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

....

....

.... [1]

(b) Two parallel wires A and B have a separation of 0.12 m, as shown in Fig. 7.1.

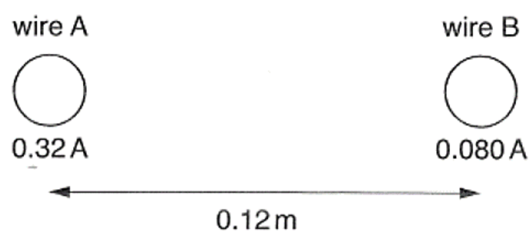

Fig. 7.1

The current in wire A is 0.32 A and the current in wire B is 0.080 A. In both wires the current is in the same direction.

Calculate the resultant magnetic flux density at mid-point between the two wires.

resultant magnetic flux density = ... T [3]

(c) A thick wire of length 80 mm is clamped in a fixed horizontal position between the plates of a horseshoe magnet. The horseshoe magnet rests on a digital balance as shown in Fig. 7.2.

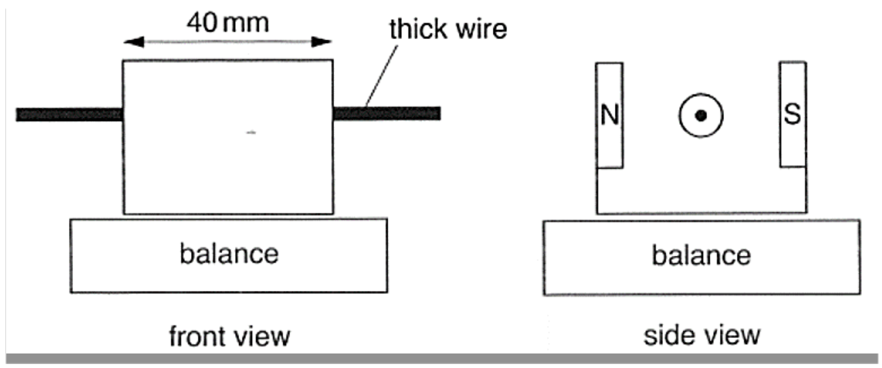

Fig. 7.2

The magnetic flux density between the poles of the magnet is 65 mT.

The length of the wire in the magnetic field is 40 mm.

When there is no current in the wire, the reading on the balance is 1.1772 N.

A current of 2.2 A now flows through the wire. The side view of Fig. 6.2 shows the current in the wire directed perpendicularly out of the page.

Calculate the reading on the balance for the current of 2.2 A in the wire.

Explain your working.

reading = ... N [4]