

- 6 Two horizontal metal plates are separated by distance d in a vacuum. A potential difference V is applied across the plates, as shown in Fig. 6.1.

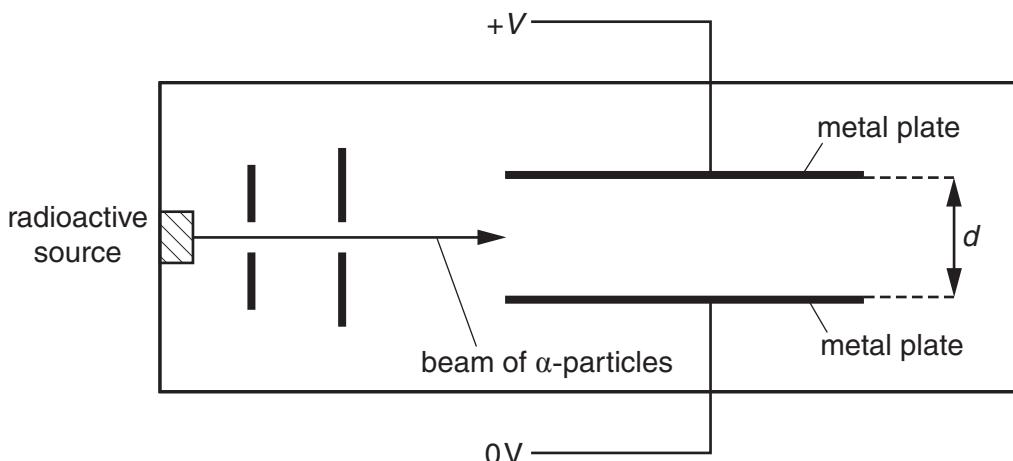


Fig. 6.1

A horizontal beam of α -particles from a radioactive source is made to pass between the plates.

- (a) State and explain the effect on the deflection of the α -particles for each of the following changes:

- (i) The magnitude of V is increased.

.....
.....

[1]

- (ii) The separation d of the plates is decreased.

.....
.....

[1]

- (b) The source of α -particles is replaced with a source of β -particles.
Compare, with a reason in each case, the effect of each of the following properties on the deflections of α - and β -particles in a uniform electric field:

(i) charge

.....
.....
.....

[2]

(ii) mass

.....
.....
.....

[2]

(iii) speed

.....
.....
.....

[1]

- (c) The electric field gives rise to an acceleration of the α -particles and the β -particles.
Determine the ratio

$$\frac{\text{acceleration of the } \alpha\text{-particles}}{\text{acceleration of the } \beta\text{-particles}}$$

ratio = [3]

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