6 **(a)** An alternating power supply is connected to a resistor *R*, a diode and an ideal battery of e.m.f. 6.0 V as shown below in Fig. 6.1.

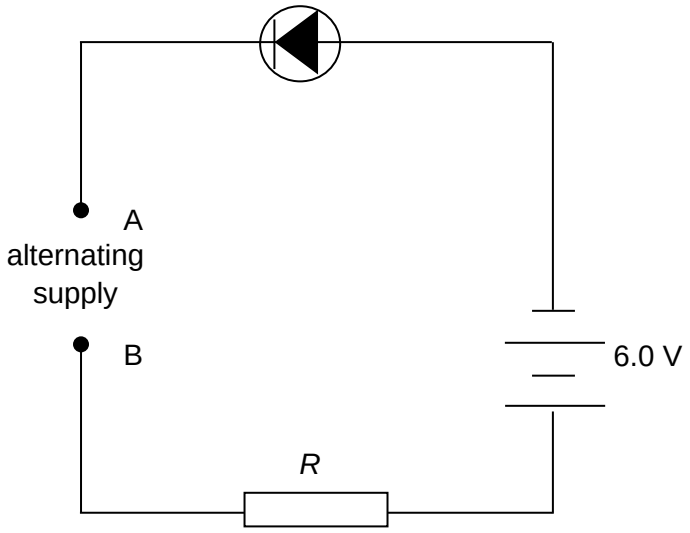

Fig. 6.1

The variation of the potential of A with respect to B, V_{AB}, is as shown in Fig. 6.2.

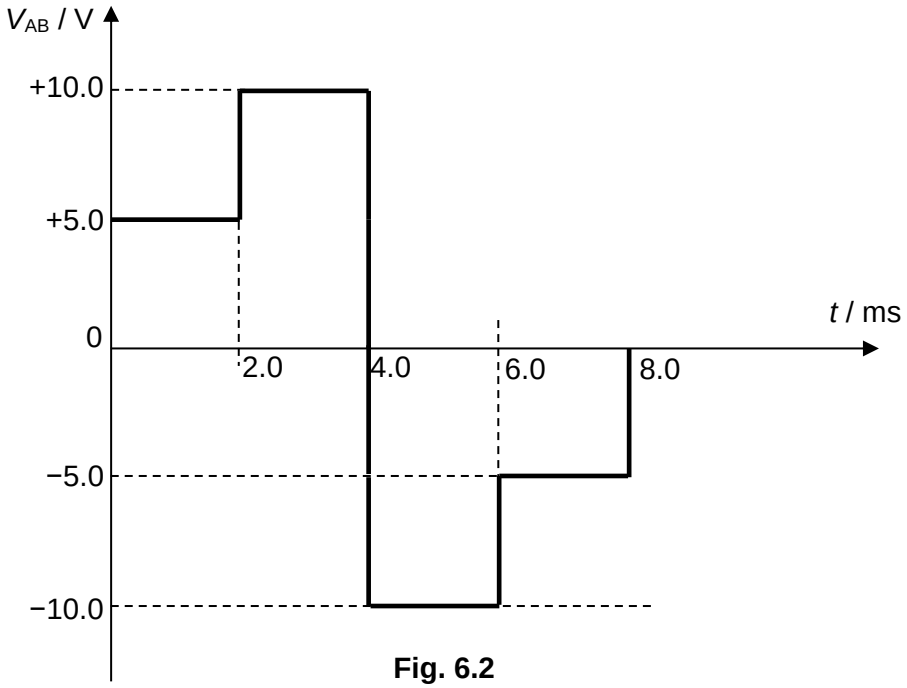

Fig. 6.2

(i) Calculate the root-mean-square potential difference V_{rms} across points A and B.

V_{rms} = …… V [2]

(ii) Determine the potential difference across resistor *R* when

1. V_{AB} = +5.0 V

potential difference = …… V [1]

2. V_{AB} = −10.0 V

potential difference = …… V [2]

(iii) Hence, sketch on Fig. 6.3 the variation with time *t* of the potential difference V_R across *R*.

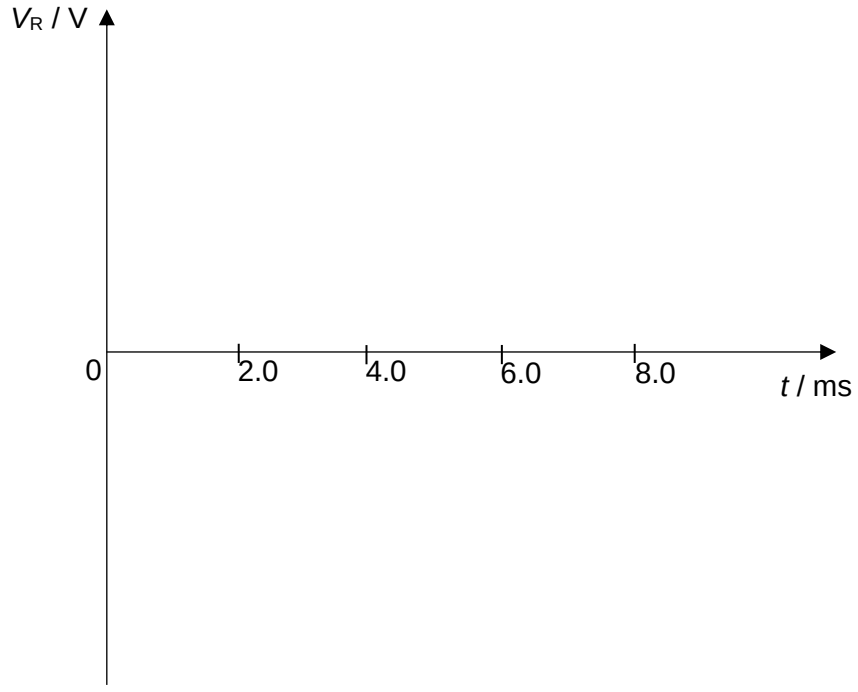

Fig. 6.3 [2]

(b) Explain an advantage of using alternating current to transmit electrical energy.

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…… [2]