

- 7 (a) State what is meant by the *capacitance* of a parallel plate capacitor.

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..... [2]

- (b) A capacitor of capacitance C is connected into the circuit shown in Fig. 7.1.

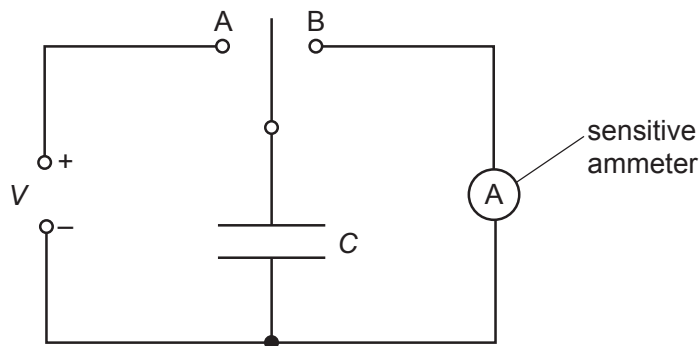


Fig. 7.1

When the two-way switch is in position A, the capacitor is charged so that the potential difference across it is V .

The switch moves to position B and the capacitor fully discharges through the sensitive ammeter.

The switch moves repeatedly between A and B so that the capacitor charges and then discharges with frequency f .

- (i) Show that the average current I in the ammeter is given by the expression

$$I = fCV.$$

[2]

- (ii) For a potential difference V of 150 V and a frequency f of 60 Hz, the average current in the ammeter is $4.8\text{ }\mu\text{A}$.

Calculate the capacitance, in pF, of the capacitor.

capacitance = pF [2]

- (c) A second capacitor, having the same capacitance as the capacitor in (b), is connected into the circuit of Fig. 7.1. The two capacitors are connected in series.

State and explain the new reading on the ammeter.

new reading = μA

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..... [3]