



Oxford Cambridge and RSA

# Foundation

**GCSE**

**Physics B Twenty First Century Science**

**J259/02: Depth in physics (Foundation Tier)**

General Certificate of Secondary Education

**Mark Scheme for June 2022**

OCR (Oxford Cambridge and RSA) is a leading UK awarding body, providing a wide range of qualifications to meet the needs of candidates of all ages and abilities. OCR qualifications include AS/A Levels, Diplomas, GCSEs, Cambridge Nationals, Cambridge Technicals, Functional Skills, Key Skills, Entry Level qualifications, NVQs and vocational qualifications in areas such as IT, business, languages, teaching/training, administration and secretarial skills.

It is also responsible for developing new specifications to meet national requirements and the needs of students and teachers. OCR is a not-for-profit organisation; any surplus made is invested back into the establishment to help towards the development of qualifications and support, which keep pace with the changing needs of today's society.

This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

© OCR 2022

## MARKING INSTRUCTIONS

### PREPARATION FOR MARKING

#### RM ASSESSOR

1. Make sure that you have accessed and completed the relevant training packages for on-screen marking: RM Assessor Online Training; OCR Essential Guide to Marking.
2. Make sure that you have read and understood the mark scheme and the question paper for this unit. These are available in RM Assessor.
3. Log-in to RM Assessor and mark the **required number** of practice responses (“scripts”) and the **required number** of standardisation responses.

#### MARKING

1. Mark strictly to the mark scheme.
2. Marks awarded must relate directly to the marking criteria.
3. The schedule of dates is very important. It is essential that you meet the RM Assessor 50% and 100% (traditional 50% Batch 1 and 100% Batch 2) deadlines. If you experience problems, you must contact your Team Leader (Supervisor) without delay.
4. If you are in any doubt about applying the mark scheme, consult your Team Leader by telephone, email or via the RM Assessor messaging system.
5. **Crossed Out Responses**

Where a candidate has crossed out a response and provided a clear alternative then the crossed out response is not marked. Where no alternative response has been provided, examiners may give candidates the benefit of the doubt and mark the crossed out response where legible.

**Rubric Error Responses – Optional Questions**

Where candidates have a choice of question across a whole paper or a whole section and have provided more answers than required, then all responses are marked and the highest mark allowable within the rubric is given. Enter a mark for each question answered into RM assessor, which will select the highest mark from those awarded. (The underlying assumption is that the candidate has penalised themselves by attempting more questions than necessary in the time allowed.)

**Multiple Choice Question Responses**

When a multiple choice question has only a single, correct response and a candidate provides two responses (even if one of these responses is correct), then no mark should be awarded (as it is not possible to determine which was the first response selected by the candidate). When a question requires candidates to select more than one option/multiple options, then local marking arrangements need to ensure consistency of approach.

**Contradictory Responses**

When a candidate provides contradictory responses, then no mark should be awarded, even if one of the answers is correct.

**Short Answer Questions** (requiring only a list by way of a response, usually worth only **one mark per response**)

Where candidates are required to provide a set number of short answer responses then only the set number of responses should be marked. The response space should be marked from left to right on each line and then line by line until the required number of responses have been considered. The remaining responses should not then be marked. Examiners will have to apply judgement as to whether a 'second response' on a line is a development of the 'first response', rather than a separate, discrete response. (The underlying assumption is that the candidate is attempting to hedge their bets and therefore getting undue benefit rather than engaging with the question and giving the most relevant/correct responses.)

**Short Answer Questions** (requiring a more developed response, worth **two or more marks**)

If the candidates are required to provide a description of, say, three items or factors and four items or factors are provided, then mark on a similar basis – that is downwards (as it is unlikely in this situation that a candidate will provide more than one response in each section of the response space.)

**Longer Answer Questions** (requiring a developed response)

Where candidates have provided two (or more) responses to a medium or high tariff question which only required a single (developed) response and not crossed out the first response, then only the first response should be marked. Examiners will need to apply professional judgement as to whether the second (or a subsequent) response is a 'new start' or simply a poorly expressed continuation of the first response.

