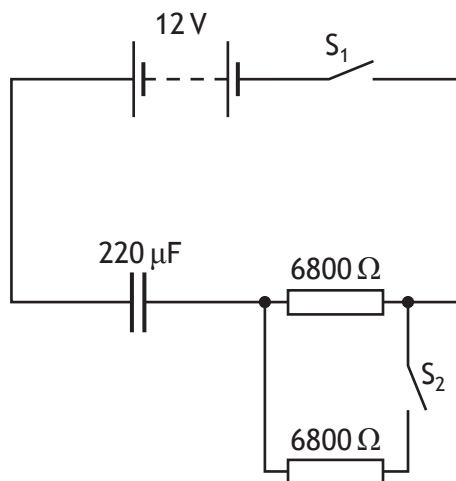


13. An uncharged $220\ \mu\text{F}$ capacitor is connected in a circuit as shown.

MARKS
DO NOT
WRITE IN
THIS
MARGIN



The 12 V battery has negligible internal resistance.

- (a) Switch S_1 is closed and the capacitor charges in a time of $7.5\ \text{s}$.

Calculate the initial charging current.

3

Space for working and answer

- (b) Switch S_1 is opened.

The capacitor is discharged.

Switch S_2 is now closed and then switch S_1 is closed.

Explain why the time for the capacitor to fully charge is less than in part (a).

2

