9 **(a)** State what is meant by a *field of force*.

.....

.....

.....[2]

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

.....

.....

.....

.....

.....

.....[4]

(c) A beam of charged particles enters a region of uniform magnetic and electric fields, as illustrated in Fig. 9.1.

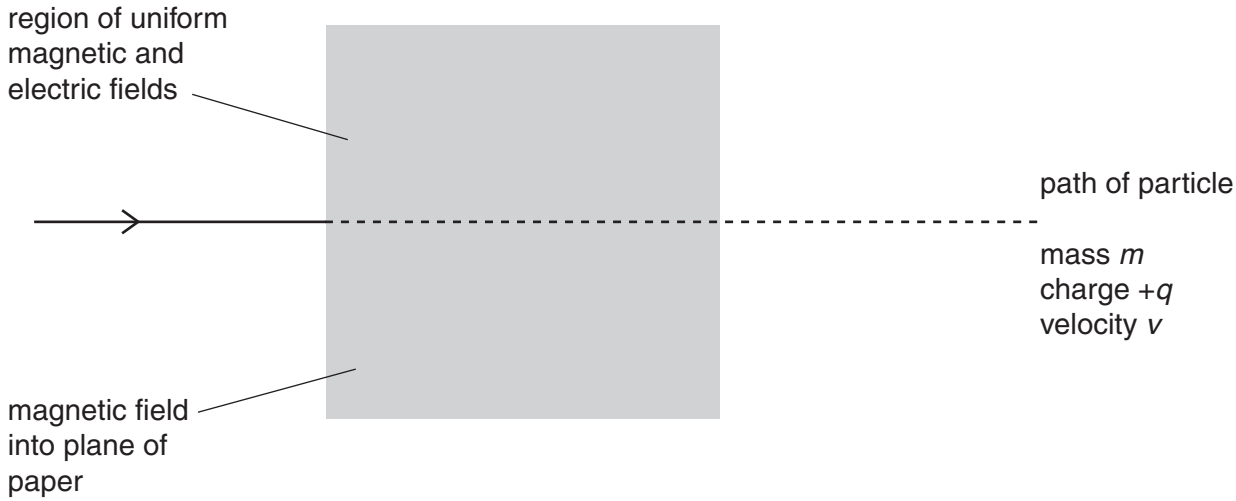

Fig. 9.1

The direction of the magnetic field is into the plane of the paper. The velocity of the charged particles is normal to the magnetic field as the particles enter the field.

A particle in the beam has mass *m*, charge +*q* and velocity *v*. The particle passes undeviated through the region of the two fields.

On Fig. 9.1, sketch the path of a particle that has

(i) mass *m*, charge +2*q* and velocity *v* (label this path Q), [1]

(ii) mass *m*, charge +*q* and velocity slightly larger than *v* (label this path V). [2]

[Total: 9]

[Turn over