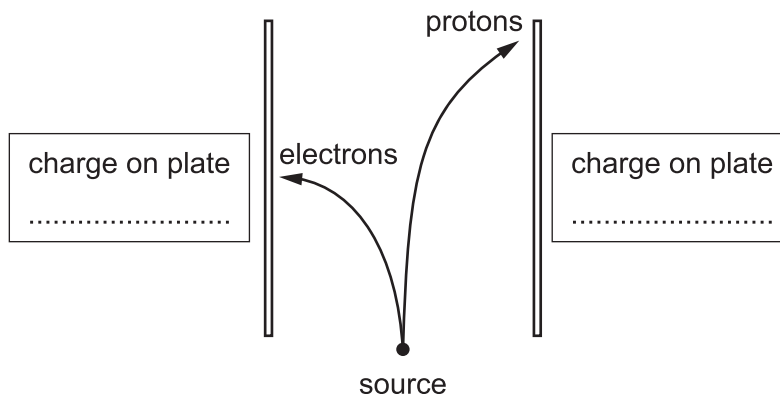


**SMART EXAM RESOURCES**  
**9701 CAMBRIDGE AS CHEMISTRY**  
**TOPIC QUESTIONS AND MARK SCHEMES**  
**TOPIC :ATOMIC STRUCTURE**  
**SUB-TOPIC: SUB-ATOMIC PARTICLES IN**  
**ELECTRIC FIELD**

**SET-1-QP-MS**

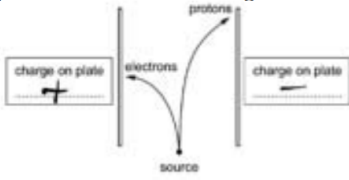
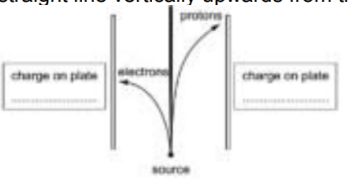
**1** Atoms contain the subatomic particles electrons, protons and neutrons. Protons and electrons were discovered by observations of their behaviours in electric fields.

- (a) The diagram shows the behaviour of separate beams of electrons and protons in an electric field.



- (i) Complete the diagram with the relative charge of each of the electrically charged plates. [1]
- (ii) On the diagram, draw a line to show how a separate beam of neutrons from the same source behaves in the same electric field. [1]

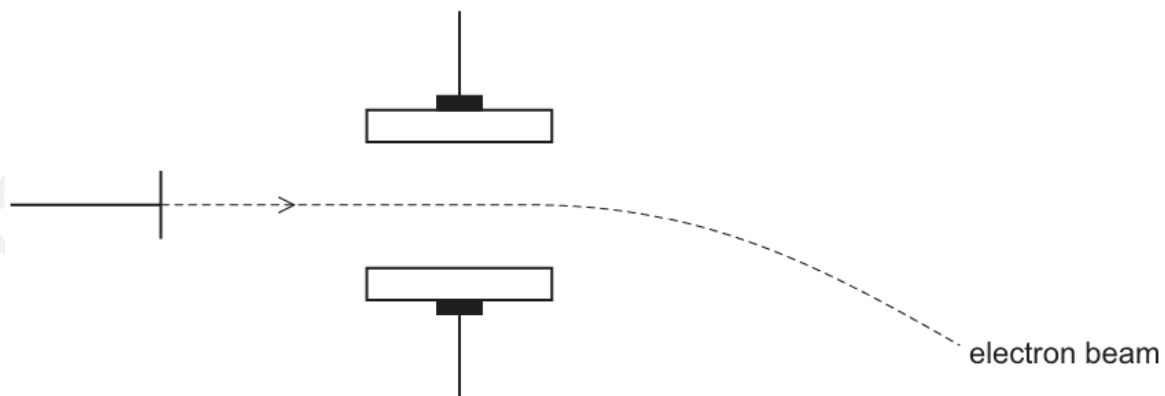
**MARK SCHEME:**

(i)	<p>positive / + on left <b>AND</b> negative / – on right</p> 	1
(ii)	<p>straight line vertically upwards from the source</p> 	1

- 2 Beams of protons, neutrons and electrons behave differently in an electric field due to their differing properties.

The diagram shows the path of a beam of electrons in an electric field.

Add and label lines to represent the paths of beams of protons and neutrons in the same field.



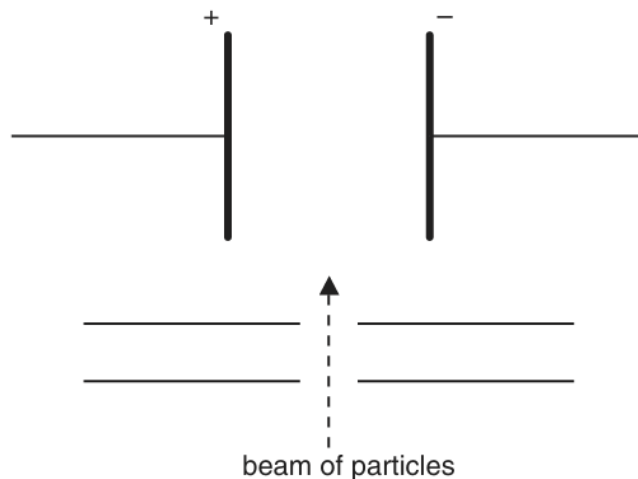
[3]

**Mark Scheme:**

line straight on labelled 'neutrons'	[1]	[3]
line (curving) up labelled 'protons'	[1]	
proton line clearly shows less (overall) deflection than electron curve	[1]	

- 3 In the 19th and 20th centuries, scientists established the atomic theory and showed that three sub-atomic particles, electron, neutron and proton, exist. The masses and charges of these three particles were subsequently determined.

When separate beams of electrons, neutrons or protons are passed through an electric field in the apparatus below, they behave differently.



- (a) (i) Which of these three particles will be deflected the most by the electric field?

.....

- (ii) In which direction will this particle be deflected?

.....

- (iii) Explain your answer.

.....

.....

[4]

**Mark Scheme:**

- (a) (i) electron (1)
- (ii) towards the positive pole (1)
- (iii) electron has negative charge (1)
- electron has very small mass (1) **[4]**