

Pearson
Edexcel

Mark Scheme (Results)

Summer 2025

Pearson Edexcel GCSE
In Physics (1PH0)
Paper 1F

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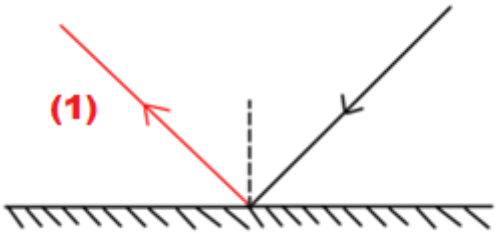
General Marking Guidance

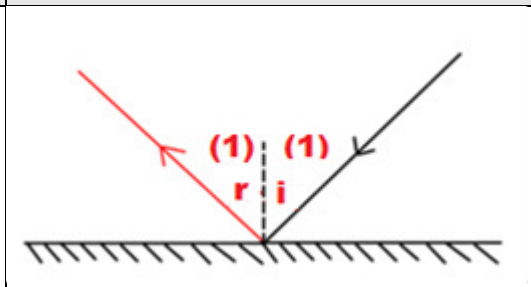
- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

Mark schemes have been developed so that the rubrics of each mark scheme reflects the characteristics of the skills within the AO being targeted and the requirements of the command word. So for example the command word 'Explain' requires an identification of a point and then reasoning/justification of the point.
Explain questions can be asked across all AOs. The distinction comes whether the identification is via a judgment made to reach a conclusion, or, making a point through application of knowledge to reason/justify the point made through application of understanding. It is the combination and linkage of the marking points that is needed to gain full marks.
When marking questions with a 'describe' or 'explain' command word, the detailed marking guidance below should be consulted to ensure consistency of marking.

Assessment Objective		**Command Word**	
Strand	**Element**	**Describe**	**Explain**
AO1		An answer that combines the marking points to provide a logical description	An explanation that links identification of a point with reasoning/justification(s) as required
AO2		An answer that combines the marking points to provide a logical description, showing application of knowledge and understanding	An explanation that links identification of a point (by applying knowledge) with reasoning/justification (application of understanding)
AO3	1a and 1b	An answer that combines points of interpretation/evaluation to provide a logical description	
AO3	2a and 2b		An explanation that combines identification via a judgment to reach a conclusion via justification/reasoning
AO3	3a	An answer that combines the marking points to provide a logical description of the plan/method/experiment	
AO3	3b		An explanation that combines identifying an improvement of the experimental procedure with a linked justification/reasoning

Physics 1PH0_1F

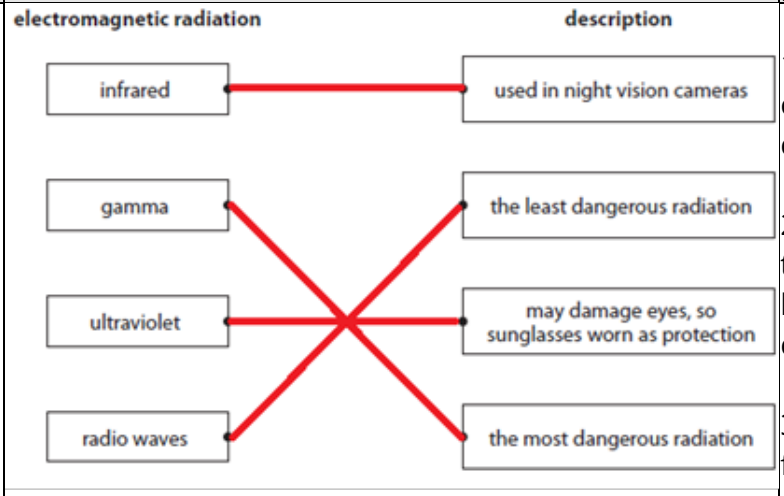
Question number	Answer	Additional guidance	Mark
1(a) (i)		judge by eye whether 'i' = 'r' ignore any arrow	**(1)** **AO2.1**

