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

……

……

……[1]

(b) A 1.0 m long wire carrying a current of 2.0 A is placed in a magnetic field. When it is aligned with XX' as shown in Fig. 5.1A, it experiences a force of 0.50 N that is directed into the page. When it is aligned with YY' as shown in Fig. 5.1B, it experiences a force of 0.80 N that is directed out of the page.

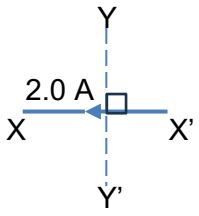

Fig. 5.1A

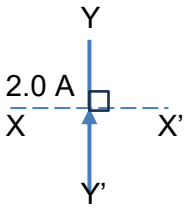

Fig. 5.1B

Determine the magnetic flux density of the field present.

magnetic flux density = …… T

direction = …… [4]

[Turn over

(c) The current-carrying wire in **(b)** has a magnetic field of its own and a thickness of 0.500 mm.

Show, by calculation whether it is possible to find a point near the wire such that its magnetic flux density at that point has the same magnitude as the field present.

[2]

(d) On Fig. 5.2, draw a diagram to show the pattern of the magnetic flux of a long straight wire carrying a current pointing out of the plane ABCD. [3]

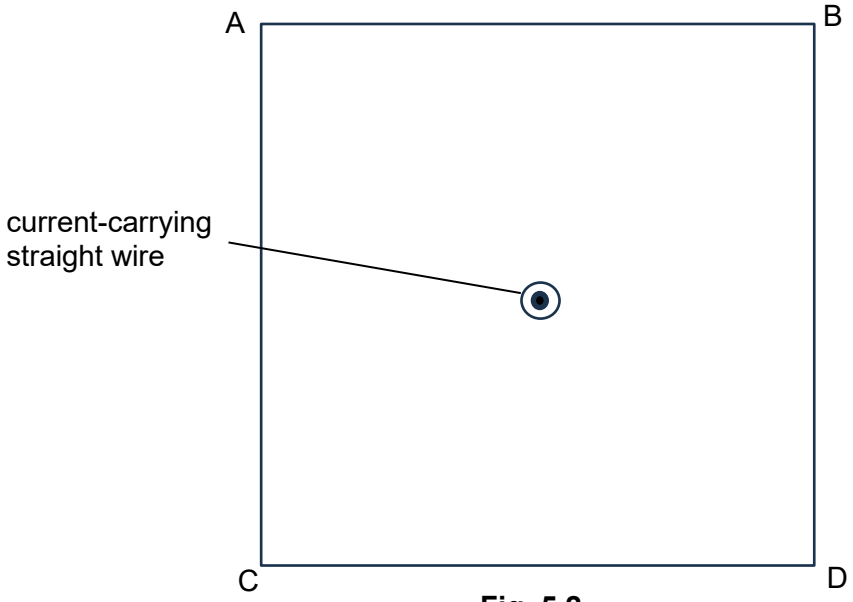

Fig. 5.2

[Total: 10]