2022 Ph H1 Q22

Section: Electricity

Topic: Capacitors

Question Summary

A 220 μF capacitor is connected in a circuit with a 12 V battery (negligible internal resistance) and a switch, as shown on the paper. The capacitor is initially uncharged. When the reading on the voltmeter is 7.0 V, what is the charge stored on the capacitor?

Worked Solution

Interpret the diagram: the voltmeter is across the resistor, not the capacitor. So the capacitor voltage is $V_C = 12 - 7 = 5.0$ V.

Use $Q = C\,V$.
$C = 220\ \mu F = 220 \times 10^{-6}$ F.
$Q = 220 \times 10^{-6} \times 5.0 = 1.10 \times 10^{-3}$ C.

Final Answer: C

Revision Tips

- Read circuit symbols carefully — where is the voltmeter connected?
- Q = C V gives instantaneous charge for a given capacitor voltage.
- Convert μF → F before substituting.