6 **(a)** State the type of field, or fields, that may cause a force to be exerted on a particle that is

(i) uncharged and moving,

..... [1]

(ii) charged and stationary,

..... [1]

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

..... [2]

(b) A particle X has mass 3.32×10^{-26} kg and charge $+1.60 \times 10^{-19}$ C.

The particle is travelling in a vacuum with speed $7.60 \times 10^{4}\,\text{m s}^{-1}$. It enters a region of uniform magnetic field that is normal to the direction of travel of the particle. The particle travels in a semicircle of diameter 12.2 cm, as shown in Fig. 6.1.

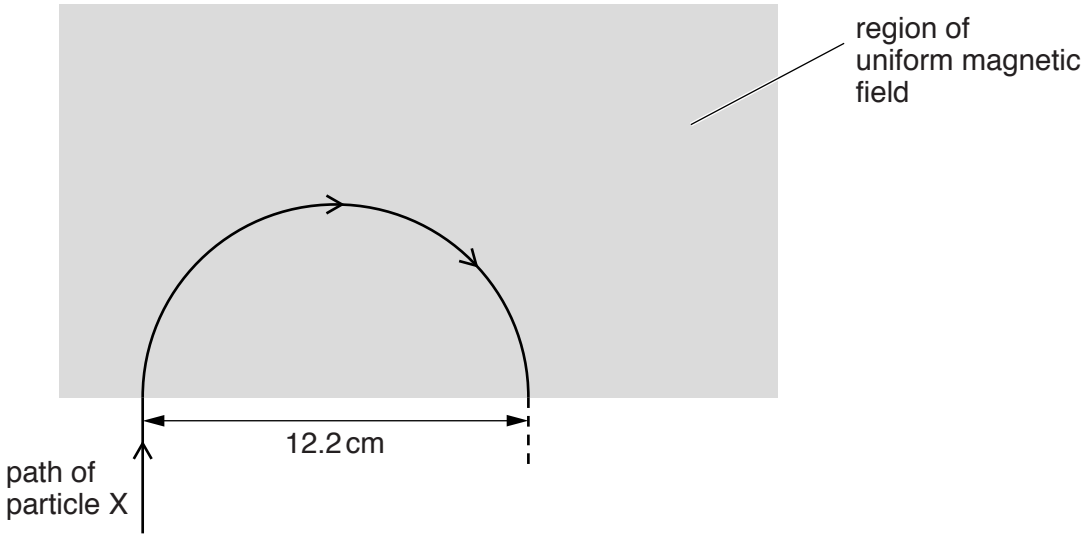

Fig. 6.1

For the uniform magnetic field,

(i) state its direction,

.....

..... [1]

(ii) calculate the magnetic flux density.

magnetic flux density = ... T [3]

(c) A second particle Y has mass less than that of particle X in **(b)** and the same charge.

It enters the region of uniform magnetic field in **(b)** with the same speed and along the same initial path as particle X.

On Fig. 6.1, draw the path of particle Y in the region of the magnetic field. [1]