

5 (a) Define the *tesla*.

For  
Examiner's  
Use

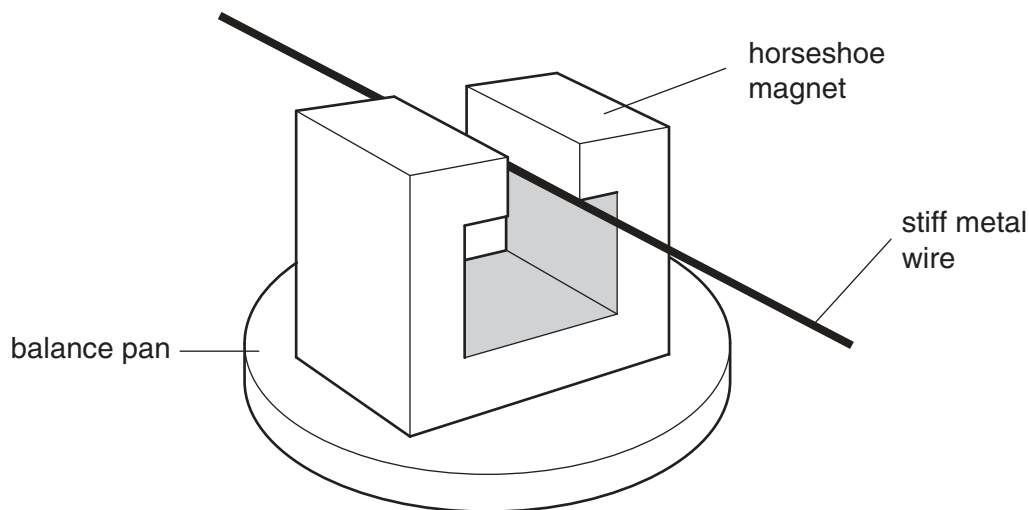
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.....[3]

(b) A horseshoe magnet is placed on a balance. A stiff metal wire is clamped horizontally between the poles, as illustrated in Fig. 5.1.



**Fig. 5.1**

The magnetic flux density in the space between the poles of the magnet is uniform and is zero outside this region.

The length of the metal wire normal to the magnetic field is 6.4 cm.

When a current in the wire is switched on, the reading on the balance increases by 2.4 g. The current in the wire is 5.6 A.

(i) State and explain the direction of the force on the wire due to the current.

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- (ii) Calculate the magnitude of the magnetic flux density between the poles of the magnet.

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flux density = .....T [2]

- (c) A low frequency alternating current is now passed through the wire in (b).  
The root-mean-square (r.m.s.) value of the current is 5.6 A.

Describe quantitatively the variation of the reading seen on the balance.

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.....[2]