



PHYSICAL SCIENCE

0652/61

Paper 6 Alternative to Practical

October/November 2018

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 **7** 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)	filter funnel, filter paper (and collecting vessel) drawn ; any two labels from funnel, filter paper, filtrate, residue ;	2
1(a)(ii)	to dissolve K / solid ;	1
1(b)(i)	Zn^{2+} / zinc (ions) ;	1
1(b)(ii)	add acid (to filtrate) AND bubbles / fizzes / effervesces / gas evolved AND carbonate ; add silver nitrate (solution) AND white ppt. AND chloride ; add barium nitrate (solution) AND white ppt. AND sulfate ;	3
1(c)(i)	hydrogen / H_2 ; (reactive) metal ;	2
1(c)(ii)	(slowly add) sodium hydroxide (solution) / ammonia solution ;	1

Question	Answer	Marks
2(a)	0.13 (A) ; 1.2 (V) ;	2
2(b)	cell runs down / circuit gets hot ; OWTTE	1
2(c)(i)	9.23 (Ω) ;	1
2(c)(ii)	0.16 (W) ;	1
2(d)(i)	12.7 (Ω) ;	1
2(d)(ii)	0.53 (W) ;	1
2(e)	(statement incorrect) values (of R_S and R_P) / they are too far apart to be explained by experimental error / not within 10% ; ORA	1
2(f)(i)	lamps in series carry less current / (dissipate) less power / higher combined resistance ;	1

Question	Answer	Marks
2(f)(ii)	add another cell / increase the voltage / current (of the power source) ;	1

Question	Answer	Marks
3(a)	105.08 recorded in table for $t = 60$;	1
3(b)(i)	both axes labelled with units ; linear scales using at least half of each axis ; at least 5 points plotted correctly to nearest half square ;	3
3(b)(ii)	straight line for first 30 s AND then best-fit curve ;	1
3(c)(i)	$(106.11 - 105.35) \div 30$; $(-)0.025(3)$;	2
3(c)(ii)	line S steeper and below plotted line ;	1
3(d)(i)	(cotton wool) prevents loss of liquid/acid (spray) ;	1
3(d)(ii)	(if bung used) mass would not drop / gas/carbon dioxide could not escape / danger of explosion ;	1

Question	Answer	Marks
4(a)(i)	61–64mm ;	1
4(a)(ii)	line present, N labelled ;	1
4(a)(iii)	normal in correct position, M labelled ;	1
4(b)(i)	68mm ;	1
4(b)(ii)	43mm ;	1
4(c)	1.58 ;	1

Question	Answer	Marks
4(d)	1.5725 ; 1.57 ;	2
4(e)	(yes) values are (very) close / not (very) far apart / < 10% apart ; ORA	1
4(f)	pins may not be straight / pins not placed vertically ;	1

Question	Answer	Marks
5(a)(i)	63.5 ;	1
5(a)(ii)	40.0 ;	1
5(b)(i)	keep other alcohols away from flame and to prevent fire / as inflammable / tie up long hair and as could catch fire / tuck in loose clothing and as could catch fire ;	1
5(b)(ii)	same distance from flame to beaker / water / same size flame ;	1
5(b)(iii)	measuring cylinder ;	1
5(c)(i)	use of $100 \times 4.2 \times 38.0$; 16000 ;	2
5(c)(ii)	Energy / joules per gram = E / m ;	1
5(c)(iii)	butanol AND larger / largest number of joules per gram / kg energy per gram / kg / 18100 / 18100000 is higher / the highest ;	1
5(d)	heat lost to air / surroundings / heat lost to glass / incomplete combustion ;	1

Question	Answer	Marks
6(a)	20 (counts per minute) ;	1
6(b)	<u>537</u> and <u>170</u> ;	1
6(c)(i)	suitable choice of linear scales (\geq half the grid used) ; plots correct to half a small square (at least 5 points) ;	2
6(c)(ii)	good best-fit curve judgement ;	1
6(d)(i)	22 (s) AND 92 (s) ; to nearest half square ecf (c)(ii)	1
6(d)(ii)	70 (s) ; ecf (d)(i)	1
6(e)(i)	Place paper / aluminium / them / it(s) between source and detector ;	1
6(e)(ii)	paper – no change in count rate, so no alpha ; aluminium – count rate reduces to zero / background, so no gamma ; Drop in count rate (with some sources) ; one from the following: <ul style="list-style-type: none"> • beta goes through paper but not aluminium • alpha does not go through paper or aluminium • gamma goes through everything ; 	2