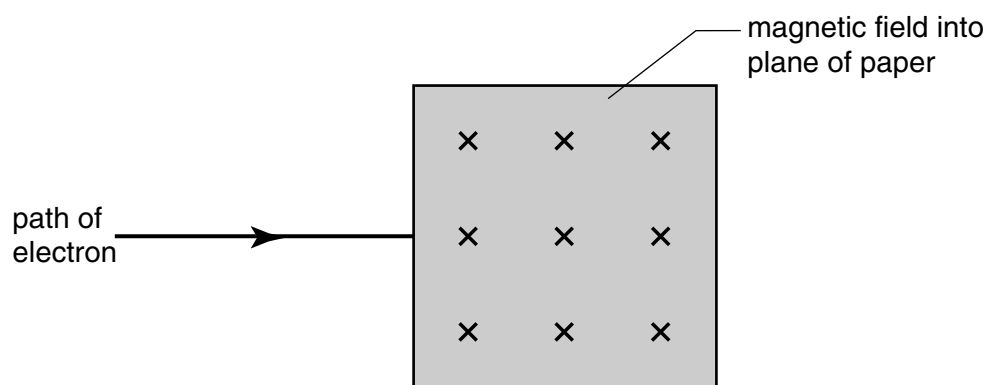


- 5 (a) An electron is accelerated from rest in a vacuum through a potential difference of  $1.2 \times 10^4 \text{ V}$ .  
Show that the final speed of the electron is  $6.5 \times 10^7 \text{ m s}^{-1}$ .

[2]

- (b) The accelerated electron now enters a region of uniform magnetic field acting into the plane of the paper, as illustrated in Fig. 5.1.



**Fig. 5.1**

- (i) Describe the path of the electron as it passes through, and beyond, the region of the magnetic field. You may draw on Fig. 5.1 if you wish.

path within field: .....

.....

path beyond field: .....

..... [3]

(ii) State and explain the effect on the magnitude of the deflection of the electron in the magnetic field if, separately,

1. the potential difference accelerating the electron is reduced,

.....  
.....  
..... [2]

2. the magnetic field strength is increased.

.....  
.....  
..... [2]