

ATAL TINKERING LAB

3. CAPACITOR AND RC CIRCUITS

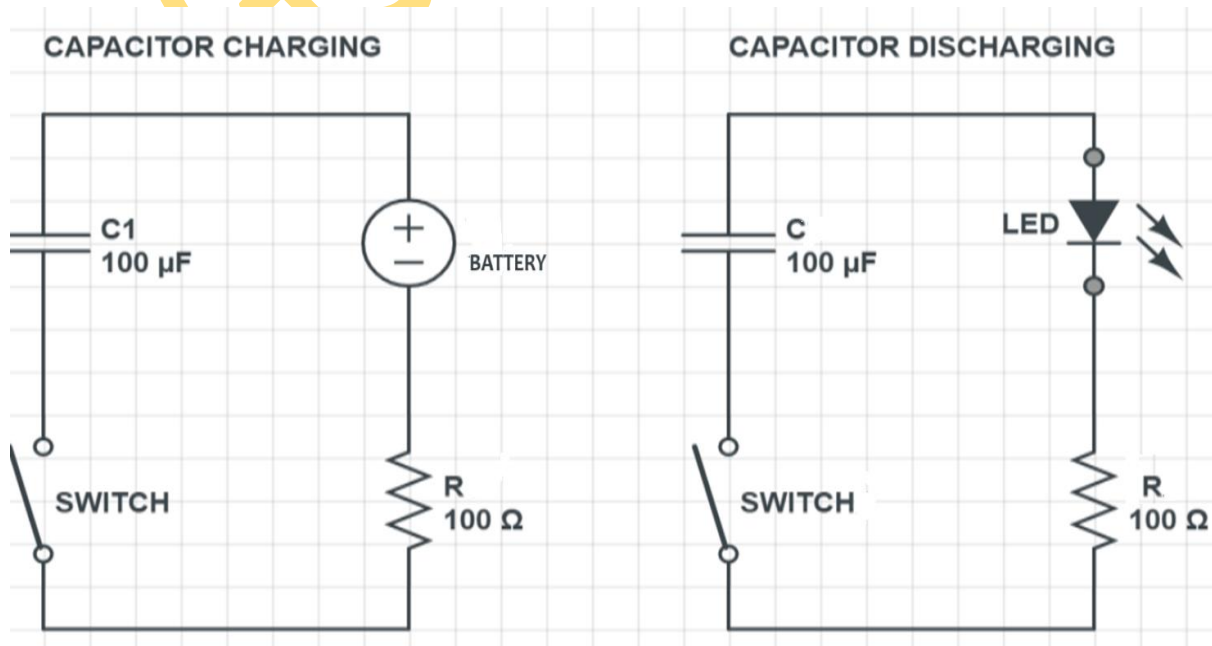
Aim:

- To investigate the charging and discharging process of a capacitor
- To determine the effect of a resistor in the circuit with the capacitor.
- To study Effective capacitance.

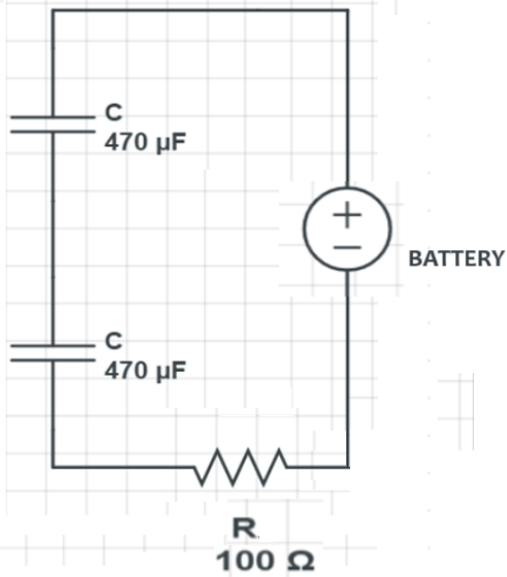
Components Required:

- ✓ PCB Main board / Bread board
- ✓ LED
- ✓ Resistor ($100\ \Omega$)
- ✓ Capacitor ($470\ \mu\text{F}$)
- ✓ Battery
- ✓ Digital Multimeter

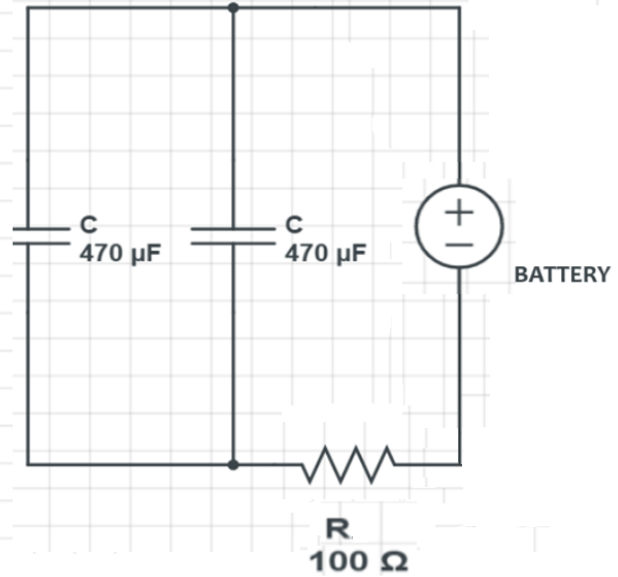
Circuit Diagram:



CAPACITOR IN SERIES



CAPACITOR IN PARALLEL



CONCLUSION:

Series- Total capacitance < Individual capacitance

$$\frac{1}{C_s} = \frac{1}{C_1} + \frac{1}{C_2}$$

Parallel- Total capacitance > Individual capacitance

$$C_p = C_1 + C_2$$

Time taken to charge 63%

$$\tau = R \times C$$

$$= 100\Omega \times 100\mu f$$

$$= 100 \times 100 \times 10^{-6}$$

$$= 0.01 \text{ Seconds.}$$

Full Charge 99%

$$\tau = 5 \times 0.01 = 0.05 \text{ Seconds.}$$

- Adding a resistor to a circuit with a capacitor slows down both the charging and discharging of the capacitor. This happens because the resistor restricts the flow of electric current in the circuit.

AGS ATALLAB