8 A horseshoe magnet is placed on a top pan balance. A rigid copper wire is fixed between the poles of the magnet, as illustrated in Fig. 8.1.
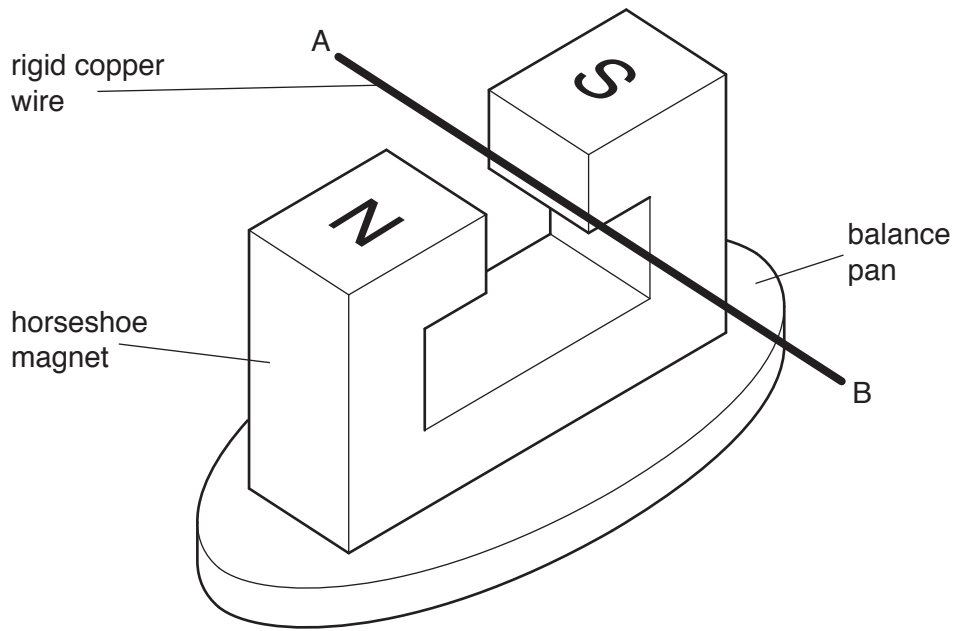

Fig. 8.1

The wire is clamped at ends A and B.

(a) When a direct current is switched on in the wire, the reading on the balance is seen to **decrease**.

State and explain the direction of:

(i) the force acting on the wire

....

....

....

.... [3]

(ii) the current in the wire.

....

....

.... [2]

(b) A direct current of 4.6A in the wire causes the reading on the balance to change by 4.5×10^{-3} N.

The direct current is now replaced by an alternating current of frequency 40Hz and root-mean-square (r.m.s.) value 4.6A.

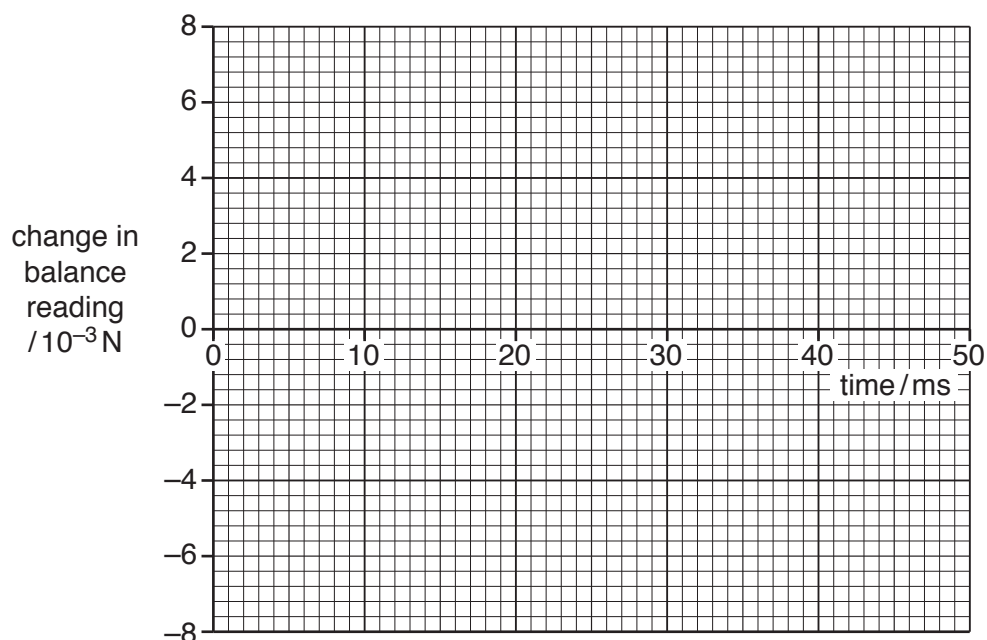On the axes of Fig. 8.2, sketch a graph to show the change in balance reading over a time of 50ms.

Fig. 8.2

[3]

[Total: 8]

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