6 (a) Explain the use of a uniform electric field and a uniform magnetic field for the selection of the velocity of a charged particle. You may draw a diagram if you wish.

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.... [3]

(b) Ions, all of the same isotope, are travelling in a vacuum with a speed of $9.6 \times 10^4 \, \text{m s}^{-1}$. The ions are incident normally on a uniform magnetic field of flux density 640 mT. The ions follow semicircular paths A and B before reaching a detector, as shown in Fig. 6.1.
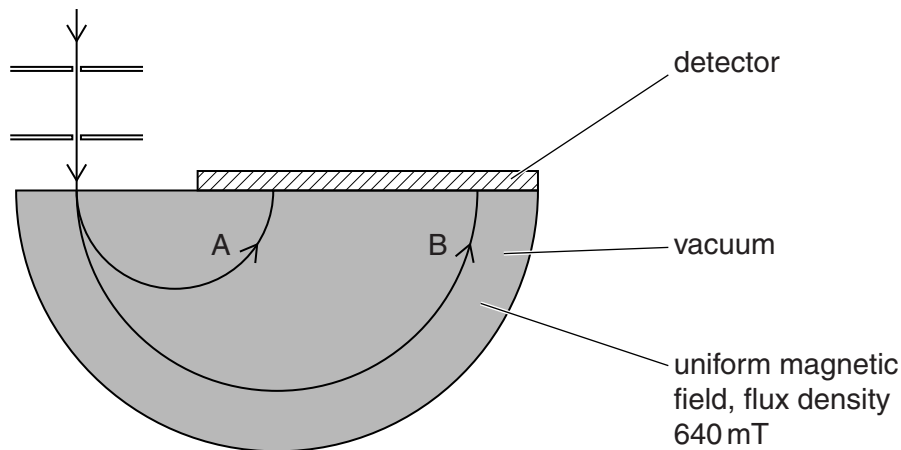

Fig. 6.1

Data for the diameters of the paths are shown in Fig. 6.2.

path	diameter/cm
A	6.2
B	12.4

Fig. 6.2

The ions in path B each have charge $+1.6 \times 10^{-19} \, \text{C}$.

(i) Determine the mass, in u, of the ions in path B.

mass = ... u [4]

(ii) Suggest and explain quantitatively a reason for the difference in radii of the paths A and B of the ions.

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.... [3]