Question number	Answer	Additional guidance	Mark
1(a) (ii)		'i' only needs to be between the incident ray and the normal 'r' only needs to be between the reflected ray and the normal ignore any rays below the mirrored surface	**(2)** **AO2.1**

Question number	Answer	Additional guidance	Mark
1 (b)	substitution (1) (power) = $\frac{1}{(0.)17}$ conversion (1) cm to m seen evaluation (1) 5.9 (dioptres)	 1.7 in denominator to any power of 10 here 0.17 seen accept 5.88(235. .) etc award full marks for correct answer without working.	**(3)** **AO2.1**

Question number	Answer	Additional guidance	Mark
1 (c)	**C** the leaf reflects green light only (1) **B** is wrong because it does not absorb yellow and blue light **only** **A** is wrong because the leaf does not absorb green light **D** is wrong because grass does not reflect yellow and blue light		**(1)** **AO1.1**

Total for Question 1 = 7 mark

Question number	Answer	Additional guidance	Mark
2 (a)		1 mark for one line correct 2 marks for two or three lines correct 3 marks for four lines correct. if more than one line is drawn from or to a box, do not credit any of those lines	**(3)** **AO1.1**

Question number	Answer	Additional guidance	Mark
2 (b)	☒ **A** blue (1) **B, C** and **D** have lower frequencies		**(1)** **AO1.1**

Question number	Answer	Additional guidance	Mark
2 (c) i	coordinate (40, 25) plotted ± half a square (1) coordinate (70, 39) plotted ± half a square (1)	judge by eye judge by eye	**(2)** **AO2.1**

Question number	Answer	Additional guidance	Mark
2 (c) ii	best fit curve touching at least four of the points (1)	do not accept tramlining (multiple curves) ignore slight shakiness in drawing ignore any curves/lines drawn before the first point or after the last point	**(1)** **AO2.1**

Question number	Answer	Additional guidance	Mark
2 (c) iii	A description to include as angle of incidence increases angle of refraction increases (1) idea of non-linear (relationship) (1)	 positive correlation not proportional / not directly proportional curve gets less steep (as angle of incidence increases) ignore curve unqualified	**(2)** **AO3.2**

Total for Question 2 = 9 marks

Question number	Answer	Additional guidance	Mark
3 (a) (i)	TS (speed/velocity/it) increases (1) SR constant (speed/velocity) (1) RQ (speed/velocity/it) decreases (1)	acceleration / accelerating no acceleration /zero acceleration deceleration / decelerating / negative acceleration	**(3)** **AO3.2**

Question number	Answer	Additional guidance	Mark
3 (a) (ii)	deceleration (between R and Q) is great**er** (than deceleration between Q and P) (1)	allow reverse argument throughout comparison needed accept (RQ) decelerates /slows down fast**er** (than QP) accept (a=) 3 (m/s^2) for RQ with (a=) 1 (m/s^2) for QP accept accelerate for decelerate ignore any reference to braking / gradient of slope	**(1)** **AO3.2**

Question number	Answer	Additional guidance	Mark
3 (b) (i)	substitution (1) $a = \frac{25 (- 0)}{5}$ evaluation (1) 5(.0) (m/s^2)	 award full marks for correct answer without working.	**(2)** **AO2.1**

Question number	Answer	Additional guidance	Mark
3 (b) (ii)	selection and substitution (1) (distance = speed x time =) 25 x 10 evaluation (1) 250 (m)	award full marks for correct answer without working	**(2) AO2.1**

Total for Question 3 = 8 marks

<table>
<tr><th>Question number</th><th>Answer</th><th>Mark</th></tr>
<tr><td>4 (a)</td><td>1 mark for answer in each box, marked independently:

