



Cambridge International Examinations
Cambridge Pre-U Certificate

CHEMISTRY (PRINCIPAL)

9791/04

Paper 4 Practical

For Examination from 2016

SPECIMEN MARK SCHEME

2 hours

MAXIMUM MARK: 40

The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 3 Pre-U Certificate.

This document consists of **3** printed pages and **1** blank page.

		Expected Answer	Mark
1	(a)	correct working for volume of H ₂ SO ₄	[1]
	(b)	adds a volume of acid between 2.00 and 4.00 cm ³	[1]
		total volume to be greater than 10.00 cm ³ beyond their calculated end-point	[1]
	(c)	columns labelled as volume, temperature and ΔT	[1]
		all volumes recorded to 0.05 cm ³	[1]
		all temperatures recorded to 0.5 °C	[1]
		volume at which candidate records maximum ΔT lies within 5.00 cm ³ of volume at which supervisor records maximum ΔT	[1]
		candidate's maximum ΔT lies within 2.0 °C of volume at which supervisor's maximum ΔT (Award 1 mark if $2.0 < \Delta \leq 4.0$ °C)	[2]
	(d)	ΔT plotted on y-axis, volume on the x-axis, correctly labelled with appropriate units	[1]
		scales chosen to use more than half of each axis	[1]
		all points plotted correctly, fine cross or encircled dot within $\frac{1}{2}$ small square and within the correct square	[1]
		two smooth intersecting curves drawn	[1]
	(e) (i)	reads the volume of H ₂ SO ₄ correctly from the intercept of their lines	[1]
	(ii)	shows working in the calculation	[1]
		correct answer given to 3–4 sf	[1]
	(f)	first part of the hypothesis is not supported as the graph is a smooth curve	[1]
		second part is supported as temperature falls after the end-point	[1]
	(g)	uses nearest added volume to the end-point	[1]
		same amount of heat is now heating a larger volume, calculates 0.10 as a % of the nearest volume	[1]
	(h)	notes that heat loss is greater at higher temperatures	[1]
		same amount of heat is now heating a larger volume	[1]
	(i)	correct answer from use of $\Delta T \times 4.2 \times \text{volume}$	[1]
		TOTAL	[23]

		Expected Answer	Mark
2	(a)	draws up a clear table of results	[1]
		FA 5 gives a green ppt with hydroxide which turns brown in contact with air	[1]
		warming with hydroxide evolves a gas which turns damp red litmus paper blue	[1]
		appropriate test for acid (carbonate etc.) with results (effervescence)	[1]
		FA 5 contains NH_4^+	[1]
		FA 5 contains Fe^{3+}	[1]
		FA 5 contains H^+	[1]
	(b) (i)	$\text{Ba}^{2+}(\text{aq})$ followed by appropriate dilute named acid OR add dilute acid and test for gas with acidified manganate(VII)	[1]
	(ii)	white ppt	[1]
		insoluble in added acid OR no effervescence observed acidified manganate(VII) does not change colour	[1]
		FA 5 contains sulfate	[1]
	(iii)	oxidation of sulfite to sulfate has taken place so analyse solution as soon as made up	[1]
	(c) (i)	solution turns yellow on adding peroxide	[1]
		on adding hydroxide get a red-brown ppt	[1]
		re-lights a glowing splint	[1]
	(ii)	oxidation of Fe^{2+} to Fe^{3+}	[1]
		decomposition of H_2O_2	[1]
		TOTAL	[17]

