6 Fig. 6.1 shows a capacitor of capacitance C connected in series with a resistor of resistance R.

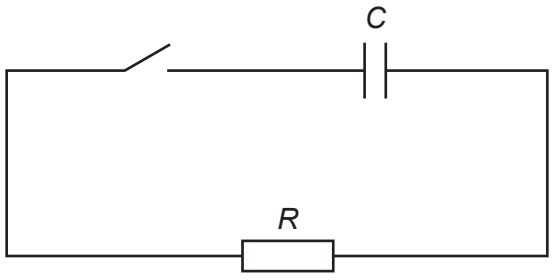

Fig. 6.1

Initially the switch is open and there is a p.d. of 12 V across the capacitor.

At time $t = 0$, the switch is closed so that there is a current I in the resistor.

Fig. 6.2 shows the variation of I with t.

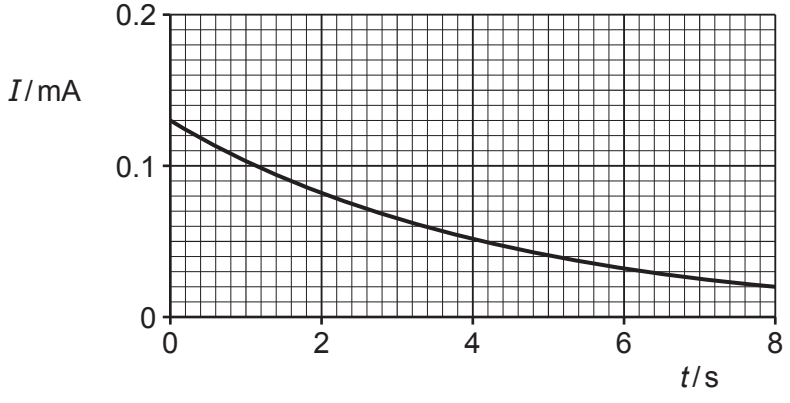

Fig. 6.2

(a) Explain the shape of the line in Fig. 6.2.

.....

.....

.....

.....

..... [3]

(b) Use Fig. 6.2 to determine:

(i) resistance R

R = ... Ω [2]

(ii) the time constant τ of the circuit in Fig. 6.1.

τ = ... s [3]

(c) Use your answers in **(b)** to determine capacitance C.

C = ... F [2]

[Total: 10]