<table><tr><th>particle</th><th>name of particle</th><th>charge</th></tr><tr><td>F</td><td>proton</td><td>positive</td></tr><tr><td>G</td><td>neutron (1)</td><td>zero / 0 / neutral (1)</td></tr><tr><td>H</td><td>electron (1)</td><td>-1 / negative (1)</td></tr></table>
if name of particle for G or H is incorrect:
1 mark for neutron and zero / 0 / neutral charge on same row
1 mark for electron and -1 / negative charge on same row</td><td>(4)
AO1.1</td></tr>
</table>

Question number	Answer		Additional guidance	Mark
4 (b) (i)	**5**	(1)	**five**	**(1) AO1.1**

Question number	Answer		Additional guidance	Mark
4 (b) (ii)	**4**	(1)	**four**	**(1) AO1.1**

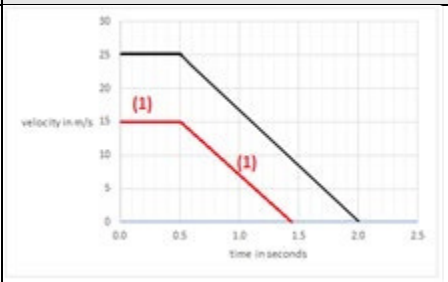
Question number	Answer	Additional guidance	Mark
4 (c) (i)	**D** becquerel (Bq) A, B and C are not units for activity		**(1) AO1.1**

Question number	Answer	Additional guidance	Mark
4 (c) (ii)	Identification of 3 half-lives OR ⅛ left (1) evaluation (1) 15 (g)	evidence of halving a number 3 times evidence of halving 120(g) award full marks for correct answer without working award one mark only for 40(g) (thinking three half lives means ÷ 3)	**(2) AO2.1**

Total for Question 4 = 9 marks

Question number	Answer	Mark
5 (a)	C 0.27 s (1) **A** and **B** are incorrect – much too small for human reaction times **D** is incorrect because it's a much longer time than is reasonable	(1) AO1.1

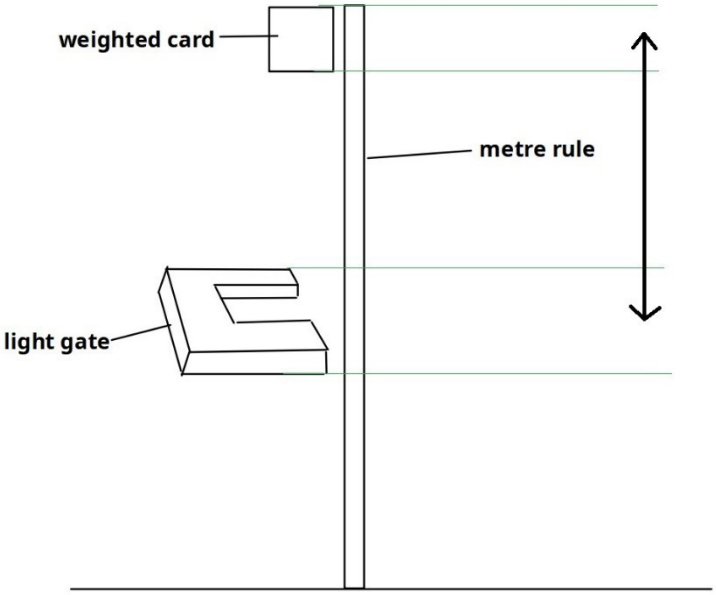
Question number	Answer	Additional guidance	Mark
5 (b)	Any **two** named factors from mass / weight of the van (1) speed / velocity of van (1) state of (the van's) brakes (1) state of the road (1) friction (between the tyre and the road surface) (1) (idea of driver's) reaction time (1) tiredness (1) alcohol / drugs / energy drink (1)	affecting thinking or braking distance worn brakes accept wet / dry / weather	(2) AO1.1

