

A level Physics B

H557/02 Scientific literacy in physics

Question Set 2

1

This question is about charging a capacitor in a circuit with two resistors in series.

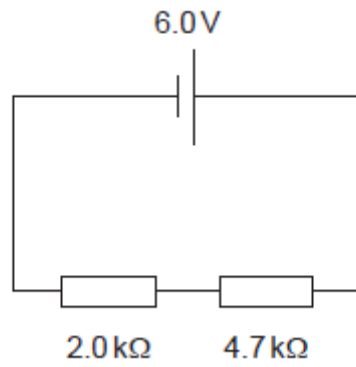


Fig. 1.1

- (a) Show that the p.d. across the 4.7 kΩ resistor in the circuit in **Fig. 1.1** is about 4 V, assuming that the cell has zero internal resistance. [2]
- (b) A student changes the circuit as shown in **Fig. 1.2**

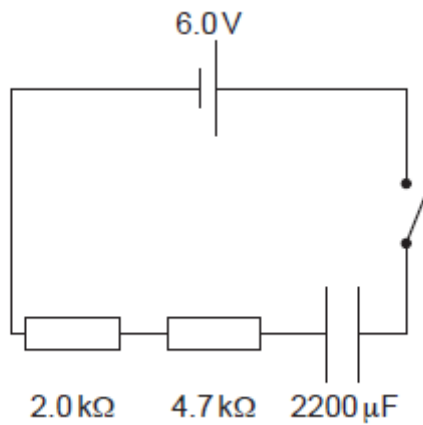


Fig. 1.2

Show that the time constant of the circuit is about 15 s. [2]

- (c) The graph in **Fig. 1.3** shows how the p.d. across the capacitor varies with time up to $5RC$.

Add a line to the graph that shows how the p.d. across the **4.7 k Ω resistor** varies with time.

Add another line to show how the p.d. across the **2.0 k Ω resistor** varies with time. Label the lines.

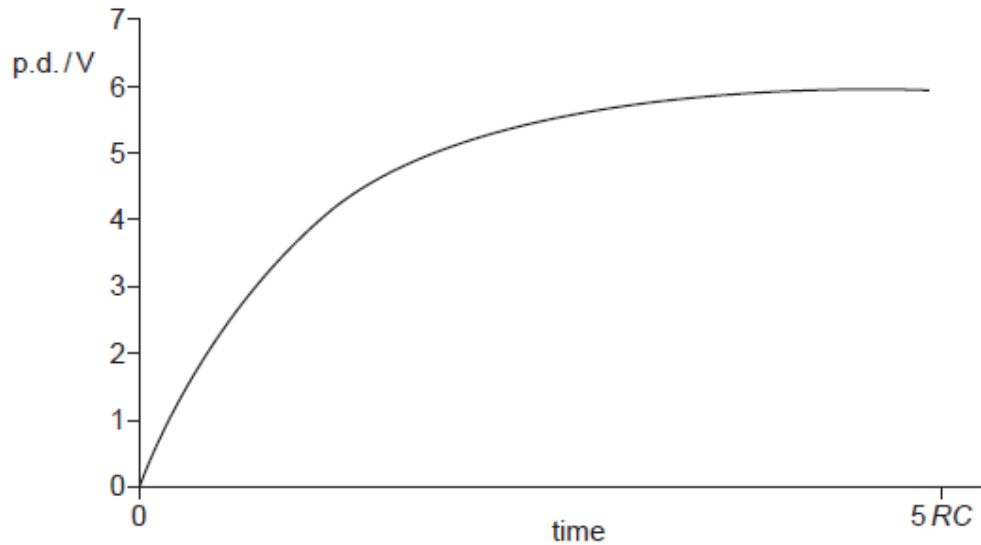


Fig. 1.3

[2]

- (d) Calculate the time it takes from the start of the charging for the p.d across the capacitor to reach 5.0 V.

time = s [4]

Total Marks for Question Set 2: 10

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