4 **(a)** Define magnetic flux density.

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.....

..... [2]

(b) A metal rod XY is fixed horizontally, perpendicular to the uniform magnetic field of a magnet. The length of the rod in the magnetic field is 12 cm.

The magnet is on a balance and the North and South poles of the magnet are as shown in Fig. 4.1.

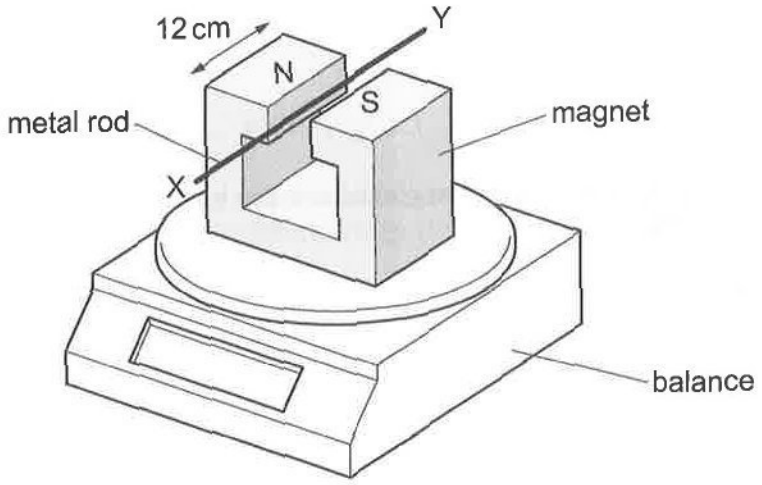

Fig. 4.1

(i) The ends of the rod are connected to a d.c. power supply. When the power supply is switched on, the reading on the balance decreases.

State and explain the direction of the current in the rod.

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.....

..... [3]

(ii) The current in the rod is 1.60A and the reading on the balance is 201.62g.

The direction of the current in the rod is reversed and its magnitude remains at 1.60A. The new reading on the balance is 202.17g.

Calculate the magnetic flux density of the uniform magnetic field.

magnetic flux density = ...T [4]

(iii) The rod is replaced with another rod of the same dimensions but made of a material with a lower resistivity.

The current in the rod is 1.60A.

State and explain the difference, if any, this change has on the readings on the balance when the current is reversed as in **(b)(ii)**.

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..... [1]

[Total: 10]