4 **(a)** Define the *tesla*.

.....

.....

.....

.....[3]

(b) A charged particle is travelling with momentum p in a vacuum. It enters a region of uniform magnetic field of flux density 0.24T, as shown in Fig. 4.1.

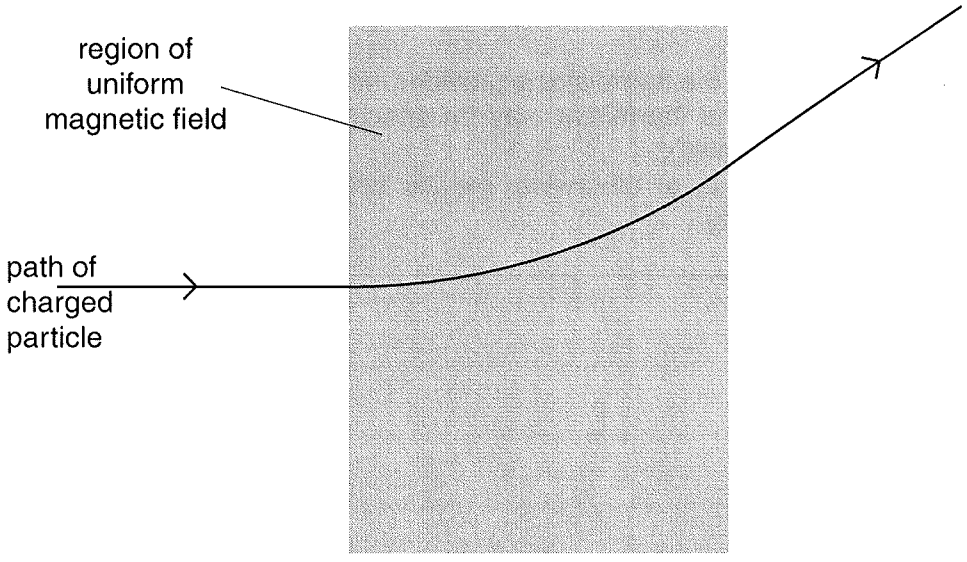

Fig. 4.1

When the charged particle is in the magnetic field, it is travelling at right-angles to the direction of the field.

(i) Explain why the path of the particle in the magnetic field is an arc of a circle.

.....

.....

.....[2]

(ii) The particle has charge 1.6×10^{-19} C. The radius of the circular path of the particle in the magnetic field is 6.2 cm.
Calculate the momentum p of the charged particle.

p = ... Ns [3]

(c) A second particle has a greater momentum than the particle in **(b)**. These two particles have charges of equal magnitude but opposite signs.

The second particle is travelling along the same path towards the magnetic field.

On Fig. 4.2, draw the path of this second particle as it passes through and leaves the region of the magnetic field.

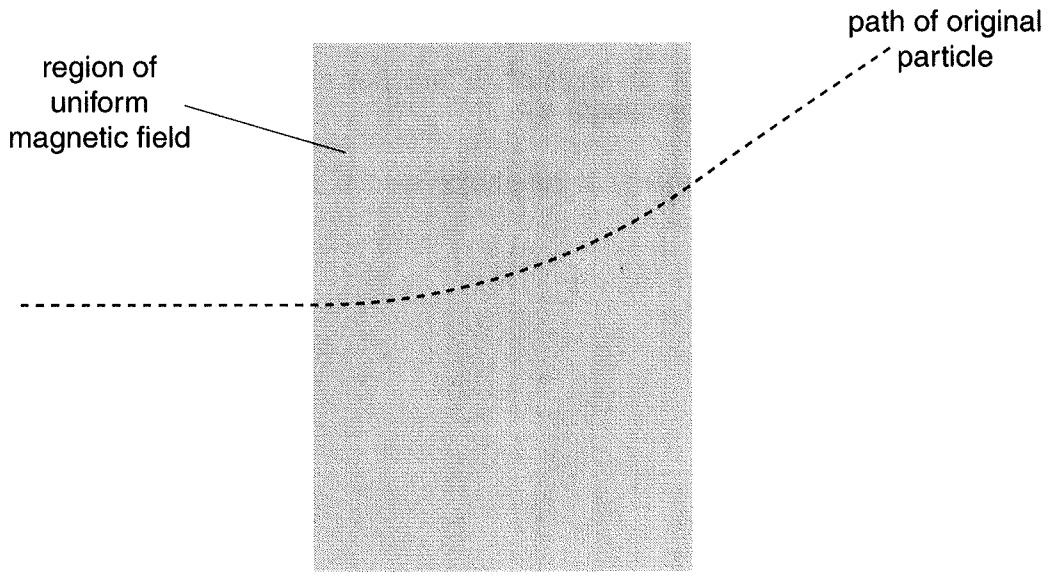

Fig. 4.2

[2]