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

.....

.....

..... [1]

(b) An alternating power supply is connected to a switch S, an ideal diode and two identical resistors R_1 and R_2, as shown in Fig. 6.1. Each resistor has a resistance of 18 Ω.

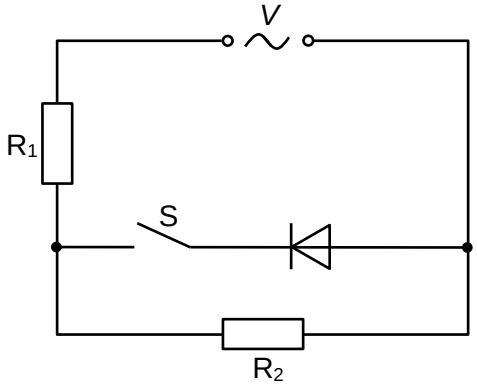

Fig. 6.1

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

$$V = 24 \sin 314\, t$$

where *V* is in volts and *t* is in seconds.

(i) Switch S is closed.

On Fig. 6.2, show the variation with time t of the potential difference V_1 across R_1 for two periods of the alternating voltage.

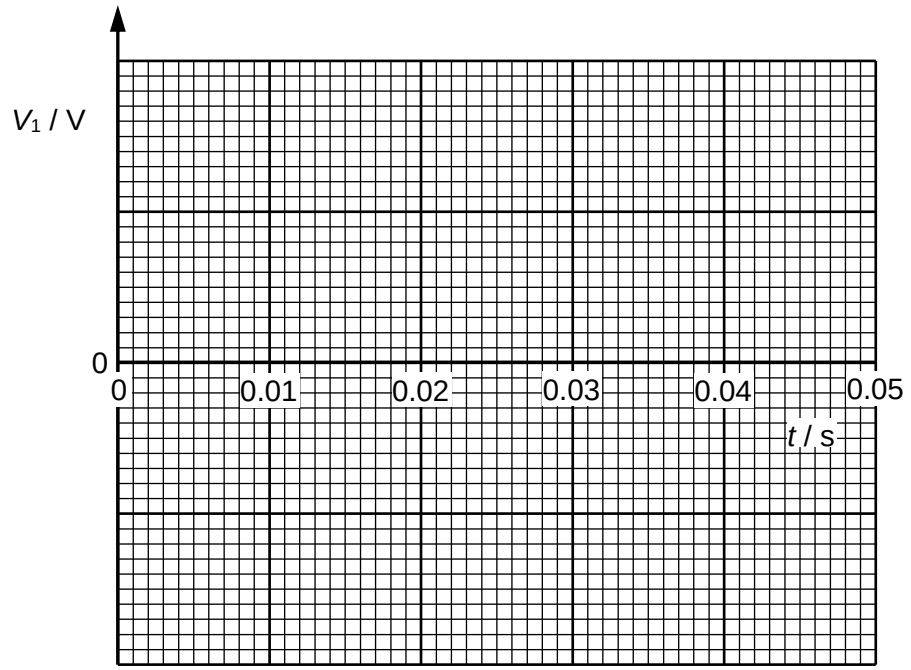

Fig. 6.2

[2]

(ii) Switch S is opened.

On Fig. 6.3, draw the variation with time t of the power P_1 transferred in R_1 for two periods of the alternating voltage.

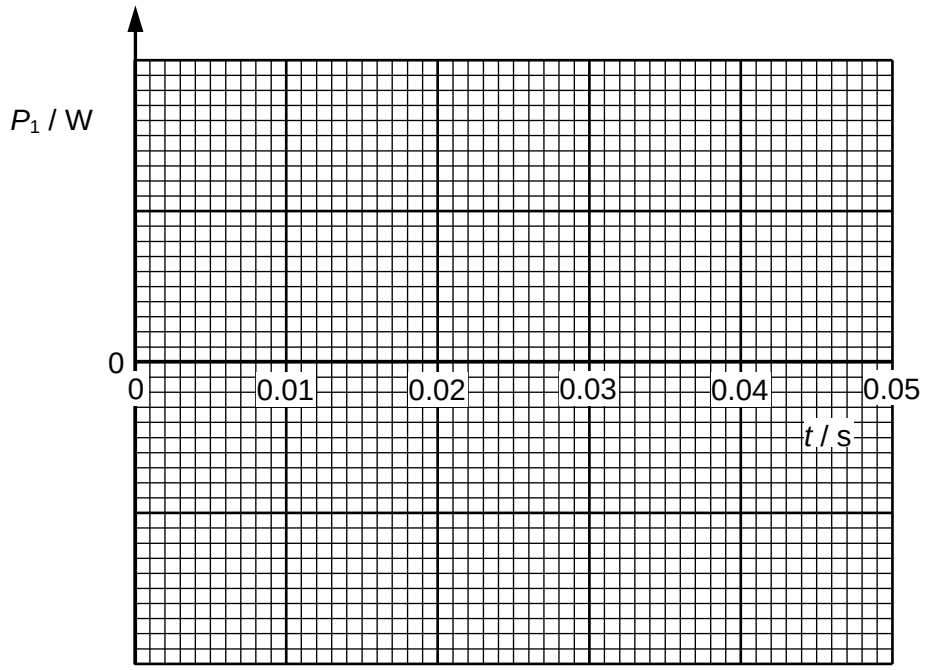

Fig. 6.3

[2]

[Total: 5]