



CO-ORDINATED SCIENCES

0654/63

Paper 6 Alternative to Practical

May/June 2019

MARK SCHEME

Maximum Mark: 60

Published

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge International will not enter into discussions about these mark schemes.

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This document consists of **8** printed pages.

PUBLISHED**Generic Marking Principles**

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptors for a question. Each question paper and mark scheme will also comply with these marking principles.

GENERIC MARKING PRINCIPLE 1:

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

GENERIC MARKING PRINCIPLE 2:

Marks awarded are always **whole marks** (not half marks, or other fractions).

GENERIC MARKING PRINCIPLE 3:

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

GENERIC MARKING PRINCIPLE 4:

Rules must be applied consistently e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

GENERIC MARKING PRINCIPLE 5:

Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).

GENERIC MARKING PRINCIPLE 6:

Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

Question	Answer	Marks
1(a)(i)	105 ;	1
1(a)(ii)	160 ;	1
1(a)(iii)	55 ;	1
1(a)(iv)	55 / 30 ; 1.8 / 1.83 ;	2
1(b)	water moves ; high concentration to low concentration ; into sugar solution / bag / dilutes sugar solution / increasing the volume of the sugar solution / pressure increases ; by osmosis ;	max 3
1(c)(i)	Benedict's ;	1
1(c)(ii)	green / yellow / orange / red ;	1
1(c)(iii)	blue ;	1
1(d)	<i>Any two from</i> surface area of bag ; volume of solution ; concentration of solution ; same (width of) glass tube ; same starting height ; time ; partially permeable membrane ;	max 2

Question	Answer	Marks
2(a)	so no other ions are introduced ;	1
2(b)(i)	copper (ion) / Cu^{2+} ;	1
2(b)(ii)	(first) student adds ammonia solution too quickly ;	1
2(c)(i)	limewater and milky ;	1
2(c)(ii)	delivery tube under level of liquid in a container ; delivery tube / tube / straw labelled ;	2
2(d)(i)	sulfuric acid has the sulfate ion ;	1
2(d)(ii)	nitric acid instead of sulfuric acid ;	1
2(e)	(dilute nitric) and silver nitrate (solution)	1

Question	Answer	Marks
3(a)	correct symbol ; correct parallel connection ;	2
3(b)	2.4 (V) ;	1
3(c)	V, A, Ω ;	1
3(d)(i)	prevent the battery running down / stop lamps overheating ;	1
3(d)(ii)	5.7(1), 6.9(4), 2.9(5) / ; consistent significant figures ;	2
3(d)(iii)	circuit 3 (greatest current) ;	1

Question	Answer	Marks
3(e)	use of either 5.7 or 2.9 ; correct matching statement (yes) given and suitable comment e.g. values are very close / close enough (even allowing for experimental error) ;	2
3(f)(i)	series connection of 3 lamps ; ammeter in series ;	2
3(f)(ii)	dimmer ;	1

Question	Answer	Marks
4(a)	oval shape with clear and continuous outline ; detail of stoma in middle ; larger than original and in box ; stoma correctly labelled ;	4
4(b)(i)	64 ;	1
4(b)(ii)	correct measurement to nearest mm ;	1
4(b)(iii)	correct calculation and rounding ;	1

Question	Answer	Marks
5(a)(i)	31.5 ;	1
5(a)(ii)	10.0*, 10.5 ;	1
5(b)(i)	axes labelled ; linear scales using at least half of the grid ; at least 5 points plotted correctly within $\frac{1}{2}$ a small square ;	
5(b)(ii)	two best-fit straight lines ;	1
5(b)(iii)	ΔT from graph ; V_{HCl} from graph ;	2
5(b)(iv)	60 minus V_{HCl} in (b)(iii) ;	1
5(c)(i)	correct calculation ($60 \times 4.2 \times \Delta T$ from (b)(iii)) ;	1
5(c)(ii)	heat lost (to air) / heat lost (to beaker) ;	1

Question	Answer	Marks
6	<p>method to include container and wrapping a layer of insulation around it ; repeating with different insulators ;</p> <p>measurements measuring the initial temperature of the hot water ; time and subsequent temperatures ;</p> <p>variables same initial temperature of hot water ; same final temperature of water / allow to cool for the same time ; same thickness of insulation ; same volume of hot water ; same room temperature ;</p> <p>table to show insulator / temperature / time headers ; clear and units ;</p> <p>conclusion: comparison of times taken to cool to a fixed temperature ; or determination of temperature drops in the same time ; the material with the lowest temperature drop / which takes the longest time is the best insulator ;</p>	max 7