

Cambridge National

Science

Unit **R072/01**: How Scientific Ideas Have Developed

Level 1

Mark Scheme for June 2015

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.

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Annotations

Used in the detailed Mark Scheme:

Annotation	Meaning
/	alternative and acceptable answers for the same marking point
(1)	separates marking points
not/reject	answers which are not worthy of credit
ignore	statements which are irrelevant - applies to neutral answers
allow/accept	answers that can be accepted
(words)	words which are not essential to gain credit
words	underlined words must be present in answer to score a mark
ecf	error carried forward
AW/owtte	alternative wording
ORA	or reverse argument

Available in scoris to annotate scripts

	indicate uncertainty or ambiguity
	benefit of doubt
	contradiction
	incorrect response
	error carried forward
	draw attention to particular part of candidate's response
	draw attention to particular part of candidate's response
	draw attention to particular part of candidate's response
	no benefit of doubt
	reject

	correct response
	draw attention to particular part of candidate's response
	information omitted

Subject-specific Marking Instructions

- If a candidate alters his/her response, examiners should accept the alteration.
- Crossed out answers should be considered only if no other response has been made. When marking crossed out responses, accept correct answers which are clear and unambiguous.

E.g.

For a one mark question, where ticks in boxes 3 and 4 are required for the mark:

Put ticks (✓) in the two correct boxes.

✗
✗

This would be worth 1 mark.

Put ticks (✓) in the two correct boxes.

✓
✗

This would be worth 0 marks.

Put ticks (✓) in the two correct boxes.

✗
✗
✓
✓

This would be worth 1 mark.

c. The list principle:

If a list of responses greater than the number requested is given, work through the list from the beginning. Award one mark for each correct response, ignore any neutral response, and deduct one mark for any incorrect response, e.g. one which has an error of science. If the number of incorrect responses is equal to or greater than the number of correct responses, no marks are awarded. A neutral response is correct but irrelevant to the question.

d. Marking method for tick boxes:

Always check the additional guidance.

If there is a set of boxes, some of which should be ticked and others left empty, then judge the entire set of boxes.

If there is at least one tick, ignore crosses. If there are no ticks, accept clear, unambiguous indications, e.g. shading or crosses.

Credit should be given for each box correctly ticked. If more boxes are ticked than there are correct answers, then deduct one mark for each additional tick. Candidates cannot score less than zero marks.

E.g. If a question requires candidates to identify a city in England, then in the boxes

Edinburgh	
Manchester	
Paris	
Southampton	

the second and fourth boxes should have ticks (or other clear indication of choice) and the first and third should be blank (or have indication of choice crossed out).

Edinburgh			✓			✓	✓	✓	✓	
Manchester	✓	x	✓	✓	✓				✓	
Paris				✓	✓		✓	✓	✓	
Southampton	✓	x		✓		✓	✓		✓	
Score:	2	2	1	1	1	1	0	0	0	NR

MARK SCHEME:

Question		Answer				Mark	Guidance
1	a					1	
		Together & further apart	✓				
	b	i	add up the results and divide; by 5			2	Allow calculation with working out. Allow 1 mark for mean = 0.39
		ii	No human error/reaction time; (ORA)			1	
	c			$\frac{2 \times 50}{0.29}$		1	
	d	i	Peer Review / analysis			1	
		ii	Light travels at 300,000 km/s / same speed			1	Allow idea of travelling through space.
	e				visible	1	
	f					1	
		Ionosphere	✓				
	g		using new / first /previously unavailable equipment (to broadcast & receive)			1	Allow engineering skill Allow had (right) equipment Allow qualified references to technology (e.g. new / advanced)
	h		Any 2 from different / distinct signal / wave sent; (different) wavelength; (different) frequency; so no interference/crosstalk			2	Ignore same base station; Ignore satellites
	i		(waves) do not penetrate walls / objects;			1	Accept spread out / lose power / weak(er) / low energy etc.
	j		... does not spread out.	✓		2	
			... signal to escape.	✓			
					Total	[15]	

Question		Answer		Mark	Guidance
2	a		True	2	3 correct, 2 marks 2 correct, 1 mark
		2 people below mean	✓		
		Aimee's is 0.2°C above.	✓		
		Ben has the lowest.	✓		
	b	Very different to mean / outside normal range; too hot body should maintain "normal" temperature;		2	Accept temperature is too / very high; Accept may indicate illness/infection
	cbrain;sweat		2	
	d	cannot design tests / not testable / not repeatable no proof / evidence		2	Accept idea of matter of belief;
Total				[8]	

