GCSE MARKING SCHEME

SUMMER 2025

GCSE
PHYSICS - UNIT 2 (FOUNDATION TIER)
3420U20-1

© WJEC CBAC Ltd.

About this marking scheme

The purpose of this marking scheme is to provide teachers, learners, and other interested parties, with an understanding of the assessment criteria used to assess this specific assessment.

This marking scheme reflects the criteria by which this assessment was marked in a live series and was finalised following detailed discussion at an examiners' conference. A team of qualified examiners were trained specifically in the application of this marking scheme. The aim of the conference was to ensure that the marking scheme was interpreted and applied in the same way by all examiners. It may not be possible, or appropriate, to capture every variation that a candidate may present in their responses within this marking scheme. However, during the training conference, examiners were guided in using their professional judgement to credit alternative valid responses as instructed by the document, and through reviewing exemplar responses.

Without the benefit of participation in the examiners' conference, teachers, learners and other users, may have different views on certain matters of detail or interpretation. Therefore, it is strongly recommended that this marking scheme is used alongside other guidance, such as published exemplar materials or Guidance for Teaching. This marking scheme is final and will not be changed, unless in the event that a clear error is identified, as it reflects the criteria used to assess candidate responses during the live series.

© WJEC CBAC Ltd

WJEC GCSE PHYSICS

UNIT 2 – FORCES, SPACE AND RADIOACTIVITY

FOUNDATION TIER

SUMMER 2025 MARK SCHEME

GENERAL INSTRUCTIONS

Recording of marks

One tick must equate to one mark (apart from the questions where a level of response mark scheme is applied).

Marking rules

All work should be seen to have been marked.

Marking schemes will indicate when explicit working is deemed to be a necessary part of a correct answer.

Crossed out responses not replaced should be marked.

Credit will be given for correct and relevant alternative responses which are not recorded in the mark scheme.

Extended response question

A level of response mark scheme is used. Before applying the mark scheme please read through the whole answer from start to finish. Firstly, decide which level descriptor matches best with the candidate's response: remember that you should be considering the overall quality of the response. Then decide which mark to award within the level. Award the higher mark in the level if there is a good match with both the content statements and the communication statement. Marking abbreviations
The following may be used in marking schemes or in the marking of scripts to indicate reasons for the marks awarded.

cao = correct answer only
ecf = error carried forward
bod = benefit of doubt

© WJEC CBAC Ltd.

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
1	(a)			<table><tr><td></td><td>1st Law</td><td>2nd Law</td><td>3rd Law</td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td>✓ **(1)**</td></tr><tr><td></td><td></td><td>✓ **(1)**</td><td></td></tr><tr><td></td><td></td><td>✓ **(1)**</td><td></td></tr></table> More than one tick in a row award 0 for the row.	3			3		
	(b)	(i)		0 [kg m/s]	1			1		
		(ii)		300 × 0.004 (1) = 1.2 (1) [kg m/s]	1	1		2	2	
		(iii)		[To the] left accept backwards / opposite		1		1		
		(iv)		Substitution: $\frac{[-]1.2(\textbf{ecf})}{0.5}$ (1) = [-] 2.4 (1) [m/s]	1	1		2	2	
		(v)		Decreases (1) A gravitational force (1)	2			2		
				Question 1 total	**8**	**3**	**0**	**11**	**4**	**0**

© WJEC CBAC Ltd.

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
2	(a)	(i)		3	1			1		
		(ii)	I	20 [s]		1		1	1	
			II	$\frac{20\ \textbf{ecf}}{5} = 4$		1		1	1	
		(iii)		100 [m]		1		1		
		(iv)		Substitution: speed = $\frac{100\ \textbf{ecf}}{80}$ (1) = 1.25 (1) [m/s]	1	1		2	2	
	(b)			[Agree because] travels greater distance each second **OR** biggest gradient **OR** steepest [line]			1	1		
				Question 2 total	**2**	**4**	**1**	**7**	**4**	**0**

© WJEC CBAC Ltd.

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
3	(a)	(i)		Mercury or Earth (Not Pluto)	1			1		
		(ii)		Uranus		1		1		
	(b)	(i)		Selection of 3.7 (1) Substitution: weight = 0.060 × 3.7 (1) = 0.22 (1) [N] **Note** If other g value selected from table award 1 mark only i.e. 0.534, 0.672, 0.624, 1.488	1	1 1		3	3	
		(ii)		Substitution: 0.50 × 0.22 (**ecf**) (1) = 0.11 (1) [J]	1	1		2	2	
		(iii)		Answer from (b)(ii) i.e. 0.11 [J]	1			1		
	(c)			Mars has lowest <u>mass</u>, lowest g **OR** Jupiter has highest <u>mass</u>, largest g (1) Accept for the 1st mark – <u>mass</u> increases, g increases provided either the 2nd or 3rd mark are awarded **For the 2nd and 3rd marks:** **Either:** Venus and Uranus don't fit the pattern (1) Because they have same g but different <u>masses</u> (1) **Or:** Neptune and Saturn don't fit the pattern (1) Because Saturn has a greater <u>mass</u> but smaller g [than Neptune] (1) Accept data values quoted that are relevant			3	3		
				Question 3 total	**4**	**4**	**3**	**11**	**5**	**0**

© WJEC CBAC Ltd.

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
4	(a)	(i)		B	1			1		
		(ii)		D	1			1		
	(b)	(i)		3 accept 144	1			1		

© WJEC CBAC Ltd.

