge is approximately equal to $5RC$.

Questions:

1. What is the physical meaning of capacitance of a capacitor?
2. State an essential condition at which the equation $I=fCV$ is valid.
3. If CRO is not provided in this experiment, how can you know that the capacitor is completely discharged?

Reference: Further Physics Book 2 p.100 - p.102, New Way Physics Book 3 p.80