7 A circuit contains a power supply that provides a sinusoidal alternating input voltage V_{IN}. There is an output voltage V_{OUT} across a load resistor R, as shown in Fig. 7.1.

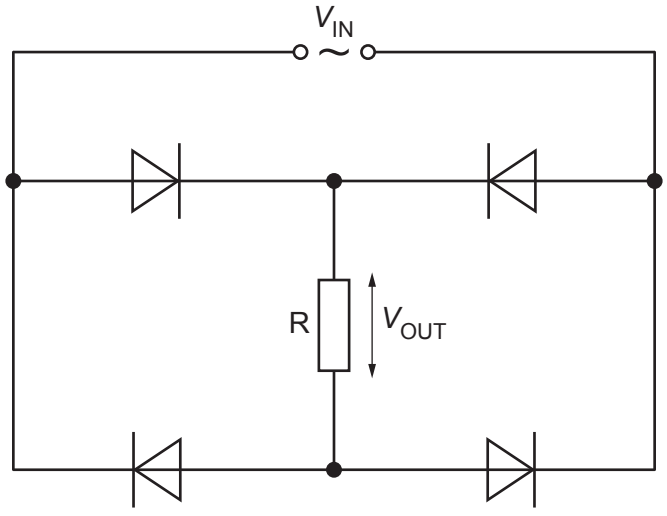

Fig. 7.1

(a) State the purpose of the circuit in Fig. 7.1.

.....

.....

..... [2]

(b) Fig. 7.2 shows the variation of V_{OUT} with time t.

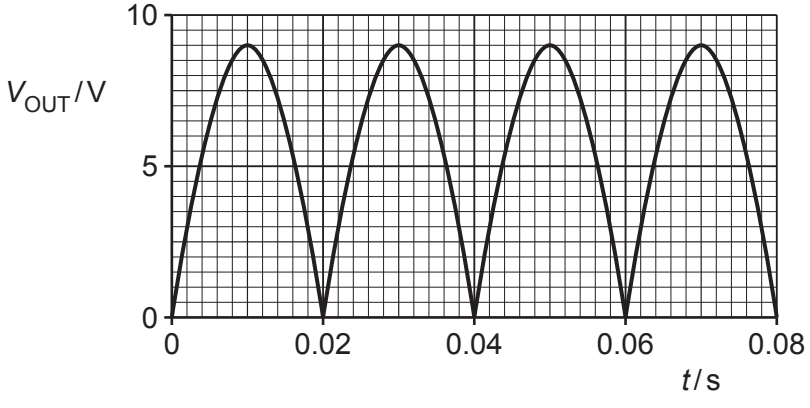

Fig. 7.2

(i) The load resistor R has a resistance of 370 Ω.

Show that the maximum power dissipated in R is 0.22 W.

[2]

(ii) On Fig. 7.3, sketch the variation with *t* of the power *P* dissipated in R.

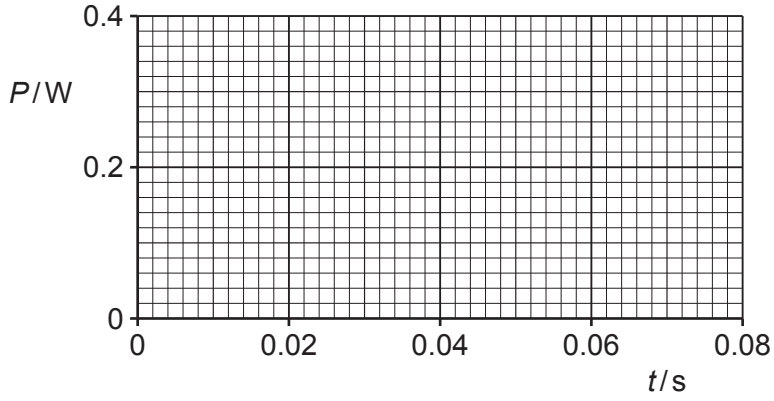

Fig. 7.3

[3]

(iii) Calculate the mean power dissipated in R.

mean power = ... W [1]

(c) The circuit of Fig. 7.1 is disconnected, and R is connected directly across the power supply.

Explain, without calculation, how the mean power now dissipated in R compares with the answer in **(b)(iii)**.

.....

.....

..... [2]

[Total: 10]