6 **(a)** State the type(s) of field that cause a force to be exerted on a particle that is

(i) charged and stationary

_____.[1]

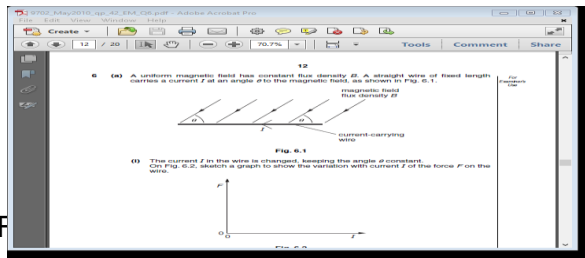
(ii) uncharged and moving parallel to the field

._____.[1]

(iii) charged and moving at right angles to the field

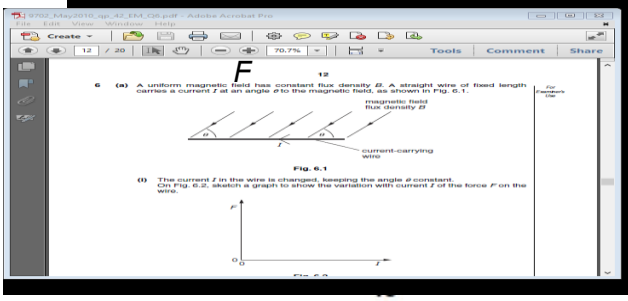
_____.[1]

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



(i) The

On F rce F on the wire.



[1]

(ii) current I is kept

ce F on the wire.

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

[2]

(c) A tic field, as shown in Fig

(b) A sample of a conductor with rectangular faces is situated in a magnetic field, as shown in Fig. 6.1.

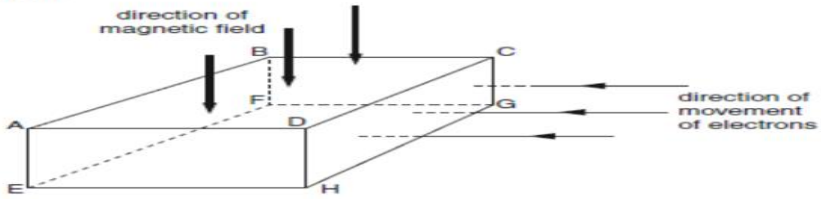


Fig. 6.1

The magnetic field is normal to face ABCD in the downward direction.

Th face

C ence

a

(i) Electrons enter face CDHG at right-angles to the face. As the electrons pass through the conductor, they experience a force due to the magnetic field.

orce.

(i) On Fig. 6.1, shade the face to which the electrons tend to move as a result of this force. [1]

[1]

(ii) The movement of the electrons in the magnetic field causes a potential difference between two faces of the conductor.
Using the lettering from Fig. 6.1, state the faces between which this potential difference will occur.

ence

face ..... and face .....[1]

(c) Explain why the potential difference in (b) causes an additional force on the moving electrons in the conductor.

Using the lettering from Fig. 6.4, state the faces between which this potential difference will occur.

face _____ and face _____. [1]

(iii) Describe and explain the motion of the remaining moving electrons at steady state after the potential difference in **(c)(ii)** is set up.

._____.

_____.

_____.

_____.

_____.

_____.[3]

[Total: 11]