Mark Scheme (Results)

Summer 2025

Pearson Edexcel International GCSE
In Science Single Award (4SS0) Paper 1P

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Summer 2025
Question Paper Log Number P74660A
Publications Code 4SS0_1P_2506_MS

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.

Question number	Answer	Notes	Marks
1 (a) (i)	**B (the sound is reflected by the rocks);** The answer cannot be A because absorption does not cause echoes. The answer cannot be C or D sound waves as neither refraction nor transmission through the rocks causes echoes		1
(ii)	**A (the amplitude is reduced);** The answer cannot be B as frequency is to do with pitch. The answer cannot be C as period of the wave has nothing to do with loudness or amplitude. The answer cannot be D as wavelength of the wave has nothing to do with loudness or amplitude.		1
(b) (i)	speed = distance (travelled) ÷ time (taken)	Allow usual symbols and any correct re-arrangement	1
(ii)	substitution; correct evaluation; unit: m/s; e.g. speed = 230 / 0.66 speed = 350 m/s m/s	allow correct consistent unit allow values that round to 350 (m/s) ms^{-1} or correct consistent unit correct answer and unit without working scores all marks correct answer without unit or working scores 2 marks	3

Total for question 1: 6 marks

Question number	Answer	Notes	Marks
2 (a)	orange/red;	allow red/orange or orange/yellow but not just yellow	1
(b)	any THREE from nebula / eq; star / main sequence star; red giant; white dwarf; PLUS ALL FOUR named stages in correct order; e.g. nebula → star → red giant → white dwarf	 allow protostar / cloud of dust/gas allow main sequence (star) ignore red supergiant allow planetary nebula Max of 3 marks if other stages are included e.g. supernova, neutron star, black hole	4
(c)	any orbit around the Earth; orbit (around Earth) is either circular or has Earth at a focus if it is elliptical;		2

Total for question 2: 7 marks

Question number	Answer	Notes	Marks
3 (a)	**D (the gradient of the line from 0.40 to 3.4 seconds)**; answers A and B cannot be correct because acceleration is not found by calculating the area answer C cannot be correct because the vehicle is not decelerating during this time		1
(b)	any attempt at finding an area; use of formula for area of a triangle (½ x base x height); correct evaluation; e.g. area of triangle = ½ × 20 × 3.0 = 30 distance = 30 (m)	allow any velocity x any time correct answer without working scores all marks	3
(c)	idea that line is less steep; (because) there is lower (braking) force;	longer time till car stops / longer braking time / lower deceleration / eq. ignore lower braking / stopping distance road more slippery / less friction / less traction / less grip	2

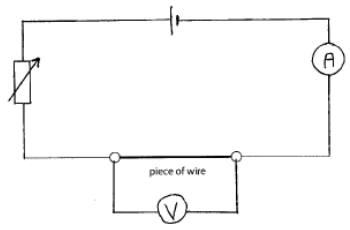
Total for question 3: 6 marks

Question number	Answer	Notes	Marks
4 (a)	-223 (ºC)	Allow –223.15 (ºC)	1
(b)	any FOUR from: MP1. kinetic energy/KE (of particles) has increased; MP2. kinetic energy (KE) has <u>doubled</u> because temperature has <u>doubled</u>; MP3. frequency of collisions (of particles) with container/walls has increased/doubled; MP4. force (from particles) on container/walls has increased/doubled; MP5. link of force increases to P= F/A MP6. pressure has increased/doubled;	 allow speed/movement (of particles) has increased allow more collisions (of particles) with container/walls allow increase in rate of change of momentum (of particles) P=F/A seen anywhere	4

