

- 7 (a) The variation of the voltage V with time t of a periodic voltage source is shown in Fig. 7.1.

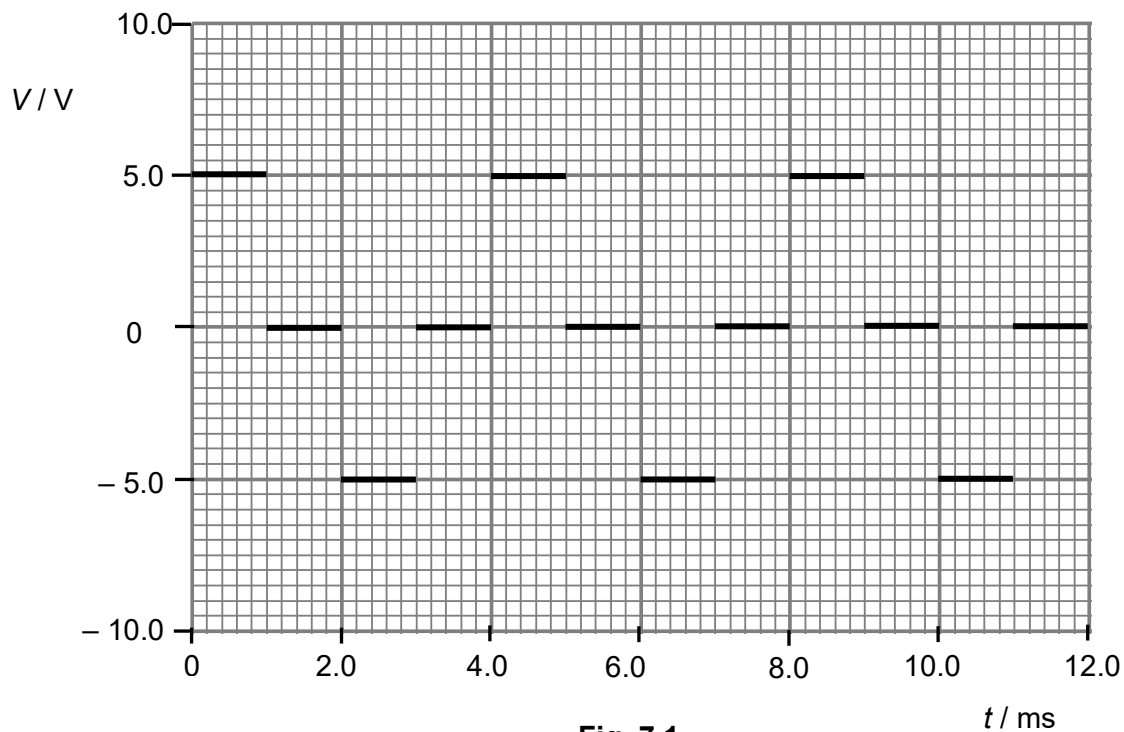


Fig. 7.1

The source is connected to an $8.0 \, \Omega$ resistor and a diode as shown in Fig. 7.2.

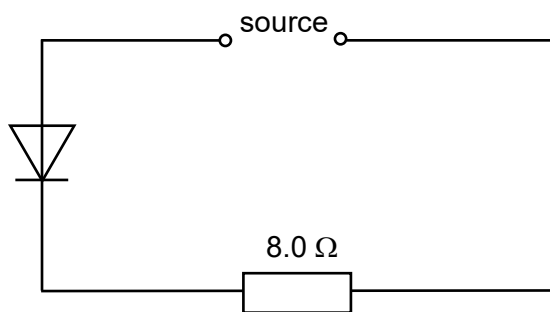


Fig. 7.2

- (i) Determine the root-mean-square voltage across the resistor.

root-mean-square voltage = V [2]

- (ii) Determine the average power dissipated in the resistor.

average power = W [1]

- (b) The voltage source in (a) is replaced by another voltage source represented by the equation:

$$V = V_0 \sin(\omega t)$$

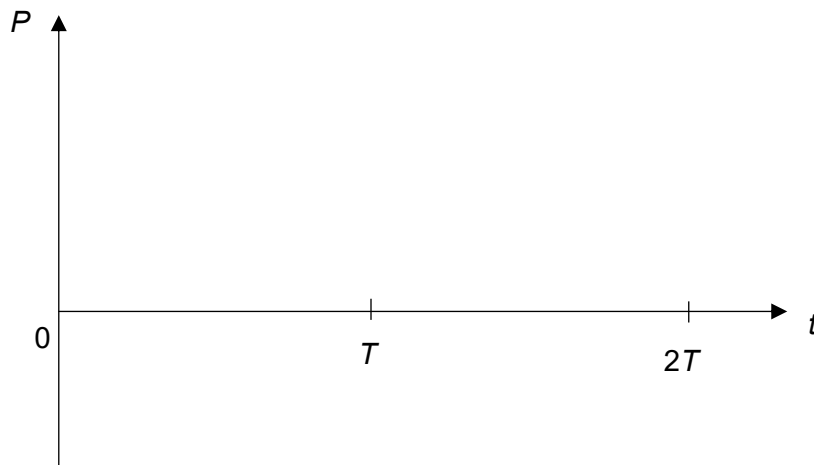
where ω and V_0 are constants, V is in volts and t is in seconds.

- (i) The average power dissipated in the resistor using this source has the same value as (a)(ii).

Determine the value of V_0 .

$V_0 =$ V [2]

- (ii) The new voltage source has period T . Sketch the variation of the instantaneous power P dissipated in the resistor with time t for two periods of this new voltage source.



[1]