**8** A proton is moving with constant velocity $v$. It enters a uniform magnetic field that is normal to the initial direction of motion of the proton, as shown in Fig. 8.1.

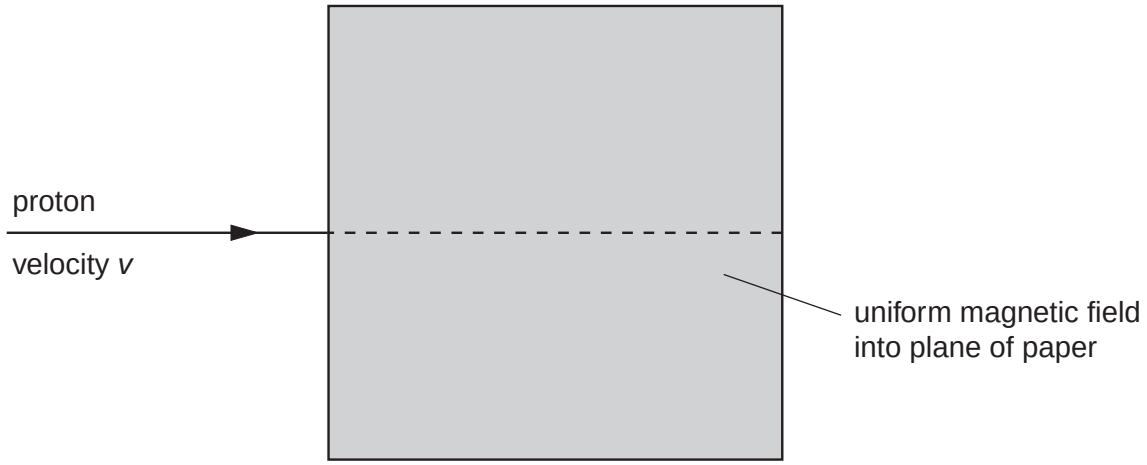


**Fig. 8.1**

A uniform electric field is applied in the same region as the magnetic field so that the proton passes undeviated through the fields.

**(a)** On Fig. 8.1, draw an arrow labelled E to show the direction of the electric field. [1]

**(b)** The proton is replaced by other particles. The electric and magnetic fields remain unchanged.

State and explain the deviation, if any, of the following particles in the region of the fields.

**(i)** an $\alpha$-particle with initial velocity $v$

.....

.....

.....

..... [3]

**(ii)** an electron with initial velocity $2v$

.....

.....

.....

..... [3]