



Cambridge IGCSE™

COMBINED SCIENCE

0653/61

Paper 6 Alternative to Practical

May/June 2023

MARK SCHEME

Maximum Mark: 40

Published

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This document consists of **9** printed pages.

Question	Answer	Marks
1(a)(i)	8.4 (cm ³) ;	1
1(a)(ii)	1.6 (cm ³) ;	1
1(a)(iii)	y axis: (volume of) iodine solution added / cm ³ and x axis: percentage concentration of vitamin C / concentration of vitamin C / % ; linear scale, plotted points so that points occupy at least half of the grid ; points plotted correctly, $\pm$ half a small square ;	3
1(a)(iv)	line of best-fit drawn ;	1
1(a)(v)	5.0 (cm ³) recorded twice ;	1
1(a)(vi)	correct estimate from graph ;	1
1(a)(vii)	syringe contaminated (with higher concs of vitamin C) / contains (vitamin C) solution / residue from previous experiment / causes change to concentration of vitamin C ;	1
1(b)(i)	to identify / check for, anomalous results / errors ;	1
1(b)(ii)	do experiments with more values of vitamin C concentration / use smaller intervals of concentration ;	1
1(c)	biuret ; (from blue to) lilac / purple / violet ;	2

Question	Answer	Marks
2(a)	1.05 ;	1
2(b)(i)	2.82 ;	1
2(b)(ii)	56.4 (%) ;	1
2(c)	to dissolve (all of) the salt ;	1
2(d)	to remove any salt still in the sand ;	1
2(e)	potassium (circled) ;	1
2(f)	sulfate / SO_4^{2-} ;	1

Question	Answer	Marks
3	One marking point from each section and any three others (if one section is missing max 6 etc.): 1 Apparatus balance ; thermometer ; 2 Brief description of method and safety precautions add different masses of salt to cetyl alcohol ; use at least five different masses of salt ; place test-tube into hot water until mixture melts then allow mixture to cool (until it turns solid) ; wearing safety goggles to keep (cetyl) alcohol / hot water out of eyes / keep alcohol away from Bunsen flame / take precautions against injury with hot apparatus, e.g. test-tube holder ; 3 Measurements and control variables measure the masses of salt / states values for the masses of salt ; measure the temperature when mixture turns (back to) solid ; use the same / constant / quoted mass of cetyl alcohol ; 4 Process results to draw a conclusion repeat for each mass of salt and calculate an average ; plot graph of melting point against mass of salt added ;	7

Question	Answer	Marks
4(a)(i)	$V_L = 2.6 \text{ (V)}$;	1
4(a)(ii)	$I_L = 0.25 \text{ (A)}$;	1
4(a)(iii)	$R_L = 10 \text{ (.4 } \Omega)$;	1
4(b)(i)	voltmeter shown connected in parallel to bulbs L and M ;	1
4(b)(ii)	$V_s = 2.6 \text{ (V)}$ and $I_s = 0.18 \text{ (A)}$;	1
4(b)(iii)	$R_s = 14(.4)$ and Ω / Ohms ;	1
4(c)(i)	ammeter in common part of circuit ; voltmeter and lamps shown in parallel ;	2
4(c)(ii)	$1.1(25) \text{ (W)}$;	1
4(c)(iii)	lamps are brighter (in parallel) ;	1
4(d)	so that the, lamp / wires / circuit does not overheat / to conserve, energy / battery ;	1
4(e)	for two marks: (no because...) states that R_s should be $20.8 / R_L$ should be $7(.22) / R_s$ is (approximately) $1.4 \times R_L$; OR combined resistance / R_s is (much) less than twice resistance of, L / R_L (or reverse argument) ; (difference between double R_L and R_s is) outside the limits of experimental accuracy ;	2