GET BETTER AT PHYSICS · MARK SCHEME

Alpha-Particle Scattering: tiered multiple choice

Edexcel IAL Physics · Unit 4 (WPH14) · Specification points 112 · 5 questions · 5 marks

1 mark per correct letter | Worked reasoning for every question

How students did = from Pearson examiner reports, where available

Answer key

Q1	Q2	Q3	Q4	Q5
B	B	B	C	C

Easy

Questions 1–5

1 **B**

What alpha scattering did not show · Edexcel IAL June 2024 · Unit 4 · Q7

Alpha scattering showed that most of the atom is empty space and that there is a tiny, dense, positively charged nucleus containing most of the mass. It gave no information about what the nucleus is made of: neutrons were not discovered until later.

How students did: 90% of students got this right in June 2024.

2 **B**

What Rutherford's experiment could not tell us · Edexcel IAL October 2023 · Unit 4 · Q5

The experiment showed a small, charged nucleus containing most of the mass, but it could not show what the nucleus is made of. 'The nucleus contains protons and neutrons' was established by later experiments.

How students did: 80% of students got this right in October 2023.

3 **B**

A valid conclusion from alpha scattering · Edexcel IAL October 2024 · Unit 4 · Q9

The rare large-angle deflections showed that most of the mass (and all the positive charge) is concentrated in a very small volume: the nucleus. The experiment did not show that all the atom's charge is there (the electrons are outside), nor anything about electron energy levels or protons and neutrons.

How students did: 77% of students got this right in October 2024.

4 **C**

An invalid conclusion from alpha scattering · Edexcel IAL January 2023 · Unit 4 · Q5

Alpha scattering shows that the positive charge is concentrated in the nucleus, but the atom's negative charge (the electrons) is outside the nucleus. So 'the nucleus contains all of the charge' is not a valid conclusion.

How students did: 76% of students got this right in January 2023.

5 **C**

Path of an alpha particle passing closer to a nucleus · Edexcel IAL January 2024 · Unit 4 · Q10

The second alpha particle approaches closer to the gold nucleus, so the electrostatic repulsion on it is larger and it is deflected through a bigger angle, away from the nucleus. Path A bends towards the nucleus (that would need attraction), B is deflected less than the first particle, and D is deflected the wrong way.

How students did: 59% of students got this right in January 2024.

End of mark scheme. Answers from Pearson's published mark schemes; explanations written for this pack. Pearson Edexcel material is © Pearson Education Ltd. More free packs and 1-to-1 tuition: **www.getbetteratphysics.co.uk**

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