5 Charged particles, of speed 4500 m s^{-1} and mass 2.66×10^{-26} kg, are travelling in a narrow beam in a vacuum as shown in Fig. 5.1.

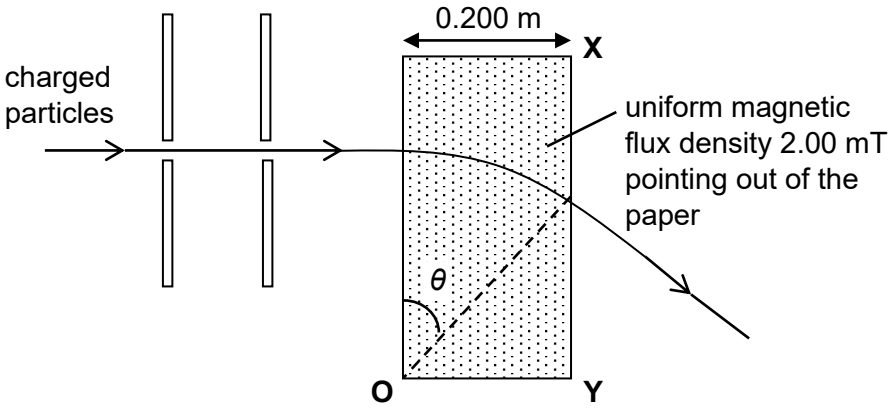

Fig.5.1

The charged particles enter a region of uniform magnetic flux density which is 0.200 m wide. The direction of the magnetic flux is pointing out of the paper.

(a) **(i)** Using Newton's Law of motion, explain any changes in the speed of the particles as they move within and exit from the uniform magnetic field.

.....

.....

..... [2]

(ii) Given that the magnitude of the charge on the particles is *e*, calculate the radius of the circular motion of the charged particles in the uniform magnetic field.

radius = ... m [3]

(b) In another experiment, similar charged particles are now fired into the magnetic field in Fig. 5.1 with different momentum.
Determine the maximum momentum of particles such that the particles will not exit the magnetic field through XY.

momentum = ... kg m s^{-1} [3]

[Total: 8]