6 An uncharged capacitor is connected in series with a battery, a switch and a resistor, as shown in Fig. 6.1.

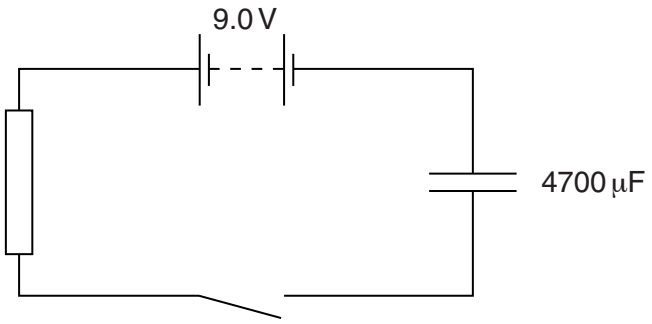

Fig. 6.1

The battery has e.m.f. 9.0 V and negligible internal resistance. The capacitance of the capacitor is 4700 μF.
The switch is closed at time $t = 0$.
During the time interval $t = 0$ to $t = 4.0$ s, the charge passing through the resistor is 22 mC.

(a) (i) Calculate the energy transfer in the battery during the time interval $t = 0$ to $t = 4.0$ s.

energy transfer = ... J [2]

(ii) Determine, for the capacitor at time $t = 4.0$ s,

1. the potential difference V across the capacitor,

V = ... V [2]

2. the energy stored in the capacitor.

energy = ... J [2]

(b) Suggest why your answers in **(a)(i)** and **(a)(ii) part 2** are different.

.....

..... [1]