3.26 Atomic Structure and the Development of the Model: 10-minute Pack

AQA 8464 · Calculator allowed · about 10 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 The radius of a typical atom is about 1×10^{-10} m. The radius of the nucleus of that atom is about 1×10^{-14} m.

(a) Calculate how many times smaller the radius of the nucleus is than the radius of the atom. **(1)**

.....

(b) What does your answer to part (a) tell you about the structure of an atom? **(2)**

(Total for Question 1 is 3 marks)

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2 Four scientists made important contributions to the development of the model of the atom. Match each scientist to the numbered contribution below.

Contributions:

1) Proposed that atoms are mostly empty space, with a tiny, dense, positively charged nucleus at the centre, based on the results of the α particle scattering experiment.

2) Discovered the electron and proposed the 'plum pudding' model, in which negative electrons are spread through a ball of positive charge.

3) Proposed that electrons orbit the nucleus at fixed distances, called shells or energy levels.

4) Provided evidence for a neutral particle in the nucleus (the neutron), helping to explain why atoms of the same element can have different masses.

(a) Which numbered contribution belongs to J.J. Thomson? **(1)**

(b) Which numbered contribution belongs to Ernest Rutherford? **(1)**

(c) Which numbered contribution belongs to Niels Bohr? **(1)**

(d) Which numbered contribution belongs to James Chadwick? **(1)**

(Total for Question 2 is 4 marks)

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Mark scheme · 3.26 Atomic Structure and the Development of the Model: 10-minute Pack

Question 1

(a) 10 000 (1×10^4) times smaller, cao **B1**

(a) Answer: 10 000 times (1×10^4)

(b) the nucleus takes up only a tiny fraction of the total volume of the atom, oe **B1**

(b) most of the atom (the space around the nucleus, where the electrons are found) is empty space, oe **B1**

(b) Answer: An atom is mostly empty space; the nucleus occupies only a tiny fraction of the atom's total volume.

Question 2

(a) 2 **B1**

(a) Answer: 2

(b) 1 **B1**

(b) Answer: 1

(c) 3 **B1**

(c) Answer: 3

(d) 4 **B1**

(d) Answer: 4

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