5 **(a)** State one function of capacitors in simple circuits.

....

....[1]

(b) A capacitor is charged to a potential difference of 15 V and then connected in series with a switch, a resistor of resistance 12 kΩ and a sensitive ammeter, as shown in Fig. 5.1.
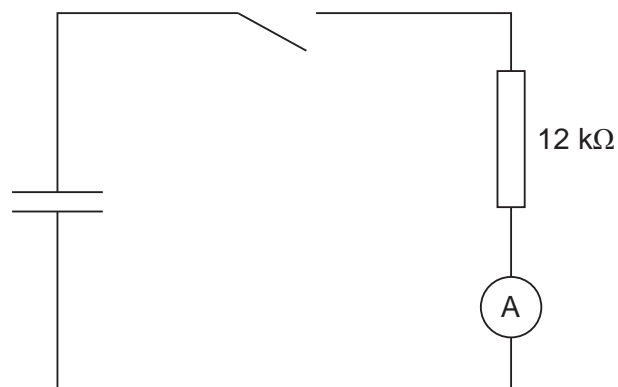

12 kΩ

A

Fig. 5.1

The switch is closed and the variation with time t of the current I in the circuit is shown in Fig. 5.2.
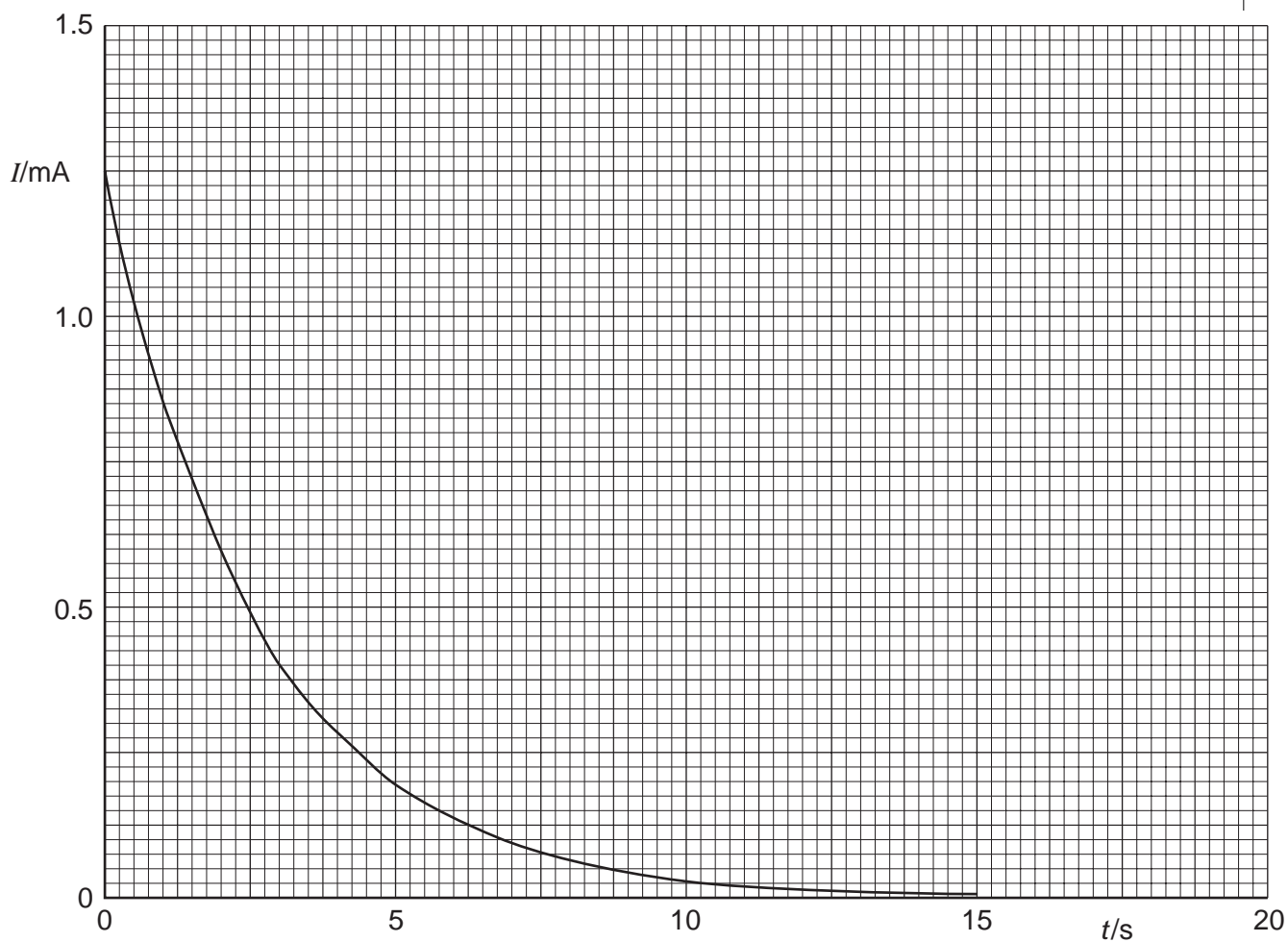

Fig. 5.2

(i) State the relation between the current in a circuit and the charge that passes a point in the circuit.

....

....[1]

(ii) The area below the graph line of Fig. 5.2 represents charge.
Use Fig. 5.2 to determine the initial charge stored in the capacitor.

charge = ... µC [4]

(iii) Initially, the potential difference across the capacitor was 15 V.
Calculate the capacitance of the capacitor.

capacitance = ... µF [2]

(c) The capacitor in **(b)** discharges one half of its initial energy. Calculate the new potential difference across the capacitor.

potential difference = ...V [3]