



Pearson
Edexcel

Mark Scheme

Sample Assessment Material 2018

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

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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.

Subject specific marking guidance

Symbols, terms used in the mark scheme

- Round brackets (): words inside round brackets are to aid understanding of the marking point but are not required to award the point
- Curly brackets { }: indicate the beginning and end of a list of alternatives (separated by obliques), where necessary, to avoid confusion
- Oblique /: words or phrases separated by an oblique are alternatives to each other and either answer should receive full credit.
- ecf: indicates error carried forward which means that a wrong answer given in an early part of a question is used correctly to a later part of a question.

You will not see 'owtte' (or words to that effect). Alternative correct wording should be credited in every answer unless the mark scheme has specified specific.

The Additional Guidance column is used for extra guidance to clarify any points in the mark scheme. It may be used to indicate:

- what will not be accepted for that marking point in which case the phrase 'do not accept' will be alongside the relevant marking point
- it might have examples of possible acceptable answers which will be adjacent to that marking point

Question number	Answer	Notes	Marks
1	Sun		1
	Milky Way		1
	moons		1
	planets		1
	stars		1
	galaxies		1

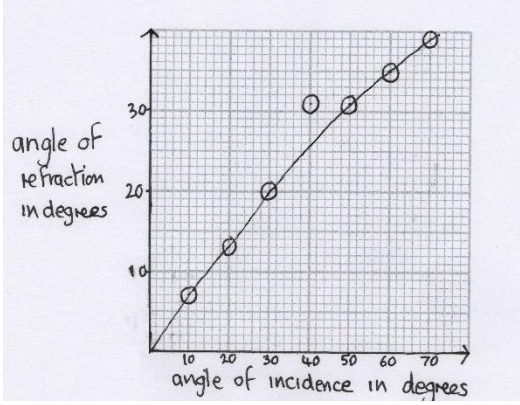
Total for Question 1 = 6 marks

Question number	Answer	Notes	Marks
2 a	<p style="text-align: center;">electromagnetic waves</p> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px; width: 20%;">visible light</div> <div style="border: 1px solid black; padding: 5px; width: 20%;">radio</div> <div style="border: 1px solid black; padding: 5px; width: 20%;">gamma rays</div> <div style="border: 1px solid black; padding: 5px; width: 20%;">microwaves</div> <div style="border: 1px solid black; padding: 5px; width: 20%;">infrared radiation</div> </div>	<p style="text-align: center;">danger</p> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px; width: 20%;">internal heating of cells in the body</div> <div style="border: 1px solid black; padding: 5px; width: 20%;">burns on the skin</div> <div style="border: 1px solid black; padding: 5px; width: 20%;">damage to the retina of the eye</div> <div style="border: 1px solid black; padding: 5px; width: 20%;">none</div> <div style="border: 1px solid black; padding: 5px; width: 20%;">ionisation of DNA molecules</div> </div> <p>(1) for each correct line linking a box on the left to one on the right REJECT for 1 mark, any cell with more than 1 line from it</p>	5
b	<p>1 any suitable use (1) e.g. fluorescent lamps, detecting forgeries, killing bacteria (in water supplies)</p> <p>2 any suitable use (1) e.g. taking 'pictures' of bones</p>	<p>ACCEPT black light, sun beds</p> <p>ACCEPT radiotherapy</p>	2

Total for Question 2 = 7 marks

Question number	Answer	Notes	Marks
3 a	A (fuse, ammeter, voltmeter)		1
b (i)	power = current \times voltage	ACCEPT in correct symbols or words e.g. $P=IV$ in any rearrangement	1
(ii)	substitution (1) evaluation (1) e.g. (P =) 2.30×11.2 (P =) 25.8 (W)	26, 25.76 (W)	2
(iii)	voltage = current \times resistance	ACCEPT in correct symbols or words e.g. $V = IR$ in any rearrangement	1
(iv)	rearrangement (1) substitution (1) evaluation (1) unit (1) e.g. $R = V/I$ (R =) $11.2/2.30$ (R =) 4.87 ohms/ Ω	rearrangement and substitution in either order 4.9, 4.869 etc	4
c	Any three from: M1 current (shown on Y) is decreased M2 (because) resistance of (series) circuit is increased M3 voltage (shown on Z) is decreased M4 (because) voltage is shared over more components in the circuit	Accept 1.15 A Accept 5.6 V	3

Total for Question 3 = 12 marks

Question number	Answer	Notes	Marks
4 a	protractor	IGNORE pen, pencil	1
b	any five from: M1 trace block on paper M2 mark emergent ray M3 join incident ray to emergent ray M4 measure angle of incidence M5 measure angle of refraction M6 measure angles from normal M7 repeat for different values of angle of incidence	ALLOW alternative words if measure angles without specifying which is <i>i</i> and which is <i>r</i> then 1 mark for M4 and M5 only marks can be awarded on the diagram	5
c i	axes labelled with quantity and unit (1) suitable scale (1) all points plotted accurately within ½ square (1)	graph to occupy more than half the grid	3
			2
	ii 40, 31 identified (1) suitable reason (1) e.g. it doesn't follow the pattern / two angles of incidence with the same angle of refraction		1
	iii smooth curve which avoids anomalous point (1)		1

Total for Question 4 = 12 marks

Question number	Answer	Notes	Marks
5 a (i)	any two from: M1 60% of the input energy (store) M2 is transferred to useful energy (stores) M3 40% is transferred to non-useful energy (stores)	ACCEPT energy for power throughout ACCEPT lost for transferred Correct formula = 1 mark if no other mark scored	2
(ii)	C (rate of transfer of energy)		1
(iii)	substitution or rearrangement (1) evaluation (1) e.g. 20 = energy / 15 OR $E = P \times t$ = 300 (J)	formula given on p2 ACCEPT work done for energy	2
b	efficiency = $18/24$ (1) 0.75 (1)	ALLOW $\times 100$ 75%	2
c	A (conservation of energy)		1

Total for Question 5 = 8 marks

Question number	Answer	Notes	Marks
6 a (i)	high energy/high frequency (1) EM wave/radiation (1)	ALLOW short wavelength	2
(ii)	alpha radiation is highly ionising (1) (therefore) alpha radiation can't penetrate skin/exit the body (1)	ALLOW particles for radiation IGNORE comments re half-life or damage to cells	2
b (i)	GM tube and counter	ALLOW suitable alternatives	1
(ii)	(1500/60=) 25		1
c (i)	four days	ALLOW argument in terms of activity	1
(ii)	to reduce the time the patient is contaminated (1) because radiation is harmful (1) count rate will not change enough / eq (1)	ALLOW specified risk e.g. damage to cells/mutation of DNA etc	3

Total for Question 6 = 10 marks

Question number	Answer	Notes	Marks
7	<p>IGNORE statements not supported by calculation or data</p> <p>any five correct statements:</p> <p>M1 train A reaches a maximum speed of 8 m/s (at 10 s)</p> <p>M2 train B reaches a maximum speed of 12 m/s (at 10 s)</p> <p>M3 train A travels for 5 s longer than train B</p> <p>M4 train A has an acceleration of 0.8 m/s²</p> <p>M5 train B has an acceleration of 2.4 m/s²</p> <p>M6 train A travels a total distance of 64m</p> <p>M7 train B travels a total distance of 66m</p>	<p>comparative statements with 2 mentions of data can gain 2 marks</p> <p>Max of (3) for train A (or train B) statements alone</p>	5

Total for Question 7 = 5 marks

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