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3 An a.c. power supply is connected to a resistor R, as shown in Fig. 3.1.

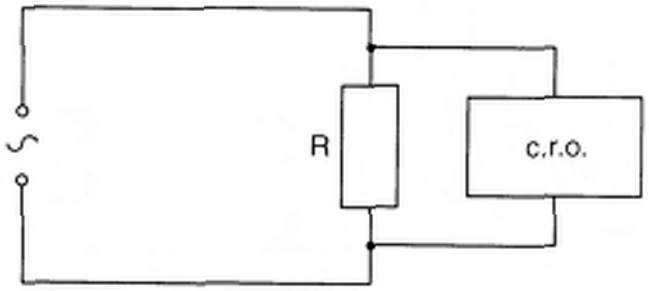

Fig. 3.1

A cathode ray oscilloscope (c.r.o.) is used to show the potential difference (p.d.) across R. The screen of the c.r.o. displays the variation with time of the p.d. across R, as shown in Fig. 3.2.

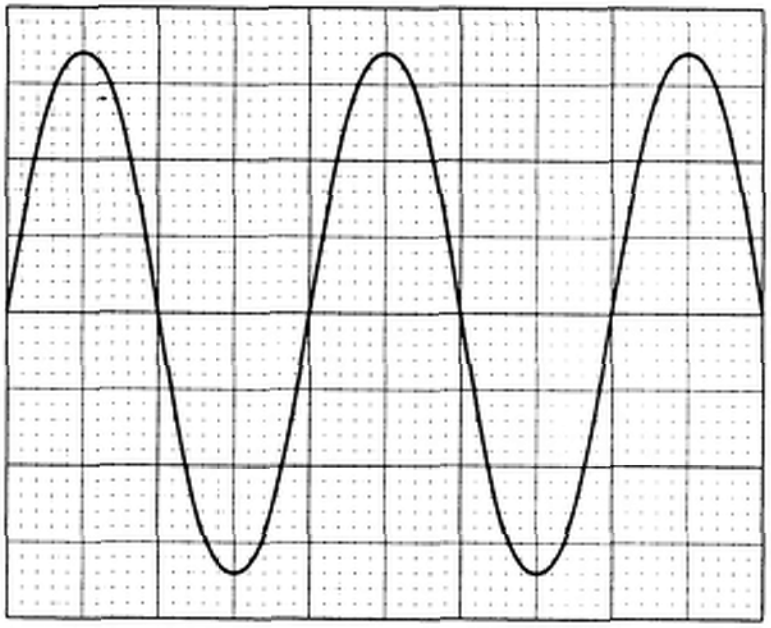

Fig. 3.2

On the vertical scale, 1.0cm represents 5.0V. On the horizontal scale, 1.0cm represents 10ms.

(a) Use Fig. 3.2 to determine

(i) the frequency of the a.c. supply,

frequency = ... Hz [2]

(ii) the peak p.d. across resistor R.

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peak p.d. = ... V [1]

(b) The resistance of R is 500 Ω.

Calculate

(i) the r.m.s. current in R,

r.m.s. current = ... A [2]

(ii) the mean power transformed in R.

mean power = ... W [2]