6. Always check the pages (and additional objects if present) at the end of the response in case any answers have been continued there. If the candidate has continued an answer there then add a tick to confirm that the work has been seen.

7. Award No Response (NR) if:

- there is nothing written in the answer space.

Award Zero '0' if:

- anything is written in the answer space and is not worthy of credit (this includes text and symbols).

Team Leaders must confirm the correct use of the NR button with their markers before live marking commences and should check this when reviewing scripts.

8. The RM Assessor **comments box** is used by your Team Leader to explain the marking of the practice responses. Please refer to these comments when checking your practice responses. **Do not use the comments box for any other reason.**

If you have any questions or comments for your Team Leader, use the phone, the RM Assessor messaging system, or email.

9. Assistant Examiners will send a brief report on the performance of candidates to their Team Leader (Supervisor) via email by the end of the marking period. The report should contain notes on particular strengths displayed as well as common errors or weaknesses. Constructive criticism of the question paper/mark scheme is also appreciated.

10. For answers marked by levels of response:

Read through the whole answer from start to finish, using the Level descriptors to help you decide whether it is a strong or weak answer. The indicative scientific content in the Guidance column indicates the expected parameters for candidates' answers, but be prepared to recognise and credit unexpected approaches where they show relevance. Using a 'best-fit' approach based on the skills and science content evidenced within the answer, first decide which set of level descriptors, Level 1, Level 2 or Level 3, best describes the overall quality of the answer.

Once the level is located, award the higher or lower mark:

**The higher mark** should be awarded where the level descriptor has been evidenced and all aspects of the communication statement (in italics) have been met.

**The lower mark** should be awarded where the level descriptor has been evidenced but aspects of the communication statement (in italics) are missing.















**In summary:**

**The skills and science content determines the level.**

**The communication statement determines the mark within a level.**

Level of response questions on this paper are **6** and **12**

## 11. Annotations available in RM Assessor

Annotation	Meaning
	Correct response
	Incorrect response
	Omission mark
	Benefit of doubt given
	Contradiction
	Rounding error
	Error in number of significant figures
	Error carried forward
	Level 1
	Level 2
	Level 3
	Benefit of doubt not given
	Noted but no credit given
	Ignore

12. Abbreviations, annotations and conventions used in the detailed Mark Scheme (to include abbreviations and subject-specific conventions).

<b>Annotation</b>	<b>Meaning</b>
/	alternative and acceptable answers for the same marking point
✓	Separates marking points
<b>DO NOT ALLOW</b>	Answers which are not worthy of credit
<b>IGNORE</b>	Statements which are irrelevant
<b>ALLOW</b>	Answers that can be accepted
( )	Words which are not essential to gain credit
—	Underlined words must be present in answer to score a mark
<b>ECF</b>	Error carried forward
<b>AW</b>	Alternative wording
<b>ORA</b>	Or reverse argument



### 13. Subject-specific Marking Instructions

#### INTRODUCTION

Your first task as an Examiner is to become thoroughly familiar with the material on which the examination depends. This material includes:

- the specification, especially the assessment objectives
- the question paper
- the mark scheme.

You should ensure that you have copies of these materials.

You should ensure also that you are familiar with the administrative procedures related to the marking process. These are set out in the OCR booklet **Instructions for Examiners**. If you are examining for the first time, please read carefully **Appendix 5 Introduction to Script Marking: Notes for New Examiners**.

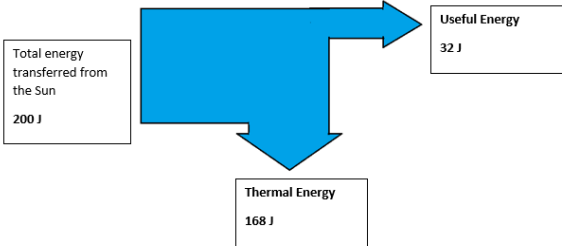
Please ask for help or guidance whenever you need it. Your first point of contact is your Team Leader.

