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Chemistry

Unit A2 2: Practical Manual

Sample Results and Observations



Practical 7.1

Titrate iodine with sodium thiosulfate using starch indicator and hence estimate oxidising agents by their reaction with excess acidified potassium iodide (spec ref 5.3.1)

Concentration of sodium thiosulfate solution = 0.1 mol dm^{-3}

		Rough titration	Accurate titration 1	Accurate titration 2
Burette Readings	Final / cm^3	29.2	28.2	42.4
	Initial / cm^3	0.0	0.2	14.3
Titre / cm^3				
Mean Titre / cm^3				

Practical 7.2

Titrate acidified potassium manganate(VII) with reducing agents (spec ref: 5.3.2)

Mass of 5 iron tablets = 1.12 g

Concentration of potassium manganate(VII) solution = 0.02 mol dm^{-3}

		Rough titration	Accurate titration 1	Accurate titration 2
Burette Readings	Final / cm^3	16.4	25.7	41.3
	Initial / cm^3	0.0	10.2	25.7
Titre / cm^3				
Mean Titre / cm^3				



Practical 7.3

Determine the purity of a Group II metal oxide or carbonate by back titration (spec ref: 5.3.4)

Mass of weighing boat = 0.23 g

Mass of weighing boat and marble chips = 1.23 g

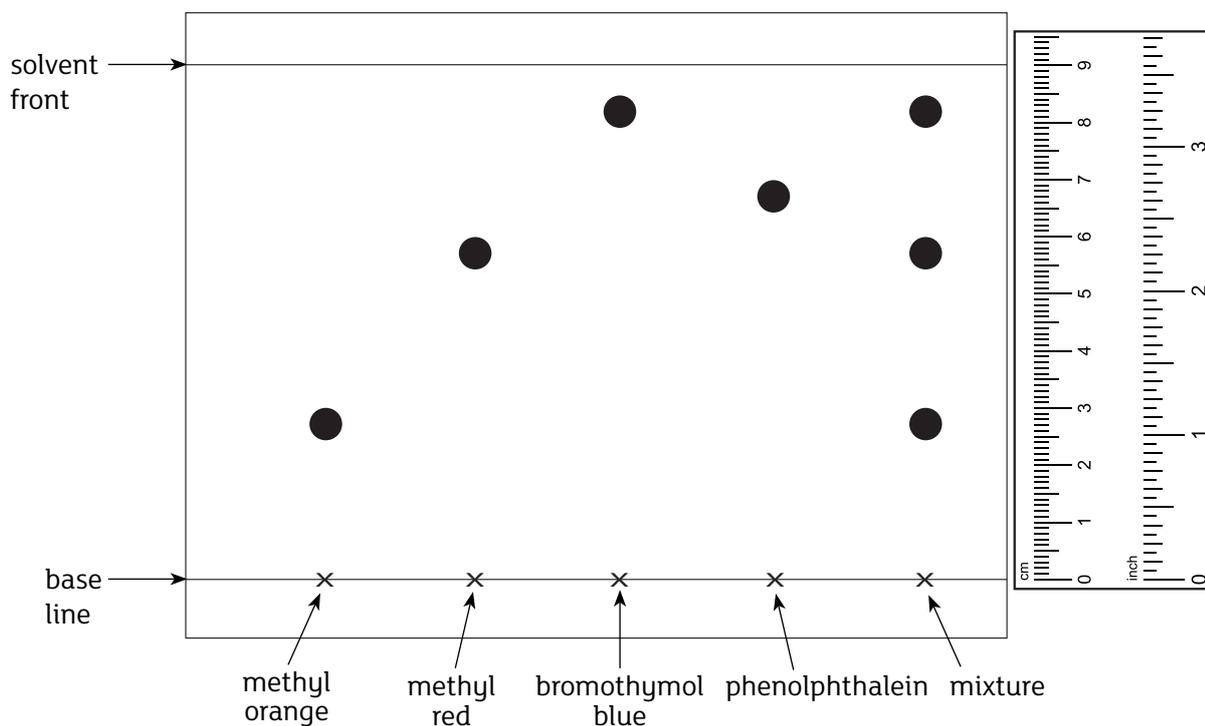
Concentration of hydrochloric acid = 1.0 mol dm^{-3}

