6 **(a)** A uniform magnetic field has a constant flux density *B*. A straight wire of fixed length carries a current I at angle θ to the magnetic field, as shown in Fig. 6.1.

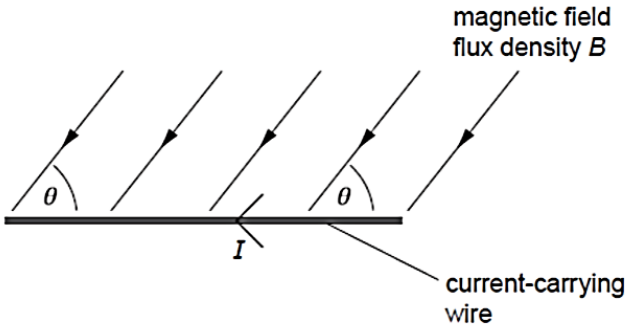

Fig. 6.1

(i) The current in the wire is changed, keeping the angle θ constant.

On Fig. 6.2, sketch the graph to show the variation with the current I of the force F on the wire.

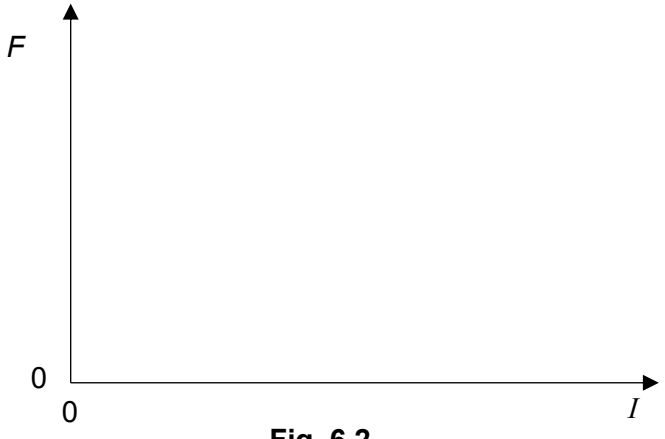

Fig. 6.2

[2]

(ii) The angle θ between the wire and the magnetic field is now varied and the current I is kept constant.

On Fig. 6.3, sketch a graph to show the variation with angle θ of the force *F* on the wire from θ = 0° to 180°.

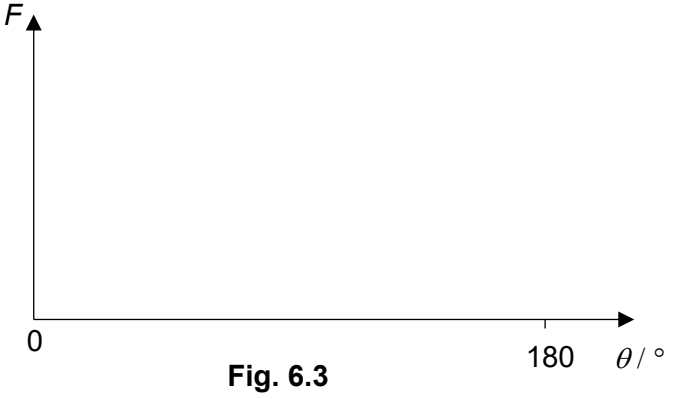

Fig. 6.3

[2]

(b) A uniform magnetic field is directed at right angle to the rectangular surface PQRS of a slice of conducting material, as shown in Fig. 6.4.

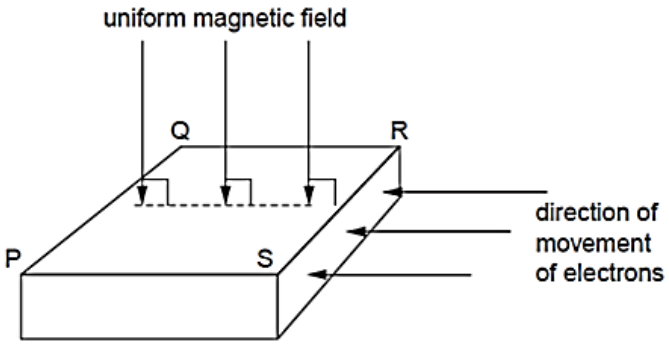

Fig. 6.4

Electrons, moving towards side SR, enters the slice of conducting material. The electrons enter the slice at right angle to side SR.

(i) Explain why the electrons do not travel in straight lines across the slice from side SR to side PQ.

.....

.....

.....[2]

(ii) State the direction of the electric field applied to the slice of conducting material for the electrons to pass through the slice undeviated.

.....[1]

[Total: 7]