



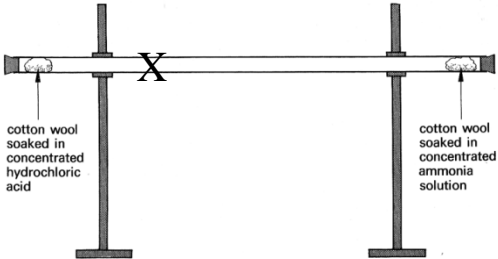
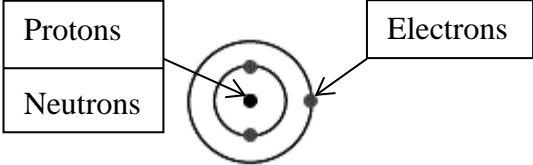
Annual Examinations for Secondary Schools 2014

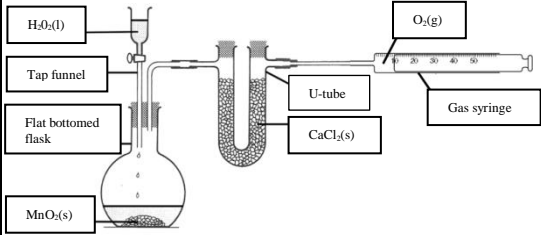
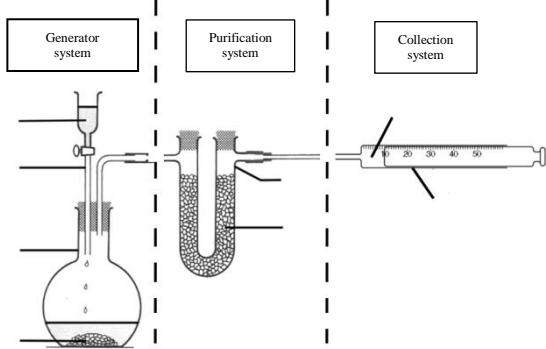
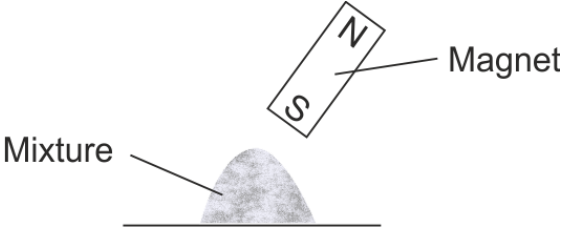
FORM 3

CHEMISTRY

MARKING SCHEME

Question		Requirement	Marks	Additional Guidelines
1a	i)	Mg	1	
	ii)	Fe	1	
	iii)	KCl	1	
	iv)	CaSO ₄	1	
	v)	Al(NO ₃) ₃	1	
1b	i)	Test tube	1	
	ii)	Beaker	1	
	iii)	Bunsen burner	1	
	iv)	Evaporating basin / dish	1	
	v)	Liebig condenser	1	Accept: condenser.
2a		fixed	1	
2b		solid melting	2	
2c		state liquid	2	
2d		vibrate	1	
2e		rise boiling	2	
2f		gaseous	1	
2g		random	1	
3a		Rust	1	
3b	i)	Water	1	½ mark for each item
	ii)	Oxygen		
3c	i)	Painting	1	
	ii)	Galvanisation	1	
	iii)	The Zn coating is heat resistant	1	Accept any reasonable answer.
3d		$C + O_2 \rightarrow CO_2$	2	1 mark for correct chemical formulae 1 mark for correct balancing
3e		No	1	
3f		Burning charcoal indoors increases the risk of producing poisonous CO due to the lack of oxygen.	2	1 mark for mentioning the production of CO due to lack of O ₂ 1 mark for saying it is poisonous

