7 Fig. 7.1 shows an ideal transformer. The primary coil of the transformer has 4000 turns and is connected to a sinusoidal a.c. supply. The secondary coil has 200 turns and is connected to a 4.8 Ω load resistor and a diode.

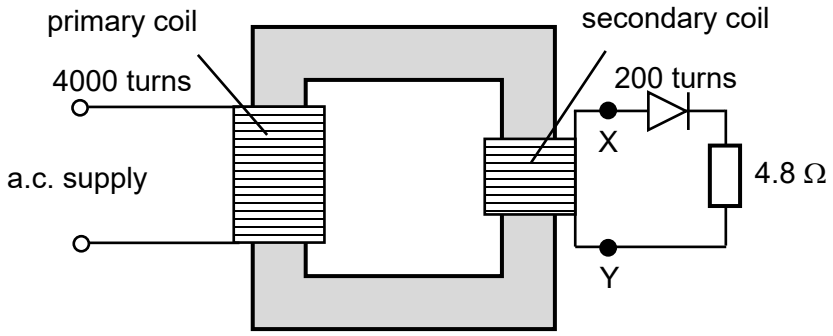

Fig. 7.1

V_{XY} is the potential of X with respect to Y. The variation with time t of V_{XY} is shown in Fig. 7.2.

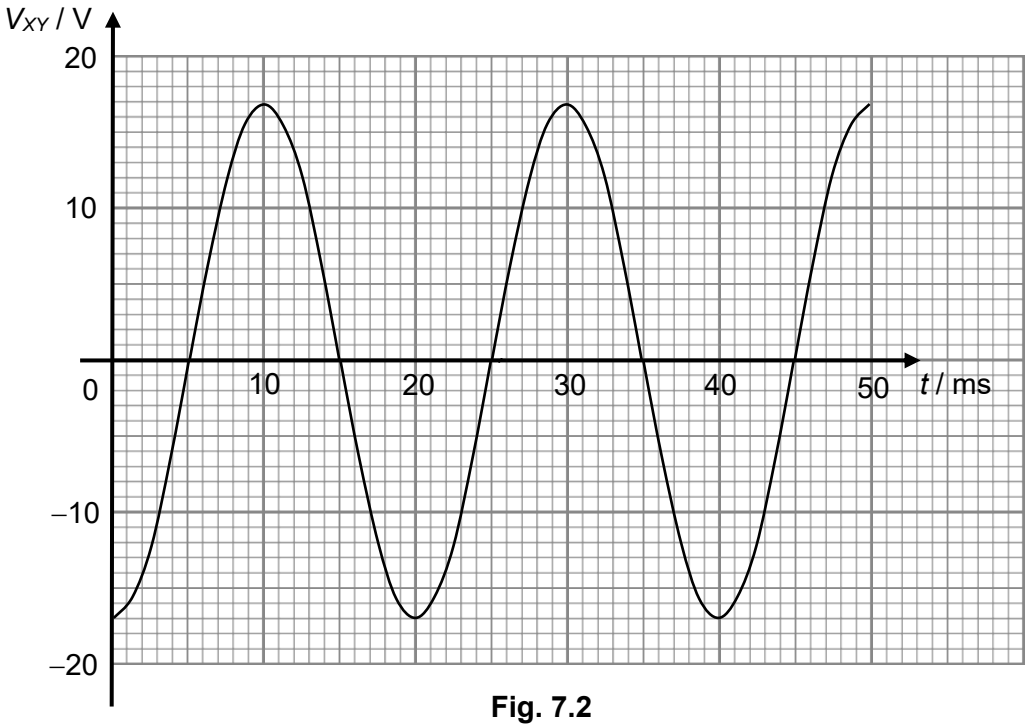

Fig. 7.2

(a) Determine the frequency of the a.c. supply.

frequency = ... Hz [1]

(b) Calculate the root-mean-square value of V_{XY}.

root-mean-square value of V_{XY} = ... V [1]

(c) Determine the root-mean-square voltage of the a.c. supply.

root-mean-square voltage = ... V [2]

(d) Determine the mean power dissipated in the load resistor.

mean power = ... W [2]

(e) With reference to Fig. 7.2, describe and explain how the potential difference across the load resistor varies with time.

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.....

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[2]

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