7 **(a)** State what is meant by the *frequency of an alternating current*.

……

……

…… [1]

(b) An alternating current I in a resistor of resistance 680 Ω varies with time t according to

$$I = 3.5\sin(40\pi t)$$

where I is in A and t is in s.

(i) Show that the period of the alternating current is 50 ms.

[1]

(ii) On Fig. 7.1, sketch the variation of I with t between t = 0 and t = 100 ms.

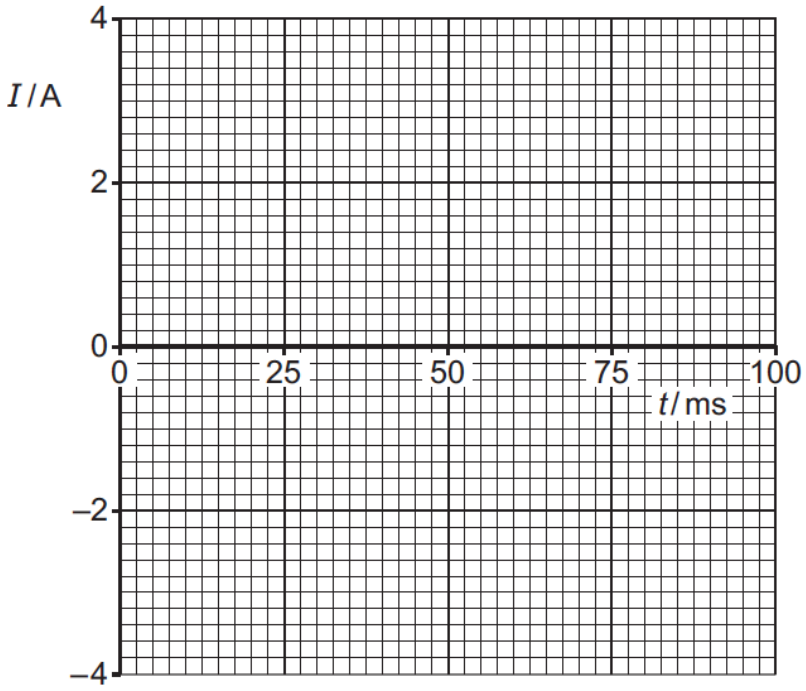

Fig. 7.1

[3]

(iii) Determine the root-mean-square (r.m.s.) current in the resistor.

r.m.s current = ... A [1]

(c) Use data from **(b)**, including your answer in **(b)(iii)**, show by calculation that the mean power in the 680 Ω resistor is half of the peak power.

[3]

[Total: 9]