The breakdown of Assessment Objectives for GCSE (9-1) in /Physics/ B:

	<b>Assessment Objective</b>
<b>AO1</b>	<b>Demonstrate knowledge and understanding of scientific ideas and scientific techniques and procedures.</b>
AO1.1	Demonstrate knowledge and understanding of scientific ideas.
AO1.2	Demonstrate knowledge and understanding of scientific techniques and procedures.
<b>AO2</b>	<b>Apply knowledge and understanding of scientific ideas and scientific enquiry, techniques and procedures.</b>
AO2.1	Apply knowledge and understanding of scientific ideas.
AO2.2	Apply knowledge and understanding of scientific enquiry, techniques and procedures.
<b>AO3</b>	<b>Analyse information and ideas to interpret and evaluate, make judgements and draw conclusions and develop and improve experimental procedures.</b>
<b>AO3.1</b>	Analyse information and ideas to interpret and evaluate.
AO3.1a	Analyse information and ideas to interpret.
AO3.1b	Analyse information and ideas to evaluate.
<b>AO3.2</b>	Analyse information and ideas to make judgements and draw conclusions.
AO3.2a	Analyse information and ideas to make judgements.
AO3.2b	Analyse information and ideas to draw conclusions.
<b>AO3.3</b>	Analyse information and ideas to develop and improve experimental procedures.
AO3.3a	Analyse information and ideas to develop experimental procedures.
AO3.3b	Analyse information and ideas to improve experimental procedures.

Question		Answer	Marks	AO element	Guidance
1	(a)	23✓ 12✓	2	2.1	
	(b)	Wet road – braking distance ✓  Alcohol – thinking distance✓  Speed – both✓    Mobile phone – thinking distance✓	4	1.1	<b>ALLOW</b> 2 lines speed – braking distance <b>AND</b> speed - thinking distance <b>OR</b> 3 lines speed - all 3 options

Question		Answer	Marks	AO element	Guidance
2	(a)	C✓	1	2.1	
	(b)	(i) B and D✓	1	2.1	
		(ii) (Two cells) give twice/double the pd ✓  (And two resistors) give twice/double the resistance (therefore same ratio) ✓	2	3.1a	<b>ALLOW</b> $I = V/R$ is the same (for both circuits) OR Same ratio of cells to resistors for 2 marks  <b>ALLOW</b> (because there are) the same amount of cells as resistors 1 mark

Question		Answer	Marks	AO element	Guidance
3	(a)	Solar panels generate more electricity when its sunny ✓  Solar panels use a renewable source of energy to generate electricity ✓	2	1.1	
	(b) (i)	200 - 32 = 168 (J) ✓	1	2.2	
	(ii)	 <p style="text-align: right;">✓</p>	1	2.2	<p><b>ALLOW</b> correct numerical values <b>OR</b> correct word labels <b>OR</b> a mixture of word labels and numerical values for output energies. <b>ALLOW</b> 200(J) 32 (J) 168 (J)</p> <p><b>ALLOW</b> 'Energy Transfer to surroundings' for 'Thermal Energy'</p> <p><b>ALLOW ECF</b> from <b>b(i)</b> for 168 (J)</p>
	(iii)	<p><b>FIRST CHECK THE ANSWER ON ANSWER LINE</b> <b>If answer = 0.16 award 2 marks</b></p> <p>efficiency = <math>32 \div 200</math> ✓ = 0.16 ✓</p>	2	2.1	<p><b>ALLOW ECF</b> for Useful energy and Total energy from <b>b(ii)</b></p> <p><b>ALLOW</b> 16 % for 2 marks provided % sign given</p>
	(c) (i)	Electromagnetic ✓	1	1.1	
	(ii)	Infrared ✓	1	1.1	

