

- 5 (a) By reference to heating effect, state what is meant by the *root-mean-square* (r.m.s.) value of an alternating current.

.....

.....

..... [2]

- (b) An alternating power supply is connected to a resistor of resistance  $58\ \Omega$ , as shown in Fig. 5.1.

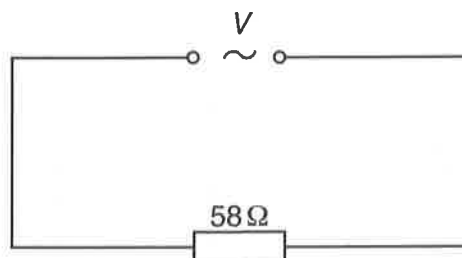


Fig. 5.1

The variation with time  $t$  of the potential difference  $V$  across the supply is given by the expression

$$V = 170 \sin 377t.$$

Determine

- (i) the root-mean-square (r.m.s.) potential difference  $V_{\text{rms}}$  of the supply

$$V_{\text{rms}} = \dots\dots\dots \text{ V [1]}$$

- (ii) the frequency  $f$  of the supply

$$f = \dots\dots\dots \text{ Hz [2]}$$

- (iii) the mean power  $P$  transferred in the resistor.

$$P = \dots\dots\dots \text{ W [2]}$$





- (c) Use your answers in (b) to sketch, on the axes of Fig. 5.2, the variation with time  $t$  of the power  $P$  transferred in the resistor. Include on your graph a time equal to two periods of the alternating potential difference.

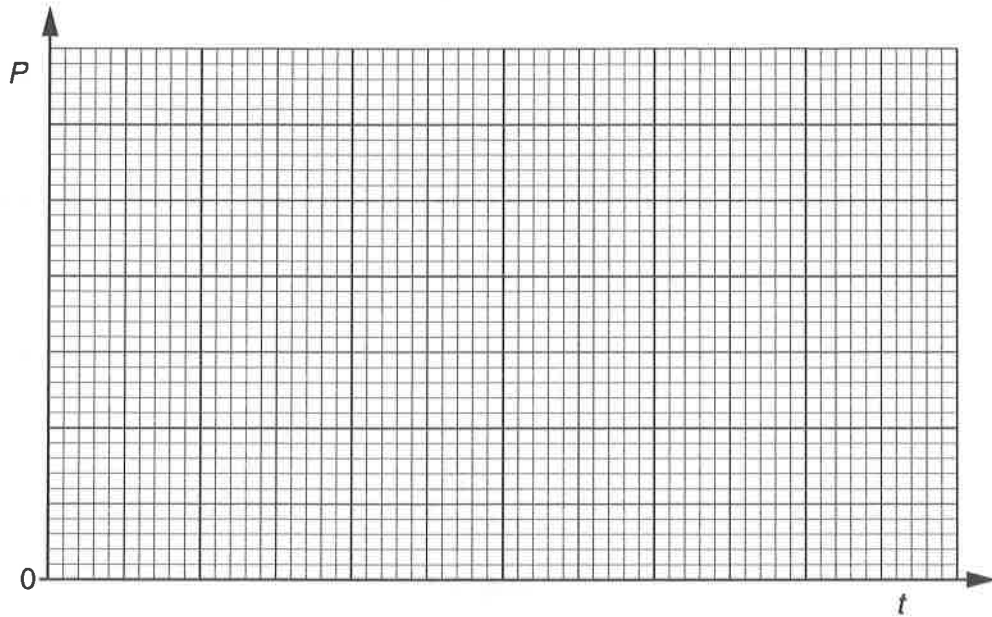


Fig. 5.2

[3]

[Total: 10]

