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

.....

.....

..... [2]

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

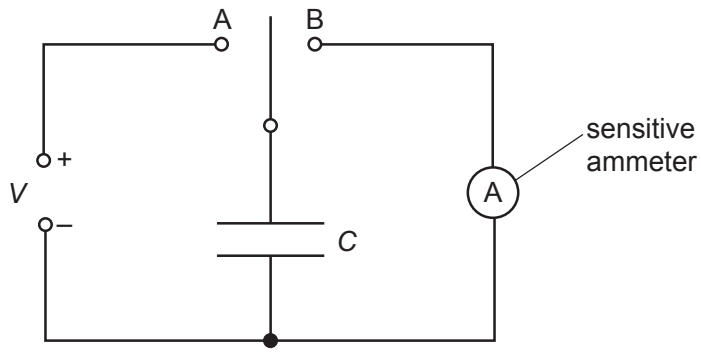

Fig. 7.1

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 μA.

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

.....

.....

..... [3]

[Total: 9]