Question		Answer	Marks	AO element	Guidance
4	(a)	X= Ammeter✓ Y= Voltmeter ✓	2	1.2	
	(b)	To change the potential difference and the current. ✓	1	1.2	
	(c) (i)	Two remaining points plotted within 0.5 square✓ Best straight line drawn through candidate's points✓	2	2.2	Must include (0,0) <b>ALLOW</b> if no candidate points
	(ii)	Expected reading 0.35A ✓	1	2.2	<b>ALLOW</b> reading from their line within 0.5 square
	(iii)	<b>FIRST CHECK THE ANSWER ON ANSWER LINE</b> <b>If answer = 20 (ohm) award 3 marks</b> Selecting suitable pair of readings from graph/table✓ Resistance = $10 \div 0.5$ ✓ =20 (ohm) ✓	3	2.2 2.1x2	<b>ALLOW ecf</b> for use of any point on their line <b>ALLOW</b> use of 7V and their value for current from (c) (ii)
	(d)	Measure/use different lengths of wire ✓  (and) measure the current and potential difference (to calculate the resistance) <b>OR</b> (and) use an ohmmeter/multimeter (to measure the resistance) ✓	2	3.3a	<b>ALLOW</b> suggested lengths e.g. 10cm 20cm <b>ALLOW</b> increase length of wire <b>ALLOW</b> use longer wire(s)  <b>ALLOW</b> Use different lengths of wire <b>AND</b> and repeat the experiment <b>OR</b> and calculate the resistance <b>OR</b> and measure the resistance = 2 marks

Question		Answer			Marks	AO element	Guidance
5	(a)	<b>Statement</b>	<b>True</b>	<b>False</b>	2	1.2	4 correct = 2 marks 2 or 3 correct = 1 mark 1 or 0 correct = 0 marks
		A protractor is used to measure angle i.	✓				
		The normal line needs to be drawn at a 45 degree angle to the side of the prism.		✓			
		The prism needs to be moved to measure the angle of refraction. .	✓				
		Angle, i, is always the same as angle r		✓			
	(b)	Hazard – Ray box gets hot <b>OR</b> Hazard – semi-dark environment ✓  Reducing risk – Do not touch the bulb/allow time to cool <b>OR</b> Reducing risk – Make sure the environment is clear of trip hazards ✓			2	3.2a  3.3b	

Question	Answer	Marks	AO element	Guidance
(c)	<p><b>Any two from:</b></p> <p>(The angle of refraction) <math>r</math> is smaller than (the angle of incidence) <math>i</math> <b>ORA</b> ✓</p> <p>As (angle of incidence), <math>i</math>, increases (the angle of refraction), <math>r</math>, increases ✓</p> <p>(The angle of refraction) <math>r</math> does not increase as much after (an angle of incidence of) <math>i \sim 50^\circ</math> <b>OR</b> the difference between <math>i</math> and <math>r</math> increases as <math>i</math> increases <b>OR</b> <math>r</math> is not proportional to <math>i</math> ✓</p>	2	3.2b	<p><b>NOT</b> <math>r</math> is proportional to <math>i</math></p> <p><b>ALLOW</b> a correct description of the graph e.g. the graph curves</p>
(d)	C ✓	1	1.1	
(e)	<p><b>Any one from:</b></p> <p>Red light refracts less than Blue light <b>ORA</b> ✓</p> <p>Red light has a longer wavelength than blue light <b>ORA</b> ✓</p> <p>Red light travels faster <b>OR</b> blue light slows down more in the prism/glass <b>ORA</b></p>	1	1.1	<p><b>ALLOW</b> Red light has a different wavelength to blue light</p> <p><b>ALLOW</b> Red light has a different speed in the prism <b>OR</b> glass <b>OR</b> to blue light</p>



