

**UNIT 6: (Double Award) PHYSICS 2
FOUNDATION TIER****MARK SCHEME****GENERAL INSTRUCTIONS**Recording of marks

Examiners must mark in red ink.

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

Question totals should be written in the box at the end of the question.

Question totals should be entered onto the grid on the front cover and these should be added to give the script total for each candidate.

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 statements.

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

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
1	(a)			Red super giant – supernova – neutron star (3) 1 mark for each correctly placed	3			3		
	(b)			Star is stable because forces are balanced (1) gravitational force balanced by gas and radiation pressure (1)	2			2		
				Question 1 total	5	0	0	5	0	0

GCSE SCIENCE (Double Award) Sample Assessment Materials 298

Question				Marking details	Marks Available						
					AO1	AO2	AO3	Total	Maths	Prac	
2	(a)			D E F A 3 or 4 correct (3) 2 correct (2) 1 correct (1)	3			3			3
	(b)			All 4 points correctly plotted within $\pm \frac{1}{2}$ small square division (2) 3 points correctly plotted within $\pm \frac{1}{2}$ small square division (1) 0-2 points correctly plotted within $\pm \frac{1}{2}$ small square division (0) Smooth curve of best fit within $\pm \frac{1}{2}$ small square division of all points (1) Don't accept thick, double, wispy lines				3	3	3	3
	(c)	(i)		Method clear (1) Half-life correct from graph to 1 d.p. (1)				2	2	2	2
		(ii)		Longer half-life (1) As lower probability of decay (1)				2	2		2
		(iii)		To increase sample size (1) to reduce effect of anomalies / to smooth out fluctuations in data (1)				2	2		2
				Question 2 total	3	7	2	12	5		12

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
3	(a)			Bottom 2 boxes ticked (2) -1 for each additional box ticked		2		2	1	
	(b)	(i)		Air resistance	1			1		
		(ii)		0.20 – 0.04 (1) = 0.16 [N] (1)		2		2	2	
		(iii)		Substitution: $\frac{0.16}{0.02}$ ecf (1) = 8 [m/s ²] (1)	1	1		2	2	
	(c)			Acceleration decreases (1) because air resistance increases / resultant force decreases (1)		2		2		
	(d)			0.20 [N]	1			1		
				Question 3 total	3	7	0	10	5	0

GCSE SCIENCE (Double Award) Sample Assessment Materials 300

Question		Marking details	Marks Available					
			AO1	AO2	AO3	Total	Maths	Prac
4	(a)	<p>Indicative content: There are 8 planets in the solar system. The rocky inner planets in order from the Sun are: Mercury, Venus, Earth and Mars. The outer planets are much bigger and they are made of gas. They are, in order of distance from the Sun: Jupiter, Saturn, Uranus and Neptune. The planet furthest from the Sun is Pluto. Between Mars and Jupiter is the asteroid belt which contains rocky objects which have never formed into a planet. Some of the inner planets have a small number of moons [Earth 1, Mars 2] but the outer planets have many moons. Generally the further away from the Sun the lower the temperature of the moons and planets, and the orbit time around the Sun increases as the distance from the Sun increases. The solar system also has dwarf planets and small comets which are made of ice.</p> <p>5 – 6 marks: All parts of the solar system named. Order of planets evident. Detail of composition of planets. Detailed description of features. <i>There is a sustained line of reasoning which is coherent, relevant, substantiated and logically structured. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar.</i></p> <p>3 – 4 marks: Most parts of the solar system named such as planets, moons, asteroids, comets, dwarf planets, with some detail given. <i>There is a line of reasoning which is partially coherent, largely relevant, supported by some evidence and with some structure. The candidate uses mainly appropriate scientific terminology and some accurate spelling, punctuation and grammar.</i></p> <p>1-2 marks: A basic description of the solar system is given, perhaps limited to naming some planets. <i>There is a basic line of reasoning which is not coherent, largely irrelevant, supported by limited evidence and with very little structure. The candidate uses limited scientific terminology and inaccuracies in spelling, punctuation and grammar.</i></p> <p>0 marks <i>No attempt made or no response worthy of credit.</i></p>				6		
		Question 4 total	6	0	0	6	0	0

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
5	(a)			2 nd and 4 th boxes ticked (2) -1 for each additional tick		2		2		
	(b)			There is an imbalance between the number of protons and neutrons	1			1		
	(c)			Alpha - helium nucleus (1) accept 2p and 2n Gamma – em wave (1)	2			2		
	(d)			Technetium-99 emits gamma which is very penetrating / less ionising (1) It has a short half-life so it decays quickly (1) It is easily detected / causes less harm (1)			3	3		
				Question 5 total	3	2	3	8	0	0

GCSE SCIENCE (Double Award) Sample Assessment Materials 302

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
6	(a)			Substitution: $\frac{20}{0.5}$ (1) Force = 40 [N] (1)	1	1		2	2	
	(b)			[Gravitational] potential energy	1			1		
	(c)			Transferred to kinetic energy		1		1		
				Question 6 total	2	2	0	4	2	0

GCSE SCIENCE (Double Award) Sample Assessment Materials 303

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
7	(a)			3 rd and 4 th boxes only ticked (2) -1 for additional boxes ticked			2	2	2	
	(b)			Thinking distance is increased by factors like tiredness and alcohol (1) Braking distance is increased by wet roads / poor brakes / heavy loads (1) Hence the distances given only correspond to best possible conditions (1)			3	3		
	(c)			As speed doubles braking distance increases (1) By a factor of 4 (1)		2		2		
	(d)			24 [m] (1) 96 [m] (1) Substitution: $24 + 96 = 120$ [m] (1) ecf	1	1		3	3	
	(e)	(i)		Air bags increase the time taken to stop / increase the distance the passenger travels whilst stopping (1) reducing the force acting on passenger (1)		2		2		
		(ii)		Any (1) from: <ul style="list-style-type: none"> • Crumple zone • Side impact protection bars • Seat belt 	1			1		
	(f)			Any 2 ×(1) from: <ul style="list-style-type: none"> • Use of speed bumps / speed cameras • Speed limits • Public awareness campaigns 			2	2		
				Question 7 total	2	6	7	15	5	0

FOUNDATION TIER**SUMMARY OF MARKS ALLOCATED TO ASSESSMENT OBJECTIVES**

Question	AO1	AO2	AO3	TOTAL MARK	MATHS	PRAC
1	5	0	0	5	0	0
2	3	7	2	12	5	12
3	3	7	0	10	5	0
4	6	0	0	6	0	0
5	3	2	3	8	0	0
6	2	2	0	4	2	0
7	2	6	7	15	5	0
TOTAL	24	24	12	60	17	12