

Q1. (2020)

02.1	contamination		1	AO1 6.4.2.4
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Q2. (2020)

02.7	use long tongs to handle the materials		1	AO1 6.4.2.4
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Q3. (2020)

02.8	peer review		1	AO1 6.4.2.4
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Q4. (2021)

06.3	beta radiation is only weakly ionising		1	AO3 6.4.2.1
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Q5. (2021)

06.4	Level 3: The method would lead to the production of a valid outcome. The key steps are identified and logically sequenced.	5–6	AO3 6.4.2.1
	Level 2: The method would not necessarily lead to a valid outcome. Most steps are identified, but the method is not fully logically sequenced.	3–4	
	Level 1: The method would not lead to a valid outcome. Some relevant steps are identified, but links are not made clear.	1–2	
	No relevant content	0	
	Indicative content <ul style="list-style-type: none"> • move the detector very close to the source • record the count rate • position the paper between the source and the detector • record the new count rate • alpha radiation will not penetrate through paper • if the count rate with the paper is (significantly) less than without then the source emits alpha radiation • remove the paper and position the aluminium between the source and the detector • record the new count rate • (alpha and) beta radiation will not penetrate through the aluminium • if the count rate has (significantly) reduced compared with using paper then beta radiation is present • if radiation penetrates through the aluminium then gamma radiation is present • the experiment should be repeated and mean results calculated because radioactivity is a random process <p>To access level 3, the candidate must use the paper sheet, the aluminium sheet and no sheet, and describe how the results would indicate the presence of alpha, beta or gamma radiation.</p>		

Q6. (2022)

a)

03.3	paper stops alpha radiation		1	AO1 6.4.2.1
b)				
03.6			1 1 1	AO3 6.4.2.1
		do not accept more than one line from a box on the left		
c)				
03.7	as distance increases the count rate decreases		1	AO3 6.4.2.1
	(between 40 cm and 50 cm) the count rate becomes zero		1	

Q7. (2023)

a)				
01.6	the count-rate decreased	allow decreased to (almost) zero	1	AO1 6.4.2.1
	because (gamma) radiation is absorbed by lead	allow (gamma) radiation cannot penetrate (thick) lead	1	
b)				
01.7	the lead was exposed to gamma radiation		1	AO1 6.4.2.4
c)				
01.9	any one from: <ul style="list-style-type: none"> • (longer tongs give) a greater distance between the scientist and the radioactive source • (longer tongs) reduce the amount of radiation the scientist is exposed to • (longer tongs) reduce the risk of cell mutation 	allow (longer tongs) reduce the risk of cancer	1	AO1 6.4.2.4

Q8. (2024)

03.8	nuclear radiation is ionising		1	AO1 6.4.2.1 6.4.2.4
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