Question	Answer	Marks	AO element	Guidance
6 *	<p>Please refer to the marking instructions on page 4 of this mark scheme for guidance on how to mark this question.</p> <p><b>Level 3 (5–6 marks)</b> A simple description of the method. <b>OR</b> A description of one or more of the variables or control variables for which results will be collected correctly identified <b>AND</b> States a correct conclusion which may include the idea of proportionality. There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.</p> <p><b>Level 2 (3–4 marks)</b> An attempt to describe a method. <b>OR</b> A description of some variables and/or controlled variables for which results will be collected. <b>AND</b> States a correct conclusion. There is a line of reasoning presented with some structure. The information presented is relevant and supported by some evidence.</p> <p><b>Level 1 (1–2 marks)</b> Attempt to describe a simple method. <b>OR</b> Description of a variable or controlled variable for which results will be collected. <b>OR</b> States a simple conclusion. There is an attempt at a logical structure with a line of reasoning. The information is in the most part relevant.</p> <p><b>0 marks</b> No response or no response worthy of credit.</p>	6	3 x 1.2 3 x 3.2b	<p><b>AO1.2 Demonstrate knowledge and understanding of a scientific procedure</b></p> <p><b>Variables</b></p> <ul style="list-style-type: none"> <li>• Independent – Number of turns</li> <li>• Dependent – Number of pins</li> <li>• Controlled – Distance electromagnet is from pins OR current OR pd OR Material of core OR same wire OR number of cells</li> </ul> <p><b>Method (possible example)</b></p> <ul style="list-style-type: none"> <li>• Step 1 - start with 20 turns</li> <li>• Step 2 - close switch</li> <li>• Step 3 -count number of pins picked up</li> <li>• Step 4 - open switch and put pins back in dish</li> <li>• Step 5 - Add 10 turns and repeat steps 2 to 4</li> <li>• Step 6 stop after 60 turns</li> </ul> <p><b>AO3.2b Analyse information and ideas to draw conclusions</b></p> <p><b>Conclusion</b></p> <ul style="list-style-type: none"> <li>• The results show that increasing number of turns increase number of pins</li> <li>• More pins = stronger magnetic field</li> <li>• (therefore) More turns – stronger magnetic field</li> <li>• More pins – greater attractive force</li> <li>• The results show a doubling of number of turns doubles the number of pins,</li> <li>• therefore, shows proportionality/linearity</li> </ul>

Question		Answer	Marks	AO element	Guidance
7	(a)	Chemical ✓ Kinetic ✓	2	1.1	
	(b)	<b>Any one from:</b>  Gravitational (store) to kinetic (store) ✓  (Kinetic store) to thermal (store) ✓  (From kinetic store transferred by) Sound ✓  (From kinetic store transferred by) light/radiation ✓  (From kinetic store transferred by) mechanical working ✓	1	1.1	<b>ALLOW</b> heat for thermal         (i.e. friction between rocket and atmosphere)
	(c)	<b>FIRST CHECK THE ANSWER ON ANSWER LINE</b> <b>If answer = 15 000 000 000 (J) award 3 marks</b>  Converting 12.5km to 12500m ✓ Substitution $GPE = 120\,000 \times 10 \times 12500$ ✓ $GPE = 15\,000\,000\,000$ (J) / $1.5 \times 10^{10}$ (J) ✓	3	1.2 2.1 x 2	<b>ALLOW</b> 15 000 000 (J) / $1.5 \times 10^7$ (J) for 2 marks

Question		Answer	Marks	AO element	Guidance
8	(a)	The diagram shows a chain reaction✓ Neutrons are absorbed by the U-235 nuclei✓ At each stage the number of nuclei doubles✓	3	2.1	
	(b)	90 ✓ 39 ✓	2	2.2	
	(c) (i)	<b>FIRST CHECK THE ANSWER ON ANSWER LINE</b> <b>If answer = 29 (years) award 2 marks</b>  using activity = 50 % ✓  29 (years) ✓	2	2.2	line on graph at activity = 50% <b>ALLOW</b> use of 25% if time ÷ 2  <b>ALLOW</b> 28 - 32
	(ii)	8 - 9 (%) ✓	1	2.2	<b>ALLOW</b> 6 -10 (%)
	(d) (i)	38 ✓	1	2.1	
	(ii)	50✓	1	2.1	