Question number	Answer	Additional guidance	Mark
5 (c) (i)	 lower level 15 m/s section up to 0.5s (1) deceleration section same gradient (parallel to braking line shown) (1)	judge by eye	(2) AO3.2

Question number	Answer	Additional guidance	Mark
5 (c)(ii)	substitution (1) (force) = $\frac{375\,(000)}{21.5}$ use of 375 000 (1) evaluation (1) 17 400 (N)	 17 441.86. . . award full marks for correct answer without working 17(.44) scores 2 marks	**(3)** **AO2.1**

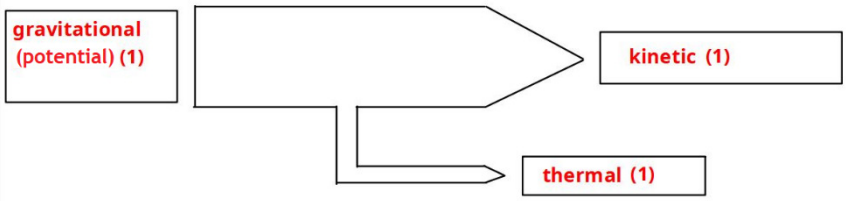
Question number	Answer	Mark
5 (c) (iii)	**A** the kinetic energy of the car before braking C and D are incorrect – GPE doesn't change, doesn't apply B is incorrect – final KE =0, not equal to work done	**(1)** **AO3.1**

Total for Question 5 = 9 marks

Question number	Answer	Additional guidance	Mark
6 (a) (i)	line drawn anywhere between the two ranges shown(1)  	upper end of drawn line/arrow between the top limits lower end of drawn line/arrow between the bottom limits accept drawn line without arrow heads or "h".	**(1)** **AO1.2**

Question number	Answer	Additional guidance	Mark
6 (a)(ii)	to check for anomalies (1)	improve reliability / improve precision / (check for) consistency / (reduce) random error / calculate an average ignore accuracy / reproducible	**(1)** **AO1.2**

Question number	Answer	Additional guidance	Mark
6 (a)(iii)	Any **two** from use a clamp to hold the ruler / light-gate (1) ensure eye is level (with the edge being measured and the rule) (1) use a set square (to aid the measurement) (1) make sure the rule is vertical (1) use a ruler with an improved resolution (1)	 look at straight (on) use of (horizontal) marker/pointer stand the ruler upright use a ruler with small(er) divisions ignore references to human error / repeat reading (by others)	**(2)** **AO1.2**

Question number	Answer	Mark
6 (b)	 accept heat or sound for thermal accept kinetic or thermal in either order in the right-hand boxes accept GPE or GP for gravitational (potential) accept KE for kinetic	**(3)** **AO3.1**

Question number	Answer	Additional guidance	Mark
6 (c)	reading **both** graph values(1) 2005 → 60 AND 2020 → 740 substitution (1) % change = $\frac{740 - 60}{60}$ x 100 evaluation (1) 1130 (%)	 accept 59 to 61 accept 740 to 750 accept any value between 1110(%) and 1180(%) award full marks for correct answer without working ignore any negative sign award 2 marks for any number that rounds to 92(%) (taking wrong denominator)	**(3)** **AO2.1**

Total for Question 6 = 10 marks

Question number	Answer	Additional guidance	Mark
7(a) (i)	substitution (1) $\frac{10}{3.7}$ evaluation (1) 2.7 (N)	10:3.7 2.7027. . . or 2.7:1 allow 1:2.7 allow 0.37:1 OR 1:0.37 (for inverted ratio) award full marks for correct answer without working	**(2)** **AO2.1**

Question number	Answer	Additional guidance	Mark
7(a) (ii)	substitution into equation with ratio (1) (730 ÷) $\frac{10}{1.6}$ evaluation (1) 120 (N)	6.25 or 6.3 used accept 116.8 award full marks for correct answer without working	**(2)** **AO2.1**

