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Cambridge International General Certificate of Secondary Education

MARK SCHEME for the May/June 2015 series

0620 CHEMISTRY

0620/62 Paper 6 (Alternative to Practical), maximum raw mark 60

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Abbreviations used in the Mark Scheme

- ; separates marking points
- / separates alternatives within a marking point
- **OR** gives alternative marking point
- **R** reject
- **I** ignore mark as if this material was not present
- **A** accept (a less than ideal answer which should be marked correct)
- **COND** indicates mark is conditional on previous marking point
- owtte or words to that effect (accept other ways of expressing the same idea)
- max indicates the maximum number of marks that can be awarded
- ecf credit a correct statement that follows a previous wrong response
- ( ) the word/phrase in brackets is not required, but sets the context
- ora or reverse argument

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Question	Answer	Marks	Guidance
1(a)	stand; thermometer;	2	
1(b)	initial temperature (of water) / room temperature / temperature change; initial mass of burner / ethanol; final mass of burner / ethanol;	3	
1(c)	half / lower temperature change / water would take longer to heat up / slower;	1	
1(d)	higher temperature change / water would heat up quicker / copper is a better conductor;	1	**I** less heat loss **I** comments on strength of copper

Question	Answer	Marks	Guidance
2(a)	nitric acid / HNO_3;	1	
2(b)(i)	spatula;	1	
2(b)(ii)	(stirring / glass) rod;	1	**A** magnetic stirrer
2(c)	filtration / decanting;	1	**A** description of decanting
2(d)(i)	anhydrous chromium nitrate / $Cr(NO_3)_3$ / chromium oxide / Cr_2O_3 / hydrated chromium nitrate / $Cr(NO_3)_3.6H_2O$ / solid chromium nitrate;	1	**A** solid / powder / crystals
2(d)(ii)	heat / evaporate / boil; to crystallising point owtte; award one mark for any two ideas: cool / filter / decant / wash / dry;	3	**A** description

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Question	Answer	Marks	Guidance
3	*aqueous potassium hydroxide* named indicator e.g. red litmus; correct colour e.g. turns blue; **OR** pH paper / indicator / meter / probe; >7; **OR** chemical test e.g. copper sulfate solution; correct result e.g. blue precipitate; *octane* lighted splint; liquid catches fire; **OR** add to water; immiscible; *pure water* boiling point / melting point; 100 °C / 0 °C;	**6**	note: any correct tests allowable for these liquids **I** pH scale, but **A** measure pH, **A** the observation in both cases **A** burn it **I** chemical tests for water **I** indicators / pH tests **I** tests that would also work for KOH(aq)
4(f)	volume of sodium thiosulfate: 50, 40, 35, 30, 20 volume of water: 0, 10, 15, 20, 30 all 10 correct = 1 mark; time: 45, 55, 66, 78, 140 all 5 correct for 2 marks 4 correct =1 mark; **all** times in seconds;	**4**	**I** decimal places **A** '–' for '0'
4(g)	all 5 points plotted correctly (2 marks); smooth line graph;	**3**	

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Question	Answer	Marks	Guidance
4(h)(i)	correct value from graph, 90-110; units; indication shown on graph;	3	**A** s / sec / seconds
4(h)(ii)	line must be above original;	1	the lines must **not** meet at any point
4(i)(i)	experiment 1 / 50 cm^3 sodium thiosulfate / 45 s / no water;	1	
4(i)(ii)	more particles of thiosulfate / particles closer together / more concentrated / no water / more (frequent) collisions;	1	
4(j)	volume over 50 cm^3 / changing total volume; so not a fair test / so depth greater / cannot compare with other results;	2	**A** (result) not valid
4(k)(i)	*any two from:* • more accurate (measurement of volume); • comparison to measuring cylinder; • less accurate measurement of time; • as it takes longer to add the acid;	2	**A** more precise
4(k)(ii)	time shorter / cross disappears faster; depth greater;	2	**R** reacts faster

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Question	Answer	Marks	Guidance
5(b)	pungent smell; paper turns blue / purple / green;	2	**A** sharp **I** pH
5(c)	(pale) yellow; precipitate;	2	**R** bright yellow
5(e)	pH 8–14;	1	**A** above 7 / 7–14
5(f)	carbon dioxide;	1	
5(g)	barium / lead / calcium / silver; carbonate;	2	

Question	Answer	Marks	Guidance
6(a)	platinum;	1	
6(b)	opposites attract / hydrogen ions are positive / cations / H^+;	1	**A** hydrogen is positive **A** hydrogen gains electrons / hydrogen is reduced
6(c)(i)	chlorine;	1	
6(c)(ii)	(red or blue) litmus; bleached / goes white;	2	**R** other indicators
6(d)	gas is soluble / chlorine is soluble / gas dissolves / chlorine dissolves;	1	**I** hydrogen ions from water

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Question	Answer	Marks	Guidance
7	*Generic marking points can be applied to any method:* mp1 (fair testing) known or stated volume of tonic water; mp2 (fair testing) repeat with other sample of tonic water; mp3 (reagent) add or react with KOH or Mg turnings etc.; mp4 (method) use of indicator / collect gas etc.; mp5 (endpoint) until colour changes / until no more gas evolved / for one minute etc.; mp6 (measurement) volume of KOH added / volume of gas evolved; mp7 (conclusion) the higher concentration is the one that needs the greater volume of KOH / gives off the most gas etc.;	**max 6**	There are many possible methods. The most common is titration by either adding tonic water to KOH or KOH to tonic water. However, reagents such as Mg or carbonates would also work. **A** a pH meter / probe could work. The volume of the tonic water does not matter, so mp1 should be replaced by constant temperature. **A** use of Universal Indicator with green as the endpoint **A** use of litmus

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