Question			Answer	Marks	AO element	Guidance
9	(a)	(i)	<p><b>Any one from:</b>            To compare the ages of the Earth and the Moon ✓            To compare the composition/types/structure of rocks from the Moon to the Earth ✓            Compare the densities of the rocks ✓</p> <p>To look for evidence on the Moon for:            Its composition ✓            How it formed ✓            Water ✓            Life ✓            That we could live there ✓            Resources we could use ✓</p>	1	3.2a	<p><b>IGNORE</b> compare the similarities and differences of the rocks on the Earth and the Moon</p> <p><b>ALLOW</b> to identify the rocks on the Moon</p>
		(ii)	<p><b>Any two from:</b>            Fame/personal ambition ✓            Personal curiosity ✓            For scientific knowledge/research ✓</p> <p>To collect samples for research/interest ✓            Duty to their country ✓            Money ✓            Thrill seeking / excitement ✓</p>	2	3.2a	<p>e.g. understand more about the Moon OR Explore the Moon            e.g. Bring Moon rock to Earth</p>
	(b)		<p><b>FIRST CHECK THE ANSWER ON ANSWER LINE</b>  <b>If answer = 3.2 (g/cm<sup>3</sup>) AND Peridotite award 4 marks</b></p> <p>Select equation: Density = mass ÷ volume ✓            Density = 31 ÷ 9.7 ✓                      = 3.2 (g/cm<sup>3</sup>) ✓</p> <p>Type of Rock = Peridotite ✓</p>	4	<p>1.2            2.1 x 2</p> <p>3.1b</p>	<p><b>ALLOW</b> Density values that round to 3.2 (g/cm<sup>3</sup>)</p> <p><b>ALLOW ECF</b> if Density wrong but in range 2.1-5.3</p>

Question		Answer	Marks	AO element	Guidance
10	(a)	C ✓	1	3.1a	
	(b)	The clockwise moment is less than the anticlockwise moment AW ✓	1	2.2	<b>ALLOW</b> moment either side of pivot should be equal / Clockwise moment $\neq$ anticlockwise moment <b>ALLOW</b> 200 $\neq$ 180
	(c)	<p><b>FIRST CHECK THE ANSWER ON ANSWER LINE</b>  <b>If answer = 4.67 (N) award 4 marks</b></p> <p><math>W \times 45 = 6 \times 35</math> ✓  <math>W = \frac{210}{45}</math> ✓  <math>W = 4.6666</math> (N) ✓  <math>W = 4.67</math> (N) 2 decimal places ✓</p>	4	2.1 x3  1.2	<b>ALLOW</b> an incorrect calculated value of W given to 2 decimal places

Question		Answer	Marks	AO element	Guidance
11	(a)	(Changing temperature) changes (kinetic) energy/speed of particles/internal energy ✓  (Hence) a change in the number of collisions with (the area of) piston ✓	2	1.1	<b>IGNORE</b> particles vibrate more/less <b>ALLOW</b> increase/decrease for change
				2.1	<b>IGNORE</b> reference to rates of reaction
	(b)	Arrow drawn perpendicular to piston surface pointing left ✓	1	2.1	<b>ALLOW</b> a correct arrow drawn near or in the piston
	(c) (i)	<b>FIRST CHECK THE ANSWER ON ANSWER LINE</b> <b>If answer = 16.8 (N) award 3 marks</b>  Select: Pressure = Force ÷ Area <b>OR</b> Force = 4.2(N) at V=8.0(cm <sup>3</sup> ) ✓ Force = 4.2 x 4 ✓ Force = 16.8 (N) ✓	3	1.2	
				2.1 x 2	
	(ii)	<b>FIRST CHECK THE ANSWER ON ANSWER LINE</b> <b>If answer = 34 (Ncm) award 3 marks</b>  Constant = 4.0 x 8.4 ✓ = 33.6 ✓ = 34 (to 2sf) ✓	3	2.1 x 2	<b>ALLOW</b> any pair of volumes from table
				1.2	<b>ALLOW</b> an incorrect calculated value to 2sf
	(iii)	<b>Any three from:</b> As volume increases the pressure decreases ✓  As volume doubles the pressure halves/PV = constant ✓  Supporting data e.g. when volume = 4cm <sup>3</sup> pressure = 8.4N/cm <sup>2</sup> and when volume = 8cm <sup>3</sup> pressure = 4.2N/cm <sup>2</sup> <b>OR</b> PV = 33.6(Ncm) for at least two pairs of values ✓	3	3.2b	<b>ALLOW</b> Volume is inversely proportional to pressure 2 marks

