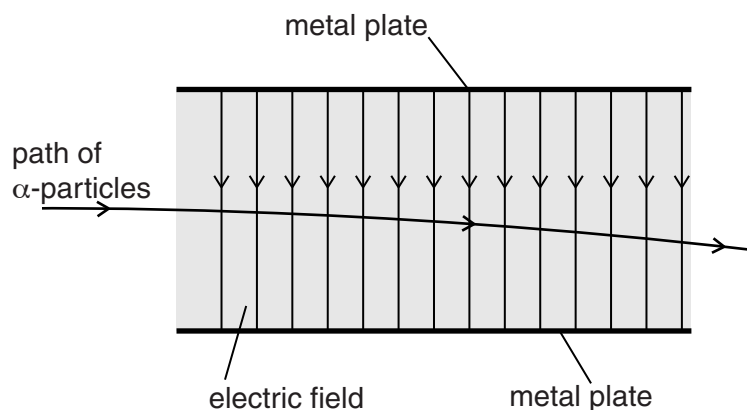
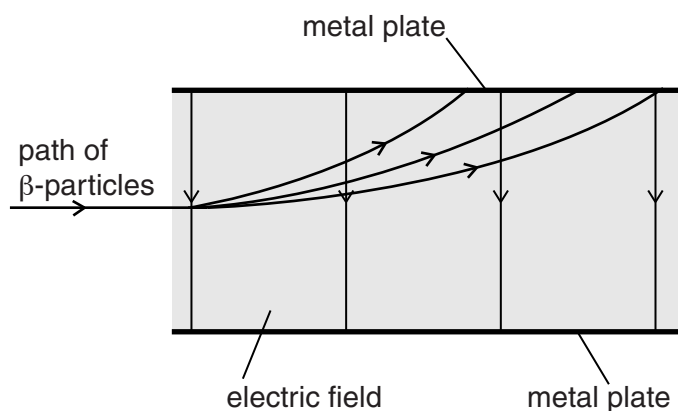


- 7 (a) An electric field is set up between two parallel metal plates in a vacuum. The deflection of  $\alpha$ -particles as they pass between the plates is shown in Fig. 7.1.



**Fig. 7.1**

The electric field strength between the plates is reduced. The  $\alpha$ -particles are replaced by  $\beta$ -particles. The deflection of  $\beta$ -particles is shown in Fig. 7.2.



**Fig. 7.2**

- (i) State one similarity of the electric fields shown in Fig. 7.1 and Fig. 7.2.

.....  
 .....[1]

- (ii) The electric field strength in Fig. 7.2 is less than that in Fig. 7.1. State two methods of reducing this electric field strength.

1. ....  
 2. ....

[2]

- (iii) By reference to the properties of  $\alpha$ -particles and  $\beta$ -particles, suggest three reasons for the differences in the deflections shown in Fig. 7.1 and Fig. 7.2.

1. ....

.....

2. ....

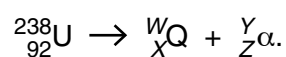
.....

3. ....

.....

[3]

- (b) A source of  $\alpha$ -particles is uranium-238. The nuclear reaction for the emission of  $\alpha$ -particles is represented by



State the values of  $W$ .....

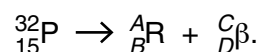
$X$  .....

$Y$  .....

$Z$  .....

[2]

- (c) A source of  $\beta$ -particles is phosphorus-32. The nuclear reaction for the emission of  $\beta$ -particles is represented by



State the values of  $A$  .....

$B$  .....

$C$  .....

$D$  .....

[1]