

- 5 Fig. 5.1 shows an a.c. power supply connected to three resistors.

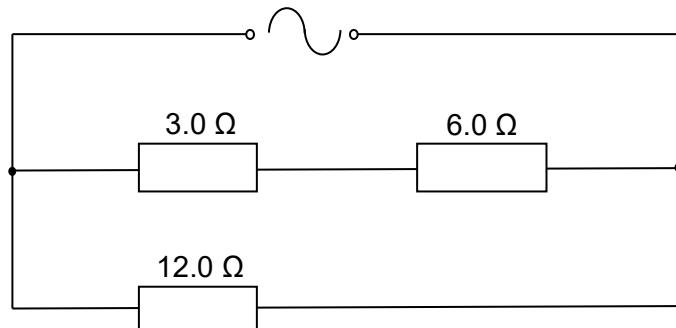


Fig. 5.1

The variation with time  $t$  of the voltage  $V$  of the power supply is given by the expression:

$$V = 15 \sin 628t$$

(a) Determine, for the power supply,

(i) the period  $T$  of the a.c. voltage,

$$T = \dots \text{ s} [1]$$

(ii) the root-mean-square (r.m.s.) voltage  $V_{rms}$ ,

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

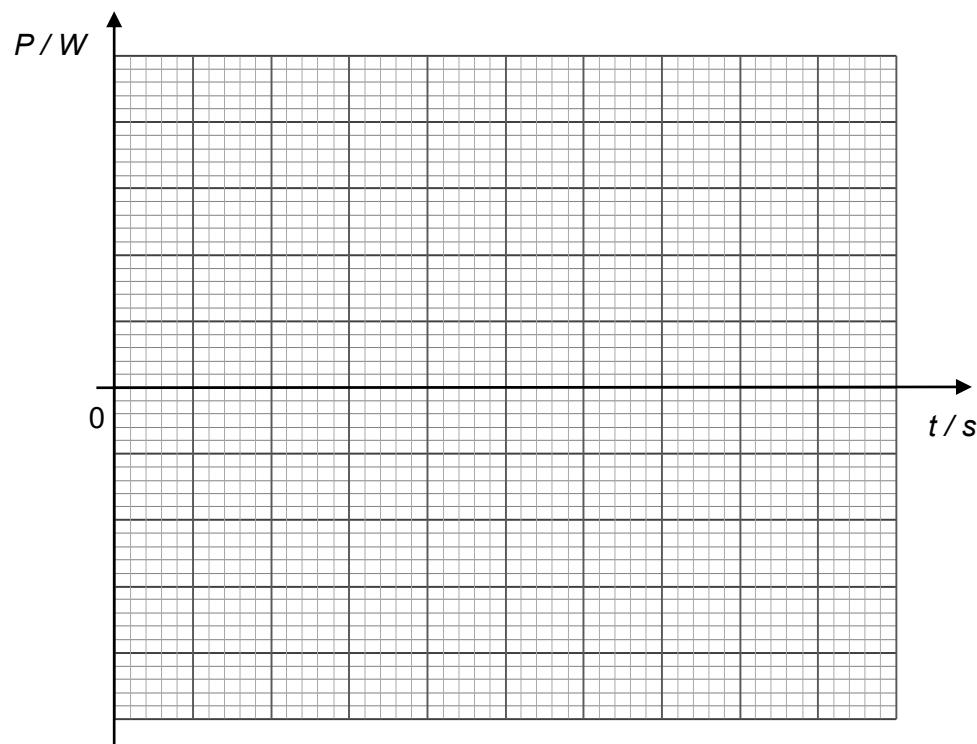
(iii) the peak current  $I_0$  from the power supply,

$$I_0 = \dots \text{A} [2]$$

- (iv) the mean power  $\langle P \rangle$  dissipated in the resistor of resistance  $6.0 \Omega$ .

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

- (b) Use your answers in (a) to sketch, on the axes of Fig 5.2, the variation with time  $t$  of the power  $P$  transferred in the  $6.0 \Omega$  resistor, for two complete periods of the alternating potential difference. Label your axes and indicate relevant values.



**Fig. 5.2**

[3]

[Total: 9]