4a	i)	Diffusion	1	
	ii)		1	Accept any position for X as long as it is to the left of the centre of the tube.
	iii)	<ol style="list-style-type: none"> HCl gas is heavier than NH₃ gas HCl diffuses at a slower rate than NH₃ 	2	
	iv)	A white ring is formed.	1	Accept: white solid is formed.
4b	i)		2	<p>½ mark for any correct structure</p> <p>½ mark for each correct label</p>
	ii)	Isotopes are atoms that have the same number of protons but different number of neutrons.	1	Accept any correct version.
	iii)	$\text{RAM} = (24 \times 78.99) + (25 \times 10.00) + (26 \times 11.01) = 2432 / 100 = \mathbf{24.32}$	2	<p>1 mark for correct working</p> <p>1 mark for correct answer and unit</p>
5a	i)	No	1	
	ii)	Use a pH meter / pH paper	1	Accept any method of checking pH as long as it does not contaminate the water.
	iii)	Limestone, CaCO ₃	1	
	iv)	<ul style="list-style-type: none"> It neutralises the acid by reacting with it. It does not dissolve in water. 	2	
5b	i)	Neutralisation is a reaction between an acid and a base to produce a salt and water only.	1	
	ii)	$\text{CaCO}_3 + 2\text{HCl} \rightarrow \text{CaCl}_2 + \text{H}_2\text{O} + \text{CO}_2(\text{g})$	2	<p>1 mark for correct chemical formulae</p> <p>1 mark for correct balancing</p>
5c	i)	When no further bubbles are produced	1	
	ii)	Carbon dioxide	1	
6a	i)	2, 1, 3.	1	
	ii)	Amount in moles = $1 \text{ g} / 63.5 = 0.01575 \text{ mol}$	2	<p>1 mark for correct working</p> <p>1 mark for correct answer and unit</p>
6b		Because unlike the beaker it can withstand high temperatures	1	
6c	i)	To make sure all the copper has reacted completely	1	
	ii)	Mass of O = $1.252 - 1 = 0.252 \text{ g}$	1	
	iii)	<p>Amt. mol of O = $0.252 / 16 = 0.01575 \text{ mol}$</p> <p>Cu:O = $0.01575 : 0.01575 = \mathbf{1:1}$</p>	2	<p>1 mark for correct working</p> <p>1 mark for correct answer</p>

6d		Empirical mass = 79.5, therefore chemical formula = empirical formula = CuO	1	
6e		% by mass = $(0.252/1.252) \times 100 = \mathbf{20.13\%}$	1	
7a		It acts as a catalyst.	1	
7b		$2\text{H}_2\text{O}_2(\text{l}) \rightarrow 2\text{H}_2\text{O}(\text{l}) + \text{O}_2(\text{g})$	3	1 mark if all formulae are correct 1 mark if all balancing is correct (and formulae are correct too) 1 mark if all state symbols are correct ½ mark if only 1 state symbol is incorrect
7c			8	2 marks for 4 labels of chemicals 2 marks for 4 labels of equipment 4 marks for overall setup of equipment Accept any setup that produces dry oxygen.
7d			4	1 mark for placement of each label 1 mark for placement of dotted lines
7e		It is used to make steel and in hospitals	2	
7f		When a glowing splint is placed in a test tube full of oxygen, the splint relights.	2	1 mark for test 1 mark for result
8a		A – ammonium chloride B – iron	2	Accept any suitable substance.
8b	i)	Method 1: Using a magnet		
		<ul style="list-style-type: none"> • Wrap the magnet in a plastic / paper bag. • Pass the magnet over the mixture. • Collect the iron powder by removing the magnet from the bag. 	3	1 mark for each step
			3	1 mark for drawing 2 marks for labels

	ii)	Method 2: Sublimation		
		<ul style="list-style-type: none"> Place the mixture in a crucible. Place an inverted funnel over it. Heat the crucible until sublimation stops. 	3	1 mark for each step
			3	1 mark for drawing 2 marks for 4 labels
8c	i)	Using a magnet	1	
	ii)	It is more cost effective.	1	Accept: Less equipment is needed or easier to do.
8d	i)	Two liquids are miscible if they mix well together.	1	
	ii)	Ethanol	1	
	iii)	Because its boiling point is lower than that of water	1	
	iv)	In the fractionating tower / column	1	
9a	i)	Water vapour	1	
	ii)	It absorbs any water vapour present in the container and keeps the bicarbonate dry.	1	Accept: to help the powder flow freely.
	iii)	No, as it needs to be edible.	2	Accept: must not be poisonous.
9b	i)	Digital weighing balance Filter funnel and paper Beaker Stirrer Or any other suitable apparatus	2	½ mark for each item
	ii)	Suitable diagram showing filtration technique	3	
	iii)	<ol style="list-style-type: none"> Weigh a sample of the mixture and a dry filter paper separately. Using the beaker, add distilled water to the sample and stir with the stirrer. Filter the undissolved anti-caking agent using a filter funnel and filter paper. Wash the residue with distilled water. Allow the anti-caking agent and filter paper to dry completely. Weigh the filter paper and anti-caking agent and then calculate the percentage of anti-caking agent in the baking powder sample. 	6	1 mark for each step Accept any method that works.
	iv)	<ul style="list-style-type: none"> Mass of the sample of baking powder Mass of the anti-caking agent 	2	

9c	i)	4.5 %	1	1 mark for correct answer
	ii)	The sample of baking powder is not dry.	2	Award marks if students say that the baking powder might have other substances mixed with it.