6 Fig. 6.1 shows a resistor connected to an alternating power supply with an output potential difference (p.d.) V.

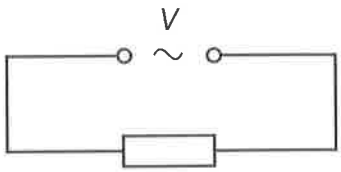

Fig. 6.1

Fig. 6.2 shows the variation with time t of the power P dissipated in the resistor.

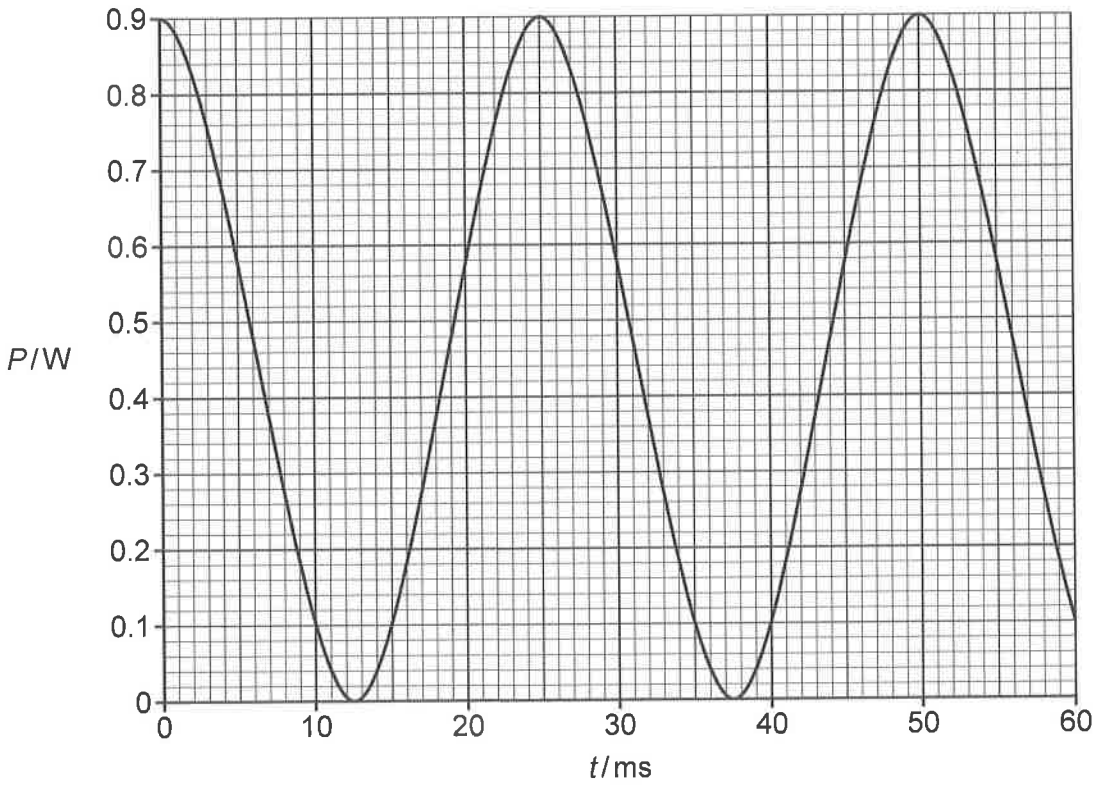

Fig. 6.2

(a) The variation of V with t is given by:

$$V = V_0 \cos 2\pi ft$$

where f is the frequency of the alternating power supply and V_0 is the peak voltage.

(i) Determine f.

$f =$ .....Hz [2]

(ii) The peak current in the resistor is 0.12A.

Determine the root-mean-square (r.m.s.) value of the output p.d. of the supply.

r.m.s. output p.d. = ...V [3]

(b) With reference to Fig. 6.2, explain why the mean power dissipated in the resistor is equal to half of the maximum power.

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..... [2]

[Total: 7]