6 **(a)** A thin slice of conducting material has its faces PQRS and VWXY normal to a uniform magnetic field of flux density B, as shown in Fig. 6.1.

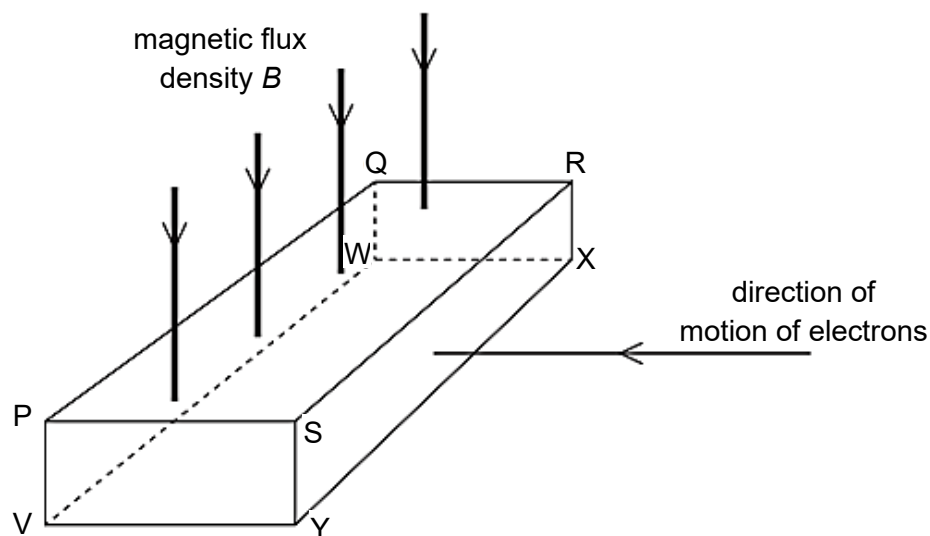**Fig. 6.1**

Electrons enter the slice at right-angles to SRXY.

A potential difference is developed between two faces of the slice.

(i) Use letters from Fig. 6.1 to name the two faces between which the potential difference is developed.

………………………………………………………………………………….

……………………………………………………………………………... [1]

(ii) State and explain which of the two faces named in **(a)(i)** is more positive.

………………………………………………………………………………….

……………………………………………………………………………... [2]

(b) Negative-charged particles are moving through a vacuum in a parallel beam. The particles have speed v.

The particles enter a region of uniform magnetic field of flux density 930 μT. Initially, the particles are travelling at right-angles to the magnetic field. The path of a single particle is shown in Fig. 6.2.

negatively-charged particles, speed v

arc of radius 7.9 cm

uniform magnetic field, flux density 930 μT
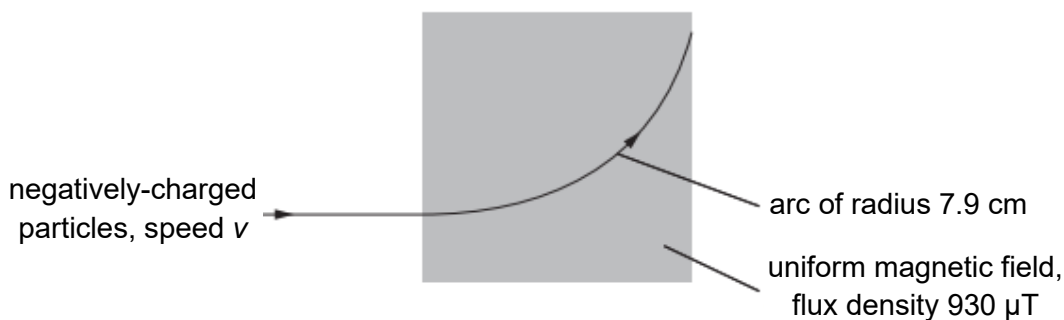
Fig. 6.2

The negatively-charged particles follow a curved path of radius 7.9 cm in the magnetic field.

A uniform electric field of strength 12 kV m^{-1} is then applied in the same region as the magnetic field. The particles then travel in a straight line.

(i) On Fig. 6.2, mark with an arrow, the direction of the electric field. [1]

(ii) Calculate, for the negatively charged particles,

    1. the speed v,

v = …………………. m s^{-1} [2]

    2. the ratio $\dfrac{\text{charge}}{\text{mass}}$

ratio = ………………. C kg^{-1} [2]