

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

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[3]

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

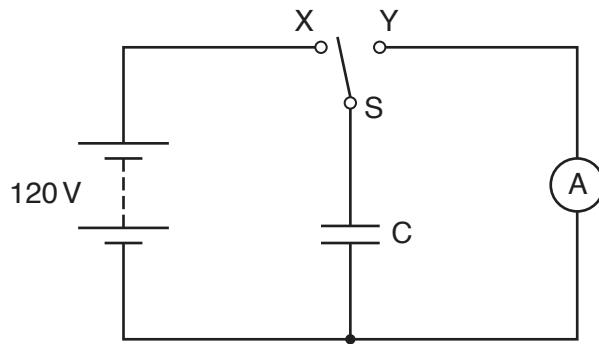


Fig. 7.1

When switch S is at position X, the battery of electromotive force 120 V and negligible internal resistance is connected to capacitor C.

When switch S is at position Y, the capacitor C is discharged through the sensitive ammeter.

The switch vibrates so that it is first in position X, then moves to position Y and then back to position X fifty times each second.

The current recorded on the ammeter is $4.5 \mu\text{A}$.

Determine

- (i) the charge, in coulomb, passing through the ammeter in 1.0 s,

$$\text{charge} = \dots \text{C} [1]$$

- (ii) the charge on one plate of the capacitor, each time that it is charged,

charge = C [1]

- (iii) the capacitance of capacitor C.

capacitance = F [2]

- (c) A second capacitor, having a capacitance equal to that of capacitor C, is now placed in series with C.

Suggest and explain the effect on the current recorded on the ammeter.

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[Total: 9]