



Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

COMBINED SCIENCE

0653/63

Paper 6 Alternative to Practical

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MARK SCHEME

Maximum Mark: 60

Published

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

Question	Answer	Marks
1(a)(i)	smooth continuous outline; larger than original drawing ; anther and filament clearly visible ; stigma and style clearly visible ;	4
1(a)(ii)	petal correctly labelled ; stigma correctly labelled ; anther correctly labelled ;	3
1(b)(i)	ethanol ; water and white emulsion ;	2
1(b)(ii)	opaque so masks observation ;	1

Question	Answer	Marks
2(a)(i)	filter funnel, paper and test-tube drawn ; at least two of funnel, paper and test-tube labelled ; positions of residue and filtrate correctly labelled ;	3
2(a)(ii)	so no impurities introduced / so no other ions introduced ;	1
2(b)	Cu^{2+} / copper(II) / copper ion ;	1
2(c)(i)	no ppt. / no reaction / remains colourless / no change ; blue / stays blue / no change AND (red goes) blue ;	2
2(c)(ii)	ammonia solution gives off ammonia gas (under all circumstances) ;	1
2(c)(iii)	(nitric) not CO_3^{2-} / not carbonate ; (barium nitrate) SO_4^{2-} / sulfate ;	2

Question	Answer	Marks
3(a)(i)	60.5 °C ;	1
3(a)(ii)	to give the thermometer time to react / to record the highest temperature reached ;	1
3(a)(iii)	<i>any two from</i> read perpendicular to scale ; stir (before reading) ; place clock close to test tube ; keep thermometer at same level ; keep the thermometer in the water ;	max 2
3(b)(i)	s and °C and °C ;	1
3(b)(ii)	33.5 (°C), 22.5(°C) ;	1
3(c)	Faster rate of cooling / more cooling / loses more heat / loses more temperature in cold surroundings ; bigger temperature drop in the same time / reference to data with time ;	2
3(d)	improvement: use measuring cylinder to measure water poured into test-tube / mark the test-tube ; reason: to compare equal volumes / amounts of water each time / amount of water affect cooling ; improvement: same volume of water ; reason: same surface area / different rates of cooling of different volumes / amount of water affect cooling ;	2

Question	Answer	Marks
4(a)(i)	2 1 3 2 ;	1
4(a)(ii)	1 ;	1
4(b)	axes labelled ; linear vertical axis <u>and</u> using more than half the grid ; bars correct height $\pm$ half a square ; same width bars ;	4
4(c)(i)	damp and dark ;	1
4(c)(ii)	all placed in the centre / two in each section / randomly ;	1
4(c)(iii)	<i>any two from</i> leave longer than 15 minutes ; use more woodlice ; repeat more times ;	max 2

Question	Answer	Marks
5(a)(i)	anhydrous / white copper sulfate ; turns blue ;	2
5(a)(ii)	to condense any water vapour ;	1
5(b)(i)	delivery tube under level of limewater in the bottle ;	1
5(b)(ii)	white ppt. / milky ;	1
5(c)	do not agree (no mark) cannot be sure of complete combustion / burns in air not oxygen / incomplete combustion ; other gases may have been produced / CO / gas goes to pump ; carbon may be produced ; there are only two tests ;	max 2
5(d)	water condenses in limewater and never reaches U-tube / water condensing in U-tube could have come from limewater ;	1
5(e)	to show that little or no water comes from the air / to show that little or no carbon dioxide comes from the air / to show that the carbon dioxide and water come from the burning ;	1
5(f)	soot / carbon ;	1

Question	Answer	Marks
6(a)	60 ;	1
6(b)	8.2 ;	1
6(c)(i)	both axes labelled with units ; linear scale covering $\geq 1/2$ paper ; minimum 4 plots correct, $\pm 1/2$ square ;	3
6(c)(ii)	straight line of best-fit ;	1
6(d)	correct value from their graph AND shown on graph ;	1
6(e)(i)	(increases) less %age error on a larger distance ;	1
6(e)(ii)	wider tank ;	1
6(f)	too little change / d small / d small range ;	1



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1(a)(i)	large (at least half of the area) neat pencil drawing ; drawing clearly shows petals, stamens, carpel ;			allow: any orientation (i.e. horizontal or vertical)
1(a)(ii)	anther and filament correctly labelled ;			
1(a)(iii)	anther/filament marked as male and carpel marked as female ;			
1(b)(i)	clear pencil drawing of carpel cross-section ;			
1(b)(ii)	ovary/ovary wall/carpel wall correctly labelled ; ovule correctly labelled ;			

2(a)	Benedict's solution;			
2(b)	reagents in a suitable container (e.g. test tube) and use of Bunsen burner (or other heating device) and water bath ; minimum of 5 temperatures ; temperatures at least one below, one at and one above 40 °C ; heat Benedict's ; same volume/concentration of starch solution ; same volume/concentration of Benedict's /amylase/enzyme ; wear goggles/wear gloves/amylase or enzyme is an irritant ; measure time for colour change ; greatest activity is at temperature with shortest time for colour change ; greatest activity identified from graph of time against temperature ;			max 6 in total note: to gain 6 marks at least 1 mark must come from each of: • apparatus • method • measurements • processing and use of results

3(a)	17 ; 65 ;			
3(b)(i)	changes colour with <u>iodine</u> /acts as an indicator for <u>iodine</u> ;			
3(b)(ii)	to keep total volume constant/so concentration proportional to volume ;			

3(b)(iii)	syringe/burette/graduated pipette/ <u>10cm³</u> measuring cylinder ;			
3(c)(i)	time increases as volume decreases inverse relationship ;			
3(c)(ii)	rate increases with increasing concentration/proportional relationship ;			
3(d)	white paper with cross on it under flask ; measure time taken for cross to disappear ;			
3(e)	keep volume of potassium salt solution constant ; vary volume of reducing agent (from 10 to 4) and water (from 0 to 6) ;			
3(f)	time greater than 0 but less than 10 ; increase in temperature increases rate ;			

4(a)(i)	77.9 75.5 ;			accept ± 0.1 cm on all values
4(a)(ii)	27.9 25.5 ;			ecf
4(a)(iii)	0.036 0.039 ;			
4(b)(i)	axis labelled and scales linear and over half of grid ; points correct within $\frac{1}{2}$ square ;			
4(b)(ii)	straight line of best fit ;			
4(b)(iii)	mass m ;			
4(b)(iv)	points identified on the graph and correct ; calculation of gradient ;			
4(c)	$M = 1 \div (\text{gradient} \times 45)$;			ecf on
4(d)	metre rule will break (splinter in person's eye) / mass and ruler might fall off pivot (onto someone's foot) ;			
4(e)(i)	possible source of error (e.g. judging middle of mass m , parallax error <u>in</u> reading position of mass/ reading length x , identifying if pivot at 50cm mark) ;			

4(e)(ii)	suggestion to overcome problem (e.g. hang the masses from the ruler using cotton, ensure that eye is at right angles to both 50 cm mark and position of m , mark underneath of the ruler at 50 cm mark) ;		