7 **(a)** Explain what is meant by an *electric field*.

.....

.....[1]

(b) A uniform electric field is produced between two vertical metal plates AB and CD, as shown in Fig. 7.1.

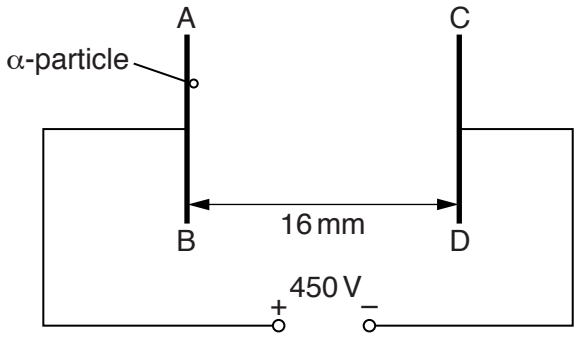

Fig. 7.1

The potential difference between the plates is 450 V and the separation of the plates is 16 mm.

An α-particle is accelerated from plate AB to plate CD.

(i) On Fig. 7.1, draw lines to represent the electric field between the plates. [2]

(ii) Calculate the electric field strength between the plates.

electric field strength = ... $V\,m^{-1}$ [2]

(iii) Calculate the work done by the electric field on the α-particle as it moves from AB to CD.

work done = ... J [3]

Question 7 continues on page 16.

(iv) A β-particle moves from AB to CD. Calculate the ratio

$$\frac{\text{work done by the electric field on the } \alpha\text{-particle}}{\text{work done by the electric field on the } \beta\text{-particle.}}$$

Show your working.

ratio = ... [1]