

Question number	Answer	Mark																																
15(a)	<div><div><ul style="list-style-type: none">• So no collisions with air molecules</div><div>Or</div><div><ul style="list-style-type: none">• So the air doesn't stop alpha particles from reaching the detector</div></div> <div><div>(1)</div><div>(1)</div></div>	(1)																																
15 (b)*	<p>This question assesses a student's ability to show a coherent and logically structured answer with linkages and fully-sustained reasoning.</p> <p>Marks are awarded for indicative content and for how the answer is structured and shows lines of reasoning.</p> <p>The following table shows how the marks should be awarded for indicative content.</p> <table><tr><th>Number of indicative marking points seen in answer</th><th>Number of marks awarded for indicative marking points</th><th>Max linkage mark available</th><th>Max final mark</th></tr><tr><td>6</td><td>4</td><td>2</td><td>6</td></tr><tr><td>5</td><td>3</td><td>2</td><td>5</td></tr><tr><td>4</td><td>3</td><td>1</td><td>4</td></tr><tr><td>3</td><td>2</td><td>1</td><td>3</td></tr><tr><td>2</td><td>2</td><td>0</td><td>2</td></tr><tr><td>1</td><td>1</td><td>0</td><td>1</td></tr><tr><td>0</td><td>0</td><td>0</td><td>0</td></tr></table> <p>The following table shows how the marks should be awarded for structure and lines of reasoning.</p>	Number of indicative marking points seen in answer	Number of marks awarded for indicative marking points	Max linkage mark available	Max final mark	6	4	2	6	5	3	2	5	4	3	1	4	3	2	1	3	2	2	0	2	1	1	0	1	0	0	0	0	(6)
Number of indicative marking points seen in answer	Number of marks awarded for indicative marking points	Max linkage mark available	Max final mark																															
6	4	2	6																															
5	3	2	5																															
4	3	1	4																															
3	2	1	3																															
2	2	0	2																															
1	1	0	1																															
0	0	0	0																															

	Number of marks awarded for structure of answer and sustained line of reasoning
Answer shows a coherent and logical structure with linkages and fully sustained lines of reasoning demonstrated throughout	2
Answer is partially structured with some linkages and lines of reasoning	1
Answer has no linkages between points and is unstructured	0

Guidance on how the mark scheme should be applied: The mark for indicative content should be added to the mark for lines of reasoning. For example, an answer with five indicative marking points which is partially structured with some linkages and lines of reasoning scores 4 marks (3 marks for indicative content and 1 mark for partial structure and some linkages and lines of reasoning). If there are no linkages between points, the same five indicative marking points would yield an overall score of 3 marks (3 marks for indicative content and no marks for linkages).

Indicative content:

- Most alpha particles passed straight through the gold foil
- Some alpha particles were deflected by small angles
- Either model would predict small or zero deflections because in the nuclear model the atom is mostly empty space and in the ‘pudding’ model matter is too spread out
- A few proportion of alpha particles were deflected by more than 90°
- This did not fit the plum pudding model as this deflection requires a high concentration of charge (to provide a large force)

Or

This could only be explained by the nuclear model as this deflection requires a high concentration of charge to (provide a large force)

- This did not fit the plum pudding model as this deflection requires a high concentration of mass (so that the alpha particle is deflected and not the gold nucleus)

Or

This could only be explained by the nuclear model as this deflection requires a high concentration of mass (so that the alpha particle is deflected and not the gold nucleus)

Total for question 15