

Energy Stored in a Capacitor

The energy stored in a capacitor is given by the equation:

$$E = \frac{1}{2}CV^2$$

where:

- E is the energy stored (in joules),
- C is the capacitance (in farads),
- V is the voltage across the capacitor (in volts).

Example Problem

Given:

- Capacitance: $C = 10\text{ }\mu\text{F} = 10 \times 10^{-6}\text{ F}$
- Voltage: $V = 100\text{ V}$

Find: Energy stored in the capacitor.

Solution

Use the formula:

$$E = \frac{1}{2}CV^2$$

Substitute the given values:

$$E = \frac{1}{2} \times (10 \times 10^{-6}) \times (100)^2$$

$$E = \frac{1}{2} \times 10 \times 10^{-6} \times 10^4$$

$$E = 5 \times 10^{-6} \times 10^4 = 0.05\text{ J}$$

Answer: The energy stored in the capacitor is 0.05 J.