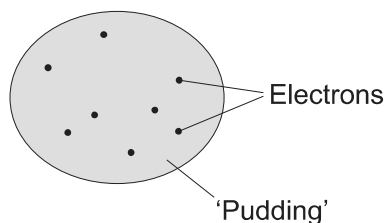


- 5 The 'plum pudding' model of the atom was used by scientists in the early part of the 20th century to explain atomic structure.



- 5 (a) Those scientists knew that atoms contained electrons and that the electrons had a negative charge. They also knew that an atom was electrically neutral overall.

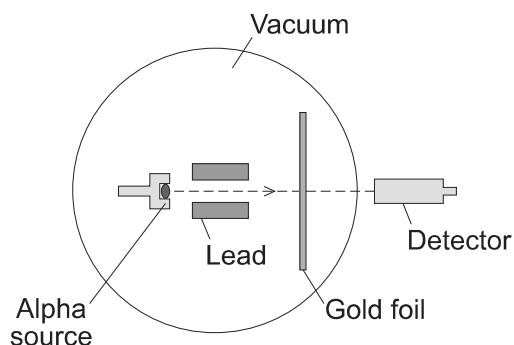
What did this allow the scientists to deduce about the 'pudding' part of the atom?

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(1 mark)

- 5 (b) An experiment, designed to investigate the 'plum pudding' model, involved firing alpha particles at a thin gold foil.



If the 'plum pudding' model was correct, then most of the alpha particles would go straight through the gold foil. A few would be deflected, but by less than 4° .

The results of the experiment were unexpected. Although most of the alpha particles did go straight through the gold foil, about 1 in every 8 000 was deflected by more than 90° .

Why did this experiment lead to a new model of the atom, called the nuclear model, replacing the 'plum pudding' model?

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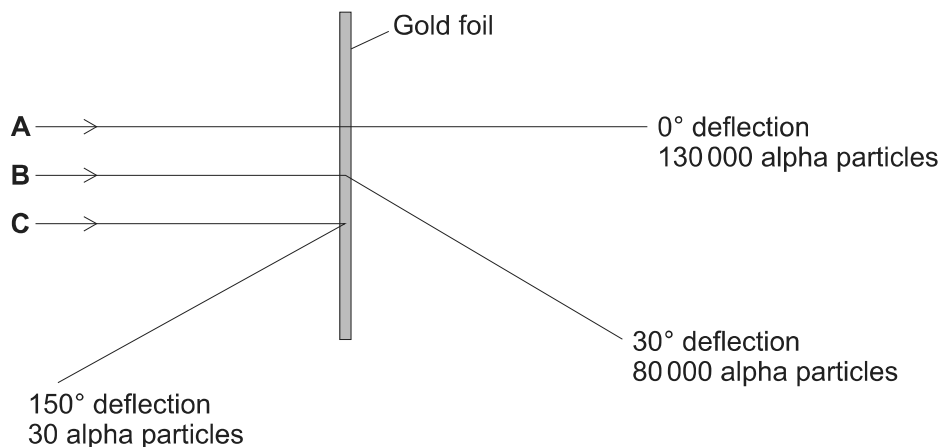
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(1 mark)



- 5 (c)** The diagram shows the paths, **A**, **B** and **C**, of three alpha particles. The total number of alpha particles deflected through each angle is also given.



- 5 (c) (i)** Using the nuclear model of the atom, explain the three paths, **A**, **B** and **C**.

A

.....

B

.....

C

.....

(3 marks)

- 5 (c) (ii)** Using the nuclear model, the scientist E. Rutherford devised an equation to predict the proportion of alpha particles that would be deflected through various angles.

The results of the experiment were the same as the predictions made by Rutherford.

What was the importance of the experimental results and the predictions being the same?

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(1 mark)

