7 A metal wire is held taut between the poles of a permanent magnet, as illustrated in Fig. 7.1.

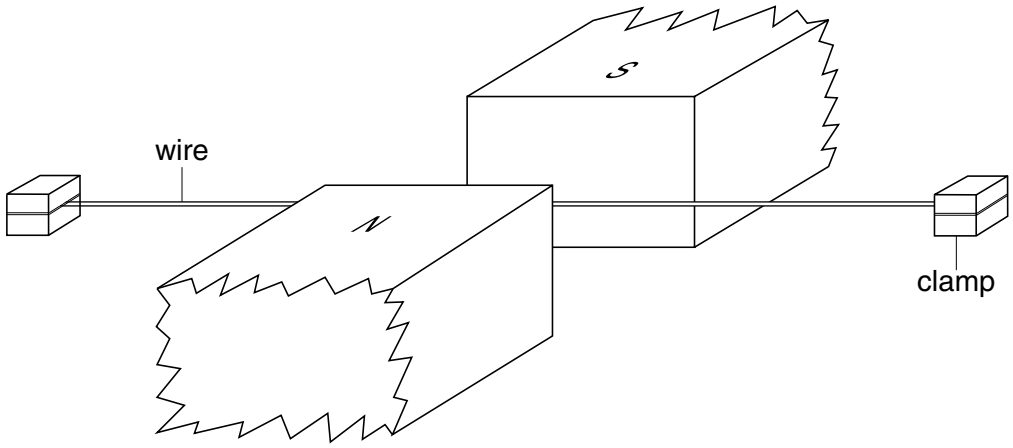

Fig. 7.1

A cathode-ray oscilloscope (c.r.o.) is connected between the ends of the wire. The Y-plate sensitivity is adjusted to 1.0 mV cm^{-1} and the time base is 0.5 ms cm^{-1}.

The wire is plucked at its centre. Fig. 7.2 shows the trace seen on the c.r.o.

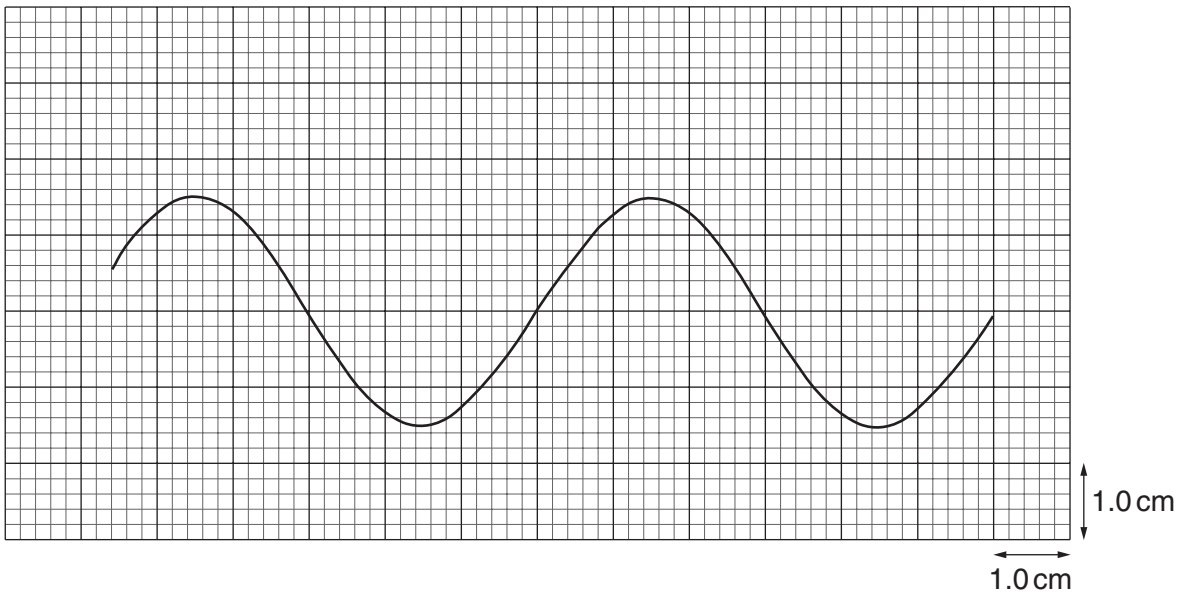

Fig. 7.2

(a) Making reference to the laws of electromagnetic induction, suggest why

(i) an e.m.f. is induced in the wire,

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.....

.....

(ii) the e.m.f. is alternating.

.....

.....

.....

[4]

(b) Use Fig. 7.2 and the c.r.o. settings to determine the equation representing the induced alternating e.m.f.

equation: ..... [4]