Total for question 4: 5 marks

Question number	Answer	Notes	Marks
5 (a) (i)	gamma more penetrating / alpha or beta less penetrating gamma can penetrate through to the surface/detector;	allow gamma longer range / alpha or beta shorter range alpha or beta cannot penetrate through to the surface/detector;	2
(ii)	Geiger-Muller (GM) tube / GM counter	allow geiger counter	1
(b) (i)	(average) time taken;	allow how long it takes	2
	for halving of; the (radio)activity;	allow count rate for activity	
	number of nuclei;	allow atoms for nuclei	
	mass of isotope;	ignore mass of substance / sample	
	isotope;		
(ii)	EITHER Idea that it minimises the time it can affect / irradiate anything in the environment / eq; OR Idea that (ionising) radiation can damage cells or tissues / cause cancer/mutations / eq;	allow stops/reduces water contamination	1
(c) (i)	speed = frequency × wavelength;	allow usual symbols and any correct re-arrangement	1
(ii)	re-arrangement; substitution; correct evaluation in standard form; e.g. wavelength = speed ÷ frequency wavelength = 3.0 ($\times 10^{8}$) ÷ 1.8 ($\times 10^{20}$) wavelength = 1.7 **× 10^{-12}** (m)	re-arrangement and substitution in either order $\lambda = v / f$ allow substitution into an incorrect but visible rearrangement allow 1.6$^{\bullet}$ **/** 1.67 / 1.66… x **10^{-12}** (m) allow 1.6$^{\bullet}$ **/** 1.67 / 1.66… to any other power of ten for 2 marks correct answer without working scores all marks	3

Total for question 5: 10 marks

Question number	Answer	Notes	Marks
6 (a) (i)	circuit symbols for ammeter, voltmeter, variable resistor all correct; any complete circuit showing ammeter in series with the piece of wire; voltmeter shown in parallel with the piece of wire;  		3
(ii)	any THREE from MP1. include a switch in the circuit or a switchable power supply; MP2. (so) the current/voltage is only on when necessary / turn off between readings/eq; MP3. Use a low(er) voltage / current (using variable resistor); MP4. (because) the wire may heat up / overheat; MP5. (because) the wire may change resistance;	 to minimise time that current flows temperature of wire could increase	3
(b) (i)	linear scale that takes up ≥ 50% of grid; labelled axes with units; all points plotted correctly within ½ a small square;	 Ignore point at (0,0)	3
(ii)	(smooth) curve that passes through points;	by eye ignore anything past last point	1

(c)	**EITHER** voltage across Y is 0.77 (V); resistance = voltage across Y divided by 0.18 (A); correct evaluation; e.g. voltage = 1.25 - 0.48 = 0.77 (V) (resistance of Y) = 0.77 / 0.18 (resistance of Y) = 4.28 (ohms) **OR an alternative** find total resistance of circuit find resistance of X Difference = resistance of Y e.g. Total R = 1.25/0.18 (= 6.94) (Ω) R of X = 0.48/0.18 (= 2.67) (Ω) resistance of Y = 4.27 (Ω)	seen anywhere allow 4.27, 4.277.., 4.28, 4.3(Ω) without working for full marks	3

Total for question 6: 13 marks

Question number	Answer	Notes	Marks
7 (a) (i)	gravitational potential energy = mass × *g* × height;	allow usual symbols and any correct rearrangement allow GPE for gravitational potential energy reject 'gravity' for *g*	1
(ii)	correct substitution; correct evaluation; e.g. GPE = mgh GPE = 0.0029 × 10 × 6.1 GPE = 0.18) (J)	 No POT error allowed allow answers that round to 0.17 or 0.18 (J)	2
(iii)	0.2 (J) or candidate's answer to (ii)		1
(iv)	substitution; re-arrangement; correct evaluation; e.g. $0.1769 = ½ \times 0.0029 \times \text{velocity}^2$ $\text{velocity}^2 = (0.1769)/0.00145 = 122$ velocity = √ (122) = 11.04... (m/s) = 11 (m/s)	ecf from aii or aiii using 0.2 gives an answer for v^2 of 137.9… Using 0.2 gives an answer of 11.7(4…) (m/s)	3
(b)	idea of (bird) having to do work;	Allow (bird) **adds/increases** energy / force / acceleration / velocity / speed (of the nut)	1 Exp

Total for question 7: 8 marks

Question number	Answer	Notes	Marks
8 (a)	horizontal arrow to the left;	seen anywhere	1
(b)	Any TWO from MP1. a.c. (continually) changes direction; MP2. magnetic field of coil (continually) changes direction; MP3. force (on cone continually) changes direction; MP4. (causing) cone/air to vibrate/oscillate / cone will move in and out;	 d.c. only goes one way / has no change of direction magnetic field of coil does not change direction force will not change direction / cone will only move once cone/air will not vibrate/oscillate	2
(c)	two from: stronger magnetic field; more turns on the coil; larger current;	 Allow description of how to achieve a stronger field e.g. reduce size of gap between poles, use stronger magnets Ignore larger/bigger/thicker magnets	2

Total for question 8: 5 marks

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