

- 6 (a) State what is meant by a magnetic field.

.....
.....
..... [2]

- (b) A long, straight wire P carries a current into the page, as shown in Fig. 6.1.

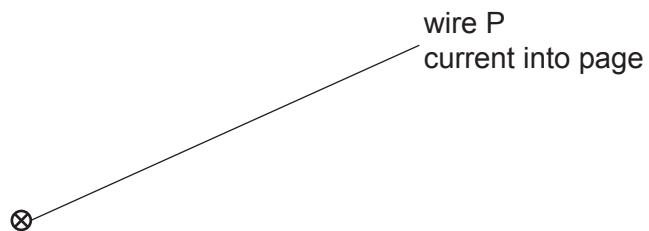


Fig. 6.1

On Fig. 6.1, draw four field lines to represent the magnetic field around wire P due to the current in the wire. [3]

- (c) A second long, straight wire Q, carrying a current of 5.0A out of the page, is placed parallel to wire P, as shown in Fig. 6.2.

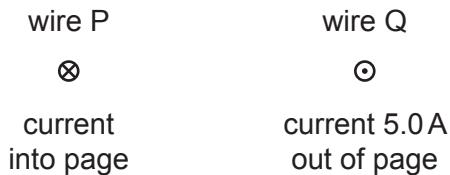


Fig. 6.2

The flux density of the magnetic field at wire Q due to the current in wire P is 2.6 mT.

- (i) Calculate the magnetic force per unit length exerted on wire Q by wire P.

$$\text{force per unit length} = \dots \text{ N m}^{-1} [2]$$

- (ii) State the direction of the force exerted on wire Q by wire P.

..... [1]

- (iii) The flux density of the magnetic field at wire P due to the current in wire Q is 1.5 mT.

Determine the magnitude of the current in wire P. Explain your reasoning.

current = A [2]