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
		(ii)		**Indicative content:** Uranium fuel rods contain the U-235 nuclei that will undergo fission. The 3 m thick concrete shield protects workers from any radiation emitted. The graphite moderator slows down neutrons so that they can be absorbed by the uranium nuclei, to keep the fission reaction going. The boron control rods absorb neutrons. They can be raised or lowered to control the rate of the reaction, so that on average for every fission reaction that occurs 1 neutron goes on to further fission. This allows a controlled chain reaction to be achieved. **5 – 6 marks** Comprehensive description of all labelled features. *There is a sustained line of reasoning which is coherent, relevant, substantiated and logically structured.* **3 – 4 marks** Limited description of all labelled features **or** a comprehensive description of the role of the moderator and control rods, **or** a comprehensive description of fuel rods, concrete shield and either the moderator or the control rods. *There is a line of reasoning which is partially coherent, largely relevant, supported by some evidence and with some structure.* **1-2 marks** Limited description of one or two labelled features. *There is a basic line of reasoning which is not coherent, largely irrelevant, supported by limited evidence and with very little structure*. **0 marks** *No attempt made or no response worthy of credit.*	6			6		
				Question 4 total	**9**	**0**	**0**	**9**	**0**	**0**

© WJEC CBAC Ltd.

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
5	(a)			All 6 points plotted correctly (2) ± <1 small square tolerance 5 points plotted correctly (1) ± <1 small square tolerance 4 or less points plotted correctly (0) ± <1 small square tolerance Straight line between 10-90 [units] (1) **Don't accept** thick, double, wispy or disjointed lines		3		3	3	3
	(b)			As distance increases, cosmological red shift increases (1) at a constant rate (1) Accept for 2 marks - distance directly proportional to cosmological red shift Accept for 2 marks - each time distance increases by 10, cosmological red shift increases by 0.6		2		2		2
	(c)	(i)		[Red shift shows that] galaxies are moving {apart / away from Earth} (1) So universe is expanding **OR** everything originated at one point (1)	1	1		2		
		(ii)		F	1			1		
		(iii)		Compare distances e.g. 10 and 20 (1) Accept A and B identified Cosmological red shift increases <u>from</u> 0.6 (1) to 1.2 which is double so agree (1) Conclusion must be present to award all 3 marks **Alternative:** Compare distances e.g. 45 and 90 (1) Accept C and F identified Cosmological red shift increases <u>from</u> 2.7 (1) to 5.4 which is double so agree (1) Conclusion must be present to award all 3 marks			3	3		
		(iv)		2nd box i.e. CMBR	1			1		
				Question 5 total	**3**	**6**	**3**	**12**	**3**	**5**

© WJEC CBAC Ltd.

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
6	(a)			Ticks in boxes 1, 2 and 4 i.e. -E-bike 1 reaches a greater velocity than e-bike 2 (1) -Initially, the acceleration of e-bike 2 is greater than e-bike 1 (1) -E-bike 2 reaches its maximum velocity before e-bike 1 (1)		3		3		3
	(b)			Substitution: = $a = \frac{20}{10}$ (1) = 2 (1) m/s^2 (1)	1 1	1		3	2	3
	(c)			E bike 1 $\frac{([0]+25)}{2}$ (1) $\times$ 25 (1) = 312.5 (1) [m] which is {more than 2 times further / more than 200 m / [about] 3 times further} (1) [so claim is incorrect] **no ecf**			4	4	4	4
				Question 6 total	**2**	**4**	**4**	**10**	**6**	**10**

© WJEC CBAC Ltd.

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
7	(a)	(i)		Thinking distance halved to 4.5 [m] (1) Accept 4.55 or 4.6 from calculation Braking distance unchanged at 14 [m] (1) Stopping distance = 4.5 **ecf** + 14 **ecf** = 18.5 [m] (1)		3		3	1	
		(ii)		Thinking distance {remains at 9 [m] / stays the same} (1) so stopping distance = 9 + 28 = 37 [m] (1) [which is not double so not true] N.B. Don't accept 18.5 $\times$ 2 = 37 [m]			2	2	2	
	(b)			Increases the {distance / time} [taken to come to rest] (1) reducing the {force / deceleration} (1) **Alternative:** Prevents driver continuing to move forward (1) By providing a force (1)	2			2		
				Question 7 total	**2**	**3**	**2**	**7**	**3**	**0**

© WJEC CBAC Ltd.

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
8	(a)	(i)		237 (1) 93 (1)		2		2		
		(ii)		95 (1) 146 (1) 0 (1)	1 1	1		3		
	(b)			$\frac{128}{32} = 4$ (1) $\times$ 0.25 = 1.0 [micrograms] (1) **Alternative:** 128 $\times$ 0.25 = 32 (1) $\frac{32}{32} = 1.0$ [micrograms] (1)		2		2	2	
	(c)	(i)		Vertical line from 420 up to the curve (1) Horizontal line at 64 from the curve to the axis (1)		2		2		
		(ii)		840 [years]		1		1		
		(iii)		Halving at last twice from 50% (1) Adding 420 at least twice (1) 2100 [years] [so the statement is roughly true] (1) Workings must be shown			3	3	3	
				Question 8 total	**2**	**8**	**3**	**13**	**5**	**0**

© WJEC CBAC Ltd.

FOUNDATION TIER

SUMMARY OF MARKS ALLOCATED TO ASSESSMENT OBJECTIVES

Question	AO1	AO2	AO3	Total	Maths	Prac
1	8	3	0	11	4	0
2	2	4	1	7	4	0
3	4	4	3	11	5	0
4	9	0	0	9	0	0
5	3	6	3	12	3	5
6	2	4	4	10	6	10
7	2	3	2	7	3	0
8	2	8	3	13	5	0
Total	**32**	**32**	**16**	**80**	**30**	**15**

© WJEC CBAC Ltd.