

Cambridge National

Science

Unit **R075/01**: How Scientific Data is Used

Level 1

Mark Scheme for June 2018

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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.
















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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
<u>words</u>	underlined words must be present in answer to score a mark
ecf	error carried forward
AW/owtte	credit alternative wording / or words to that effect
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
	draw attention to particular part of candidate's response
	information omitted

Subject-specific Marking Instructions

- a. Accept any clear, unambiguous response (including mis-spellings of scientific terms if they are *phonetically* correct, but always check the guidance column for exclusions).
- b. 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 the third and fourth boxes are required for the mark:

✗
✗

*This would be worth
1 mark.*

✓
✗

*This would be worth
0 marks.*

✗
✗
✓
✓

*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-box questions:

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 and other markings. If there are no ticks, accept clear, unambiguous indications, e.g. shading or crosses. Credit should be given according to the instructions given in the guidance column for the question. 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 cities in England:

Edinburgh	<input type="checkbox"/>
Manchester	<input type="checkbox"/>
Paris	<input type="checkbox"/>
Southampton	<input type="checkbox"/>

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

e. For answers marked by levels of response:

i. **Read through the whole answer from start to finish**

ii. **Decide the level that best fits** the answer – match the quality of the answer to the closest level descriptor

iii. **To determine the mark within the level**, consider the following:

Descriptor	Award mark
A good match to the level descriptor	The higher mark in the level
Just matches the level descriptor	The lower mark in the level

iv. Use the **L1**, **L2**, **L3** annotations in Scoris to show your decision; do not use ticks.

Quality of Written Communication skills assessed in 6-mark extended writing questions include:

- appropriate use of correct scientific terms
- spelling, punctuation and grammar
- developing a structured, persuasive argument
- selecting and using evidence to support an argument
- considering different sides of a debate in a balanced way
- logical sequencing.

Question			Answer	Marks	Guidance
1	(a)	(i)	any THREE from: clean/sterile swab separate swab for each patient don't touch swab wear gloves clean/sterile sample tube put lid on sample tube separate containers	3	
		(ii)	Label / name	1	
	(b)		Antibody: electron mic only (1); Bacterium: light and electron mic (1); Skin cell: light only (1)	3	Need both for mark
	(c)	(i)	B	1	
		(ii)	C	1	
		(iii)	A and C and D	1	all three needed for mark
Total				10	

Question		Answer	Marks	Guidance
2	(a)	False True False	2	3 correct gets 2 marks 2 correct gets 1 mark 1 or none correct gets 0
	(b) (i)	(No) <i>any TWO from:</i> Y is most acidic Y has lower pH value X is nearer to neutral most acidic is to the left on chart	2	no mark for just no, needs a reason allow lower number
	(ii)	same colour / both yellow	1	
	(iii)	pH meter (1); more sensitive / gives values to decimal places (1)	2	
	(c) (i)	copper	1	
	(ii)	Two/more than one metal produce white / aluminium and lead both produce white	1	allow aluminium and lead give same colour

Question		Answer	Marks	Guidance
	(iii)	They identify the metal ions in the soil.	1	
	(iv)	spectrophotometer	1	
		Total	11	

Question		Answer	Marks	Guidance												
3	(a)	solvent ✓	1													
	(b) (i)	<table border="1" style="width: 100%; text-align: center;"> <tr> <td>(C)</td> <td>B</td> <td>A</td> <td>E</td> <td>D</td> </tr> </table>	(C)	B	A	E	D	2	All four correct gets 2 marks Three or two correct gets 1 mark One or none correct gets 0							
(C)	B	A	E	D												
	(ii)	It separates the spots as much as possible ✓	1													
	(c)	<table border="1" style="width: 100%; text-align: center;"> <tr> <td></td> <td>True</td> <td>False</td> </tr> <tr> <td>Drink 1 contains more than one type of sugar.</td> <td>✓</td> <td></td> </tr> <tr> <td>Both drinks contain fructose.</td> <td>✓</td> <td></td> </tr> <tr> <td>Drink 2 contains sucrose.</td> <td></td> <td>✓</td> </tr> </table>		True	False	Drink 1 contains more than one type of sugar.	✓		Both drinks contain fructose.	✓		Drink 2 contains sucrose.		✓	2	All three correct gets 2 marks Two correct gets 1 mark One or none correct gets 0 marks
	True	False														
Drink 1 contains more than one type of sugar.	✓															
Both drinks contain fructose.	✓															
Drink 2 contains sucrose.		✓														
	(d)	known value / comparison	1													
	(e) (i)	4.4/10 (1); 0.44 (1)	2	allow 4.2 to 4.6 allow 0.42 to 0.46 0.44 without working gets 2 marks												
	(ii)	glucose	1	allow ecf from part (i)												
	(iii)	Any TWO from: idea of checking / comparing give same answer make conclusion more secure / confirm conclusion	2	allow to be more certain												

Question		Answer	Marks	Guidance
3	(f)	<p>[Level 3] Comment made about sweetness and shelf life of at least three drinks with supporting evidence OR comment made about both sweetness and shelf life of two drinks with supporting evidence. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks)</p> <p>[Level 2] Comment made about sweetness or shelf life of at least two drinks with supporting evidence OR comment made about both sweetness and shelf life of one drink with supporting evidence. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks)</p> <p>[Level 1] Comment made about sweetness or shelf life of at least two drinks without supporting evidence OR comment made about both sweetness and shelf life of one drink without supporting 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 D</p> <p>Indicative scientific points may include:</p> <p>Comment without evidence:</p> <ul style="list-style-type: none"> • W and Y are sweet • X and Z are not sweet • W and Y have not past their shelf life • X and Z have past their shelf life <p>Supporting evidence:</p> <ul style="list-style-type: none"> • W and Y contain aspartame as spot at 0.50 • X and Z contain aspartic acid as spot at 0.25 <p>Use the L1, L2, L3 annotations in Scoris; do not use ticks.</p>
Total			18	

Question	Answer	Marks	Guidance
4	<p>[Level 3] Identifies minerals correctly in at least two samples with reference to data from both shapes and peaks. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks)</p> <p>[Level 2] Identifies minerals correctly in at least two samples with reference to data from either shape or peaks. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks)</p> <p>[Level 1] Identifies minerals correctly in at least two samples without reference to data OR identifies minerals in one sample with reference to data from either shape or peaks. 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 D</p> <p>Indicative scientific points may include:</p> <p>Sample A:</p> <ul style="list-style-type: none"> • forsterite and chrysoberyl • different shapes • peak at 1050 for forsterite • peaks at 420 and 600 for emerald <p>Sample B:</p> <ul style="list-style-type: none"> • emerald and/or diopase • shapes same • peak at 430 and 600 for chrysoberyl • peak at 780 for diopase • chrysoberyl and diopase present <p>Sample C:</p> <ul style="list-style-type: none"> • forsterite • shape • emerald and/or diopase from shape • peak at 1050 for forsterite • peaks at 430 and 600 for chrysoberyl • only chrysoberyl with forsterite <p>Use the L1, L2, L3 annotations in Scoris; do not use ticks.</p>
	Total	6	

Question		Answer	Marks	Guidance
5	(a)	45.0	1	do not allow 45 allow 45.0 if put next to question
	(b)	results close together / titration 2 and 3 within 0.1 / no trend up (or down)	1	allow consistent
	(c) (i)	22.6 (cm ³)	1	
	(ii)	0.2 / 22.5 to 22.7 / 22.7 to 22.5	1	Unit not required
	(d)	0.75	1	allow 0.74 to 0.76 allow ecf from c(i)
		TOTAL	5	

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