Question number	Answer	Additional guidance	Mark
7 (a) (iii)	An explanation including (it depends on) mass of planet (1) (it depends on) radius / diameter / size of planet (1)	ignore references to weight if no other mark awarded allow 1 mark for (depends on) density	**(2)** **AO1.1**

Question number	Answer	Mark
7 (b)	**A** the Sun (1) **B, C** and **D** are incorrect because the orbits are not around those objects	**(1)** **AO1.1**

Question number	Indicative content	Mark
***7(c)**	Answers will be credited according to candidate's deployment of knowledge and understanding of the material in relation to the qualities and skills outlined in the generic mark scheme. The indicative content below is not prescriptive and candidates are not required to include all the material which is indicated as relevant. Additional content included in the response must be scientific and relevant. Planets in our Solar System • identifies planet(s): P Venus, Q the Earth, R Mars • planets P, Q and R in zone, so could have life • OR P just in zone / **marginal idea** • Mercury outside the zone/too hot • Jupiter outside the zone/too cold • Earth the most central to the zone • Earth has life Planets A, B and C • A and B are outside the zone • A and B too hot • C almost in the zone / **marginal idea** • B might just have some water on its surface • C is the most promising for life	**(6)** **AO3.2**

Level	Mark	Descriptor
	0	• No rewardable material.
Level 1	1-2	• Deconstructs scientific information but understanding and connections are flawed. An unbalanced or incomplete argument that provides limited synthesis of understanding. • Judgements are supported by limited evidence. (AO3)
Level 2	3-4	• Deconstructs scientific information and provides some logical connections between scientific concepts. An imbalanced argument that synthesises mostly relevant understanding, but not entirely coherently. • Judgements are supported by evidence occasionally. (AO3)
Level 3	5-6	• Deconstructs scientific information and provide logical connections between scientific concepts throughout. A balanced, well-developed argument that synthesises relevant understanding coherently. • Judgements are supported by evidence throughout. (AO3)

Level	Mark	Additional Guidance	General additional guidance – the decision within levels e.g. - At each level, as well as content, the scientific coherency of what is stated will help place the answer at the top, or the bottom, of that level.
	0	No rewardable material.	
Level 1	1–2	Additional guidance Isolated facts (use of limited evidence)	Possible candidate responses • recognises Solar System planet(s) • planets P, Q and R in zone • A and B outside the zone
Level 2	3–4	Additional guidance Discussion informed by some evidence from the chart. Talks about the possibility of life Addressing solar system planets, identifying at least one. OR Addressing the distant planets A, B and C	Possible candidate responses • identifies planet(s) e.g. P Venus, Q the Earth, R Mars • planets P, Q and R in zone, so could have life • C on the edge of the zone
Level 3	5–6	Additional guidance Detailed discussion drawing on evidence with conclusions informed by scientific knowledge Talks about the possibility of life Addressing solar system planets, identifying at least two. AND Addressing the distant planets A, B and C	Possible candidate responses • Earth the most central to the zone and Earth has life • C almost in the zone so might just have life

Total for Question 7 = 11 marks

Question number	Answer	Additional guidance	Mark
8 (a) (i)	B newton kilogram A, C and D are incorrectly associated units		**(1)** **AO1.1**

Question number	Answer	Additional guidance	Mark
8 (a) (ii)	(mass) balance (1)	accept spring balance OR (weighing) scale(s)	**(1)** **AO1.2**

	Answer	Additional guidance	Mark
8(b)(i)	use of (F=)0.92 (N) (1) substitution and rearrangement (1) (acceleration) = $\frac{0.92}{0.25}$ evaluation (1) (acceleration) = 3.7 (m/s^2)	allow 0.92 x 0.25 OR $\frac{0.25}{0.92}$ allow MP2 for use of incorrect force giving $\frac{2.5}{0.25}$ OR $\frac{3.42}{0.25}$ OR $\frac{1.58}{0.25}$ OR $\frac{0.46}{0.25}$ allow values that round to 3.7 e.g. 3.68 allow values that round to 3.7 x 10^{-3} or 0.0037 for 2 marks (g instead of kg) allow for 2 marks an evaluation of 10(.0) OR 14 OR 13.7 OR 6.3(2) OR 1.8(4) (use of incorrect force) award full marks for the correct answer without working ignore negative values throughout if no other marks scored allow 1 mark for $a = \frac{F}{m}$	**(3)** **AO2.1**