Concentration of sodium hydroxide solution = 0.1 mol dm^{-3}

		Rough titration	Accurate titration 1	Accurate titration 2
Burette Readings	Final /cm ³	31.2	30.8	40.7
	Initial /cm ³	0.0	0.3	10.2
Titre /cm ³				
Mean Titre /cm ³				

Practical 8.1

Carry out paper and thin-layer chromatography and measure the R_f values of the components and interpret chromatograms (spec ref: 5.4.1/5/4/3)





Practical 9.1

Use ethylene diamine (1,2-diaminoethane), phenylamine and aqueous ammonia to demonstrate ligand replacement based on lone pair availability (spec ref: 5.5.8)

Colour of copper(II) sulfate solution	Colour of solution on addition of phenylamine	Colour of solution on addition of ammonia(aq)	Colour of solution on addition of ethylene diamine
blue	yellow/green	dark blue	purple

Practical 9.2

Demonstrate the relative strengths of ligands using hydrated copper(II) ions and hydrochloric acid (spec ref: 5.5.9)

Blue solution changes to yellow.



Practical 9.3

Carry out qualitative tests for the formation of transition metal hydroxides with sodium hydroxide and aqueous ammonia (spec ref: 5.5.12)

Complex ion	Colour and formula of precipitate	Colour of solution if precipitate dissolves in excess NaOH(aq) and formula of complex formed	Colour of solution if precipitate dissolves in excess NH ₃ (aq) and formula of complex formed
[Co(H ₂ O) ₆] ²⁺	blue Co(OH) ₂	Does not dissolve	yellow [Co(NH ₃) ₆] ²⁺
[Cu(H ₂ O) ₆] ²⁺	blue Cu(OH) ₂	Does not dissolve	deep/dark blue [Cu(NH ₃) ₄ (H ₂ O) ₂] ²⁺
[Fe(H ₂ O) ₆] ²⁺	green Fe(OH) ₂	Does not dissolve	Does not dissolve
[Cr(H ₂ O) ₆] ³⁺	green-blue Cr(OH) ₃	green [Cr(OH) ₆] ³⁻	May dissolve forming a violet solution [Cr(NH ₃) ₆] ³⁺
[Fe(H ₂ O) ₆] ³⁺	brown Fe(OH) ₃	Does not dissolve	Does not dissolve
[Mn(H ₂ O) ₆] ²⁺	white Mn(OH) ₂	Does not dissolve	Does not dissolve



Practical 9.4

Carry out the reduction of acidified ammonium metavanadate with zinc and observe the sequence of colours (spec ref: 5.5.13)

Ion	Oxidation state of vanadium	Colour
VO_2^+		yellow
VO^{2+}		blue
V^{3+}		green
V^{2+}		violet

Practical 10.1

Determine the electrode potentials of a series of cells and predict their values using standard electrode potentials (spec ref: 5.6.2)

Cell	Measured cell potential difference / V
Zinc/copper	1.10
Iron/copper	0.78
Iron/zinc	0.31
Zinc/lead	0.63



Practical 11.1

Determine the amount of a carbonate, for example calcium carbonate or magnesium carbonate, in an indigestion tablet (spec ref: 5.11.2)

Mass of weighing boat = 0.23 g

Mass of weighing boat and marble chips = 0.83 g

Concentration of hydrochloric acid = 1.0 mol dm^{-3}

Concentration of sodium hydroxide solution = 0.2 mol dm^{-3}

		Rough titration	Accurate titration 1	Accurate titration 2
Burette Readings	Final /cm ³	20.8	40.8	45.2
	Initial /cm ³	0.0	20.8	25.2
Titre /cm ³				
Mean Titre /cm ³				

Practical 11.2

Prepare aspirin using salicylic acid and ethanoic anhydride (spec ref: 5.11.7)

Mass of 2-hydroxybenzoic acid / g	2.00
Mass of recrystallised aspirin / g	2.04
Melting point of recrystallised aspirin	134–136 °C
Colour of iron(III) chloride solution	yellow
Colour of iron(III) chloride solution with crude aspirin	purple
Colour of iron(III) chloride solution with recrystallised aspirin	yellow



Practical 11.3

Use chromatography to compare the purity of laboratory-made aspirin with commercial tablets (spec ref: 5.11.8)

