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

.....

.....

.....

.....

.....

[2]

(b) A rigid square single-wire coil PQRS of side 4.00 cm and mass 25.0 g hangs vertically in a uniform magnetic field with magnetic flux density of 0.0420 T acting vertically downwards, as shown in Fig. 7.1

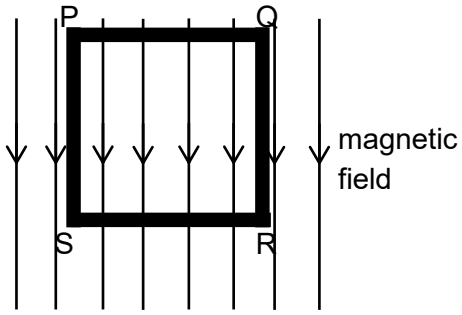

Fig. 7.1

This coil can rotate freely, pivoted along the top edge PQ. When a current of 7.50 A passes through the coil, it hangs at an angle of θ to the vertical as shown in the side view of the coil in Fig. 7.2.

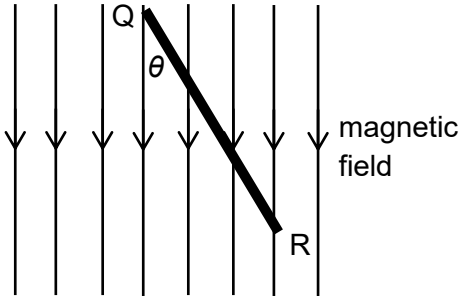

Fig. 7.2

(i) State the direction of current along the side RS.

direction =.....[1]

(ii) Explain how the answer in **(i)** was determined.

.....

.....

[1]

(iii) Calculate angle θ the coil makes with the magnetic field.

θ =……[3]

[Total: 7]