

- 8 (a) Define *magnetic flux density*.

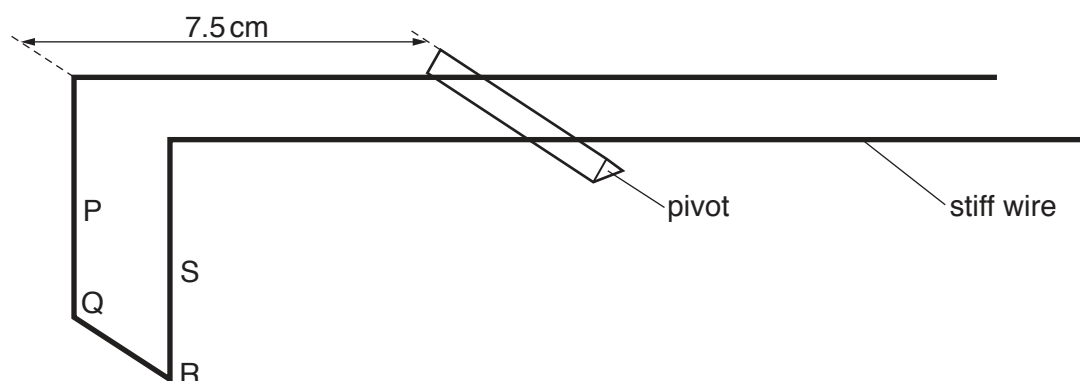
.....

.....

.....

.....[3]

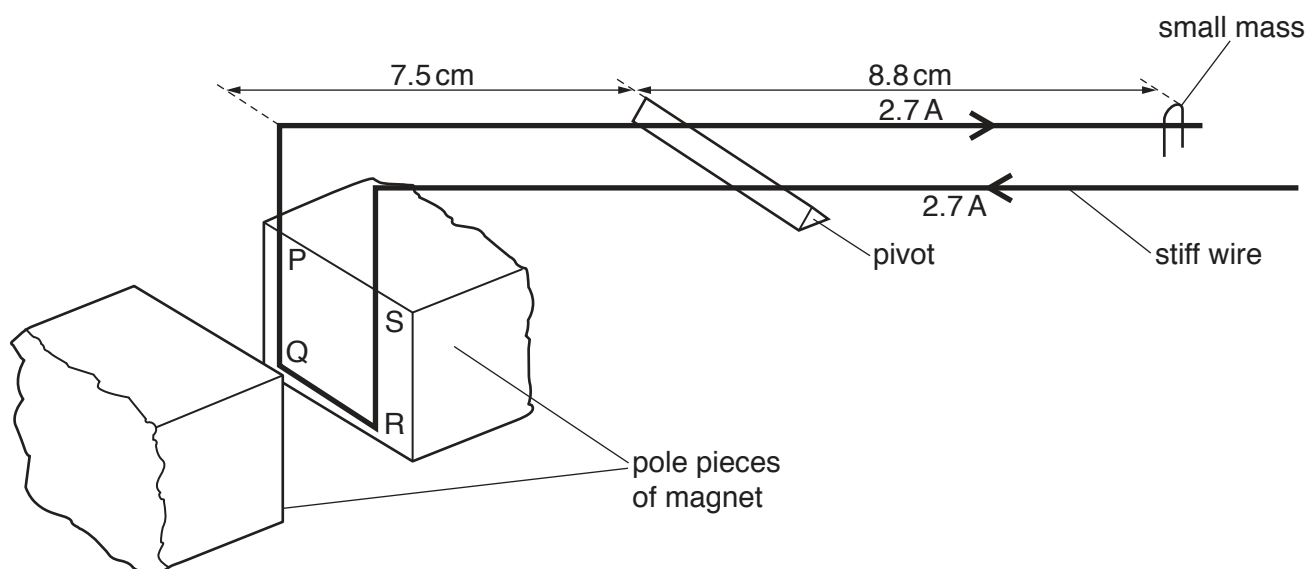
- (b) A stiff copper wire is balanced horizontally on a pivot, as shown in Fig. 8.1.



**Fig. 8.1**

Sections PQ, QR and RS of the wire are situated in a uniform magnetic field of flux density  $B$  produced between the poles of a permanent magnet. The perpendicular distance of PQRS from the pivot is 7.5 cm.

When a current of 2.7 A is passed through the wire, a small mass of 45 mg is placed a distance 8.8 cm from the pivot in order to restore the balance of the wire, as shown in Fig. 8.2.



**Fig. 8.2**

- (i) Explain why, when the current is switched on, the current in the sections PQ and RS of the wire does not affect the balance of the wire.

.....

.....

.....[2]

- (ii) The length of section QR of the wire is 1.2 cm.  
Calculate the magnetic flux density  $B$ .

$B =$  ..... T [3]

[Total: 8]