Question	Answer	Marks	AO element	Guidance
12 *	<p>Please refer to the marking instructions on page 4 of this mark scheme for guidance on how to mark this question.</p> <p><b>Level 3 (5–6 marks)</b> An evaluation of the choice of radioisotopes to use as a tracer <b>AND</b> Description of a risk and a benefit of radioisotopes in medicine There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.</p> <p><b>Level 2 (3–4 marks)</b> A simple evaluation of the choice of a radioisotope to use as a tracer <b>AND</b> Description of a risk or a benefit of using radioisotopes in medicine There is a line of reasoning presented with some structure. The information presented is relevant and supported by some evidence.</p> <p><b>Level 1 (1–2 marks)</b> A simple evaluation of the choice of a radioisotope to use as a tracer <b>OR</b> Stated a risk or a benefit of using radioisotopes in medicine There is an attempt at a logical structure with a line of reasoning. The information is in the most part relevant. <b>0 marks</b> No response or no response worthy of credit.</p>	6	2 x 1.1 2 x 2.1 2 x 3.2a	<p><b>AO3.2a Analyse information and ideas to make judgements on what type of radiation each isotope emits</b></p> <ul style="list-style-type: none"> <li>• A and D = Gamma as only reduced by lead</li> <li>• B and E = Beta as stopped by aluminium</li> <li>• C = Alpha as stopped by skin</li> </ul> <p><b>AO2.1 Apply knowledge and understanding of the properties of radioisotopes</b></p> <ul style="list-style-type: none"> <li>• radioisotope D best choice with reasons e.g. requires short Half-life (B-D) so does not remain active for long but long enough to be used and must be able to pass out of skin easily to be detected so ideally Gamma/ not stopped by skin or aluminium (AD)</li> <li>• Beta would be partially absorbed so could cause damage to tissues / might not exit to give an image</li> </ul> <p><b>AO1.1 Demonstrate understanding of associated risks and benefits of radiation</b></p> <ul style="list-style-type: none"> <li>• All radiation is ionising</li> <li>• Damages/mutates living cells</li> <li>• Increased exposure increases the risk</li> <li>• Risk greater inside body than outside</li> <li>• No need for exploratory surgery (non invasive)</li> <li>• Increase in life expectancy potentially</li> <li>• Diagnosis</li> <li>• <b>ALLOW</b> benefits in terms of minimising the risk</li> </ul>

## Need to get in touch?

If you ever have any questions about OCR qualifications or services (including administration, logistics and teaching) please feel free to get in touch with our customer support centre.

### Call us on

**01223 553998**

### Alternatively, you can email us on

**support@ocr.org.uk**

### For more information visit

 [ocr.org.uk/qualifications/resource-finder](https://ocr.org.uk/qualifications/resource-finder)

 [ocr.org.uk](https://ocr.org.uk)

 [Twitter/ocrexams](https://twitter.com/ocrexams)

 [/ocrexams](https://twitter.com/ocrexams)

 [/company/ocr](https://www.linkedin.com/company/ocr)

 [/ocrexams](https://www.youtube.com/ocrexams)



OCR is part of Cambridge University Press & Assessment, a department of the University of Cambridge.

For staff training purposes and as part of our quality assurance programme your call may be recorded or monitored. © OCR 2022 Oxford Cambridge and RSA Examinations is a Company Limited by Guarantee. Registered in England. Registered office The Triangle Building, Shaftesbury Road, Cambridge, CB2 8EA.

Registered company number 3484466. OCR is an exempt charity.

OCR operates academic and vocational qualifications regulated by Ofqual, Qualifications Wales and CCEA as listed in their qualifications registers including A Levels, GCSEs, Cambridge Technicals and Cambridge Nationals.

OCR provides resources to help you deliver our qualifications. These resources do not represent any particular teaching method we expect you to use. We update our resources regularly and aim to make sure content is accurate but please check the OCR website so that you have the most up-to-date version. OCR cannot be held responsible for any errors or omissions in these resources.

Though we make every effort to check our resources, there may be contradictions between published support and the specification, so it is important that you always use information in the latest specification. We indicate any specification changes within the document itself, change the version number and provide a summary of the changes. If you do notice a discrepancy between the specification and a resource, please [contact us](#).

Whether you already offer OCR qualifications, are new to OCR or are thinking about switching, you can request more information using our [Expression of Interest form](#).

Please [get in touch](#) if you want to discuss the accessibility of resources we offer to support you in delivering our qualifications.