	Answer	Additional guidance	Mark
8(b)(ii)	1.6 (N) OR 1.58 (N)		**(1)** **AO3.1**

	Answer	Additional guidance	Mark
8(c)(i)	2.4 (N) OR 2.375 (N) OR 2.38 (N)		**(1)** **AO2.2**

	Answer	Additional guidance	Mark
8(c)(ii)	straight line extended to meet h = 0.80 m axis (1) 3.1 (N) (1)	judge by eye allow 3.05 to 3.20 inclusive award full marks for the correct answer without working	**(2)** **AO2.2**

	Answer	Additional guidance	Mark
8(c)(iii)	select two points on the line (1) evaluation (1) 3.90 ± 0.10 (N/m)	allow triangle drawn on graph award full marks for the correct answer without working	**(2)** **AO2.2**

Total for Question 8 = 11 marks

	Answer	Additional guidance	Mark
9(a)(i)	10(.0) (cm)		**(1)** **AO1.1**

	Answer	Additional guidance	Mark
9(a)(ii)	12(.0) (cm)		**(1)** **AO1.1**

	Answer	Additional guidance	Mark
9(a)(iii)	a description to include time a wave (crest) over a measured/fixed/known/stated distance (1) use (speed =) <u>distance</u> (1) time ALTERNATIVE METHOD (determine frequency by measuring) the time taken for a set number of waves to pass a point (1) use (speed =) $f \times \lambda$ (1)	 measure how long it takes for a wave to travel a set distance measure distance travelled in a stated time (count) the number of waves in a specified time 'measure frequency' is not sufficient for this mark use (speed =) f x (0.)12	**(2)** **AO1.2**

	Answer	Additional guidance	Mark
9(b)(i)	any **one** from electromagnetic (wave) (1) ripples/water (waves) (1) (waves on a) string (1)	 radio(waves) / microwaves / IR / infrared / visible / light / UV / ultraviolet / X(-ray) / gamma / γ allow sea / ocean / tidal wave ignore waves on a spring ignore earthquake or seismic P or S	**(1)** **AO1.1**

	Answer	Additional guidance	Mark
9(b)(ii)	a description to include: (causes it to) vibrate/oscillate (1) perpendicular/at right angles to (the direction of travel of) the wave (1)	can be shown on diagram allow shake in this context allow double headed arrow(s) ↔ or ↕ centred on R on diagram (to show vibration) allow "up and down" or "forwards and backwards" for vibration perpendicular/at right angles to (direction of) energy transfer allow horizontal arrow(s) → or ← centred on R on diagram (to show direction) allow side to side OR left to right OR in and out for perpendicular ↔ centred on R scores 2 marks ignore possible eventual consequences e.g. rock breaks up / heats up	**(2)** **AO2.1**

Question number	Indicative content	Mark
***9(c)**	Answers will be credited according to candidate's deployment of knowledge and understanding of the material in relation to the qualities and skills outlined in the generic mark scheme. The indicative content below is not prescriptive and candidates are not required to include all the material which is indicated as relevant. Additional content included in the response must be scientific and relevant. • count rate goes down when you put paper in the way (data processed) • indicates alpha being absorbed • alpha not very penetrating • count rate goes down (a lot) when the lead is in the way (data processed) • indicates gamma being absorbed • count rate above background • so some gamma still getting through (data processed) • overall conclusion alpha and gamma radiation emitters present	**(6)** **AO2**

