7 **(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 supply is connected to a heater, as shown in Fig. 7.1.
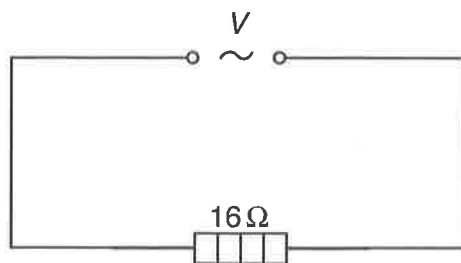

Fig. 7.1

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

$$V = 24 \sin 440t,$$

where V is in volts and t is in seconds.

Determine, for the supply,

(i) the r.m.s. potential difference,

r.m.s. potential difference = ... V [1]

(ii) the frequency, in Hz.

frequency = ... Hz [1]

(c) The heater in **(b)** has resistance $16\,\Omega$.

(i) Calculate the mean power dissipated in the heater.

power = ... W [2]

(ii) On Fig. 7.2, show the variation with time t of the power P dissipated in the heater for two periods of the alternating voltage. The alternating voltage has period T.
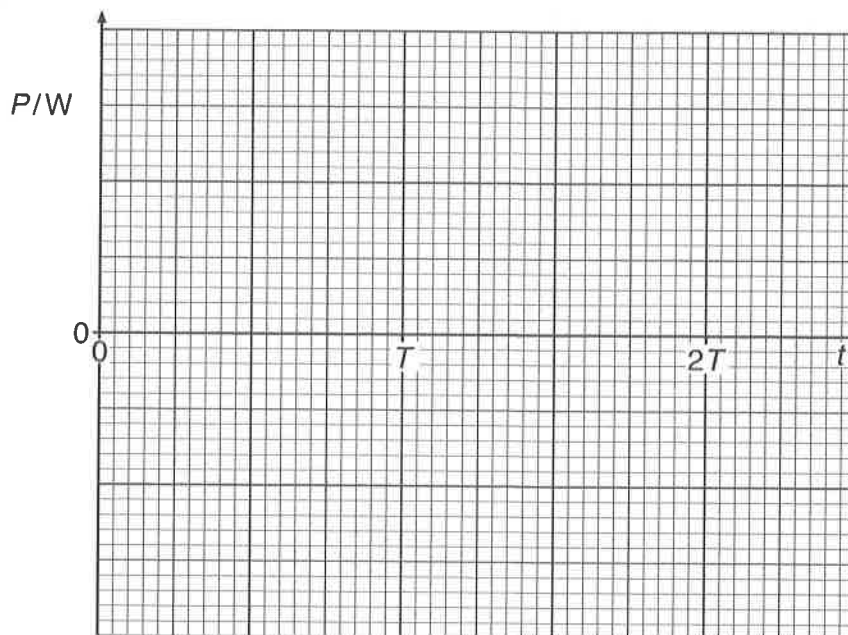

Fig. 7.2

[3]

[Total: 9]