Question		Answer		Mark	Guidance								
3	a	i	<table border="1"> <tr> <td>Taxus</td> <td>Genus</td> </tr> <tr> <td>baccata</td> <td>Species</td> </tr> </table>	Taxus	Genus	baccata	Species	2	Mark each line separately. No more than one line from each box on LHS.				
			Taxus	Genus									
		baccata	Species										
ii	<table border="1"> <tr> <td>binomial system</td> <td>✓</td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> </table>	binomial system	✓										
binomial system	✓												
iii	<table border="1"> <tr> <td></td> <td>Linnaeus</td> </tr> </table>		Linnaeus	1									
	Linnaeus												
	b	i Shape of leaves is inherited (from parent plant); involves genes / alleles /chromosomes /DNA		2	Allow seedlings same species as parent / same type of tree								
		ii	<table border="1"> <tr> <td>The hedge shape is not passed on.</td> <td>✓</td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td>The hedge has the same genes.</td> <td>✓</td> </tr> <tr> <td></td> <td></td> </tr> </table>	The hedge shape is not passed on.	✓			The hedge has the same genes.	✓			2	
The hedge shape is not passed on.	✓												
The hedge has the same genes.	✓												
Total				[8]									

Question		Answer	Marks	Guidance
4	a	<p>[Level 3] Describes continental drift AND gives more detailed evidence. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks)</p> <p>[Level 2] Describes continental drift AND at least one type of evidence. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks)</p> <p>[Level 1] Describes continental drift OR gives one type of evidence. Quality of written communication impedes communication of the science at this level. (1 – 2 marks)</p> <p>[Level 0] Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)</p>	6	<p>This question is targeted at grades up to Level 1 Distinction.</p> <p>Indicative scientific points may include:</p> <p>Evidence for Wegener:</p> <ul style="list-style-type: none"> • “Jigsaw fit” of continents • Matching fossils • Matching rock strata / layers / patterns (Ignore rocks unqualified) • Earthquakes along edges of continents • Volcanoes along edges of continents • Mountains along edges of continents. <p>Continental drift:</p> <ul style="list-style-type: none"> • continents all once formed one supercontinent (Pangaea) / continents once all together • continents moved away from each other / continents change position / spread out <p>Allow references to drifted apart but not ‘continents drifted’ Do not allow countries / islands drifted apart. Ignore: ideas or evidence later than Wegener e.g. tectonics, mid ocean ridges, magnetised rock</p> <p>Use the L1, L2, L3 annotations in Scoris; do not use ticks.</p>

Question			Answer				Mark	Guidance
4	b	i		T	F	?	4	5 correct : 4 marks 4 correct: 3 marks 3 correct: 2 marks 2 correct: 1 mark
			10x as fast	✓				
			Faster		✓			
			Thicker		✓			
			Not moving			✓		
			More slowly			✓		
	c		2 x 100; 200 (cm)				2	200 with no working (2) Allow 2 metres
			Total				[12]	

Question		Answer	Marks	Guidance
5	a	<p>[Level 3] A statement about all 3 of the following: Structure Bases Evidence Quality of written communication partly impedes communication of the science at this level. (5 – 6 marks)</p> <p>[Level 2] A statement about 2 of the following: Structure Bases Evidence Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks)</p> <p>[Level 1] A statement about 1 of the following: Structure Bases Evidence Quality of written communication partly impedes communication of the science at this level. (1 – 2 marks)</p> <p>[Level 0] Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)</p>	6	<p>This question is targeted at grades up to Level 1 Distinction.</p> <p>Indicative scientific points may include:</p> <p>Structure</p> <ul style="list-style-type: none"> • Two chains • Double helix (Ignore helix only) • (Chain of) sugar / phosphate <p>Bases</p> <ul style="list-style-type: none"> • Joined by bases • Bases on the inside • In pairs • A-T and C-G <p>Evidence</p> <ul style="list-style-type: none"> • Franklin produced photographs • Using X-rays • Showing diffraction (patterns) • Giving spacing of atoms / size of structure <p>Use the L1, L2, L3 annotations in Scoris; do not use ticks.</p>

Question		Answer	Marks	Guidance
	b	<p>Any 3 from: Sample of tissue / cells taken at crime scene; Take sample from suspect; Match / Compare DNA to the crime scene Do analysis / DNA sequence / DNA Fingerprinting;</p>	3	<p>e.g. blood, skin, hair, saliva Ignore finger print Accept electrophoresis If DNA not mentioned = maximum 2 marks</p>
		Total	[9]	

Question		Answer	Mark	Guidance
6	a	Seeds seem to improve /treat patient condition; Not a (permanent) cure;	2	Allow seeds lower sugar (in urine / body)
	b	Any two from: Thirst / dry mouth; Weight loss; Tiredness; Dizziness; Slow healing of cuts and wounds Headaches; Increased urination; Eye problems	2	
	c	Any three from: Repeat without seeds (and measure); Repeat with seeds (and measure); Keeping meals the same in each case; compare these (mean) results; Look for “real” difference (e.g. mean outside other range); QWC: Response addresses the question and is easily understood	4	
		Total	[8]	
		Overall Total	[60]	

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