AO targeting: 6 marks AO2 strand 2

Level	Mark	Descriptor
	0	• No awardable content
Level 1	1-2	• The explanation attempts to link and apply knowledge and understanding of scientific enquiry, techniques and procedures, flawed or simplistic connections made between elements in the context of the question. • Lines of reasoning are unsupported or unclear. (AO2)
Level 2	3-4	• The explanation is mostly supported through linkage and application of knowledge and understanding of scientific enquiry, techniques and procedures, some logical connections made between elements in the context of the question. • Lines of reasoning mostly supported through the application of relevant evidence. (AO2)
Level 3	5-6	• The explanation is supported throughout by linkage and application of knowledge and understanding of scientific enquiry, techniques and procedures, logical connections made between elements in the context of the question. • Lines of reasoning are supported by sustained application of relevant evidence. (AO2)

Level	Mark	Additional Guidance	General additional guidance – the decision within levels e.g. - At each level, as well as content, the scientific coherency of what is stated will help place the answer at the top, or the bottom, of that level.
	0	No rewardable material.	
Level 1	1–2	Additional guidance Isolated facts (uses limited observational evidence from the table)	Possible candidate responses alpha stopped by paper count rate goes down, with paper
Level 2	3–4	Additional guidance uses limited observational evidence from the table AND links to some scientific knowledge about the radiations	Possible candidate responses count rate goes down, with paper AND links to alpha being absorbed OR count rate goes down with lead AND links to gamma being absorbed
Level 3	5–6	Additional guidance uses extensive observational evidence from the table AND links to detailed scientific knowledge about the radiations WITH some synthesis / making logical connections between observations argued from the table.	Possible candidate responses count rate goes down, with paper linked to alpha being absorbed AND count rate goes down (a lot) when the lead is in the way, linked to gamma being absorbed

Total for Question 9 = 13 marks

Question number	Answer	Mark
10 (a) (i)	**B** ionising radiation (1) A is incorrect because gamma rays are considered as radiation in this context C and D are incorrect because gamma rays are ionising	**(1)** **AO1.1**

Question number	Answer	Mark
10 (a) (ii)	**A** control rods (1) B is incorrect because the coolant is used for the purpose of cooling C is incorrect because the moderator is used to slow neutrons down D is incorrect because a PET scanner is not part of a nuclear reactor.	**(1)** **AO1.1**

Question number	Answer	Additional guidance	Mark
10(b) (i)	reading from graph and substitution (1) = $\frac{19.5}{50}$ (x100) evaluation (1) 39 (%)	allow use of values between 19 and 20 allow values between 38(%) and 40(%) award full marks for correct answer without working.	**(2)** **AO2.1**

Question number	Answer	Additional guidance	Mark
10(b)(ii)	an explanation linking **two** from they collide (1) annihilate (1) (releasing a pair of) gamma ray(s) (1)	 ignore interact/combine allow (charges) cancel/neutralise/become neutral photons ignore light	**(2)** **AO1.1**

Question number	Answer	Additional guidance	Mark
10 (c)	an explanation linking any three from neutron absorbed (into uranium) (1) (causing) nucleus becomes unstable (1) (so nucleus) breaks up/splits (into two nuclei) (1) (then) releasing (more) neutron(s)(1) releases gamma rays / energy (1)	 allow collides/hits/joins with do not allow atoms for this mark allow daughter/smaller if no other marks scored award 1 mark for neutrons go onto hit other nuclei	**(3)** **AO1.1**

Question number	Answer	Additional guidance	Mark
10 (d)	substitution (1) $= \frac{4.4\ (\times 10^9)}{8.9\ (\times 10^9)}$ evaluation to 2 s.f(1) 0.49	 0.49438 allow 4.4:8.9 allow 44:89 allow 0.49:1 accept 1(.0): 0.49 award full marks for correct answer without working.	**(2)** **AO2.1**

Total for Question 10 = 11 marks

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