



Cambridge IGCSE™

COMBINED SCIENCE

0653/62

Paper 6 Alternative to Practical

March 2021

MARK SCHEME

Maximum Mark: 40

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.

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

Question	Answer	Marks
1(a)	bubbles / fizzes / effervesces ;	1
1(b)(i)	63 ;	1
1(b)(ii)	<i>any one from:</i> glucose is needed for respiration ; glucose is needed for CO ₂ production ; glucose speeds up respiration ;	1
1(b)(iii)	to find out, if yeast is needed / if glucose reacts on its own ;	1
1(b)(iv)	rounded bottom (of test-tube) / meniscus (of water) ;	1
1(b)(v)	limewater and goes milky ;	1
1(b)(vi)	<i>any one from:</i> time ; glucose concentration ; yeast concentration ; temperature ;	1
1(c)(i)	<i>any one from:</i> lower temperature ; less yeast (cells) added ; less glucose added ; less time ;	1
1(c)(ii)	13 ;	1
1(c)(iii)	higher concentration of glucose gives higher volume gas ; remains the same, at 10 to 11 / above 10 ;	2
1(c)(iv)	gas syringe / measuring cylinder ;	1
1(c)(v)	<i>any one from:</i> lower volume of gas (in 5 minutes) ; slower rate of gas made ;	1

Question	Answer	Marks										
2(a)(i)	more precise ;	1										
2(a)(ii)	(because it is a pale) blue ;	1										
2(b)(i)	wash with water / pour water through residue / pour water through filter funnel ;	1										
2(b)(ii)	white ;	1										
2(c)	<i>headings</i> – test / experiment AND results / observations ; test described as small volume of ammonia added followed by excess and results entered correctly for small volume followed by excess ; test described as small volume of sodium hydroxide followed by excess and results entered correctly for small volume followed by excess ; e.g. <table><tr><td>test</td><td>observations</td></tr><tr><td>(four) drops / little, aqueous sodium hydroxide</td><td>blue ppt.</td></tr><tr><td>excess / lots, aqueous sodium hydroxide</td><td>blue ppt.</td></tr><tr><td>little / drops, aqueous ammonia</td><td>blue ppt.</td></tr><tr><td>excess / lots, aqueous ammonia</td><td>dark blue solution</td></tr></table>	test	observations	(four) drops / little, aqueous sodium hydroxide	blue ppt.	excess / lots, aqueous sodium hydroxide	blue ppt.	little / drops, aqueous ammonia	blue ppt.	excess / lots, aqueous ammonia	dark blue solution	3
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Question	Answer	Marks
3	One marking point from each section and any <u>two</u> others: apparatus measuring cylinder / burette / (volumetric) pipette ; balance ; brief description and safety precautions add Universal Indicator to <u>acid</u> ; add calcium hydroxide (solid) to acid ; stir / complete reaction ; repeat for different masses (at least 2) or a continuous method ; repeat, each mass / whole of continuous method ; idea of using at least five, different masses / additions if continuous ; safety goggles AND protect eyes AND (from) acid / calcium hydroxide is corrosive ; measurements mass of calcium hydroxide ; volume of nitric acid ; colour / pH, of Universal Indicator in acid alone ; colour / pH, of Universal Indicator after adding calcium hydroxide ; using pH colour chart to match colour with pH ; variables constant volume of acid ; concentration of acid ; processing and conclusion take averages from repeated experiments ; plot graph of mass against pH ; does increasing mass of calcium hydroxide increase the pH ;	7

Question	Answer	Marks
4(a)(i)	test-tube shown approximately half-full AND water level below water level in beaker ; thermometer shown with bulb fully below the level of water in test-tube ;	2
4(a)(ii)	24.5 ; 28(.0) ; both to one decimal place ;	3
4(a)(iii)	<i>any one from:</i> ensure the thermometer is read perpendicular to the scale ; stir (using a stirring rod to ensure water has even temperature throughout) ; thermometer is, in liquid / not touching beaker ;	1
4(a)(iv)	thermal energy / heat, gained from water in test-tube ; OR thermal energy / heat, from test-tube goes to water in beaker ;	1
4(b)(i)	axes vertical temperature AND °C AND horizontal time AND s / min ; sensible linear scale with plots covering at least half of grid ; points plotted correctly ;	3
4(b)(ii)	best-fit curve ;	1
4(c)(i)	0.63 ;	1
4(c)(ii)	rate decreases (over time) ;	1