




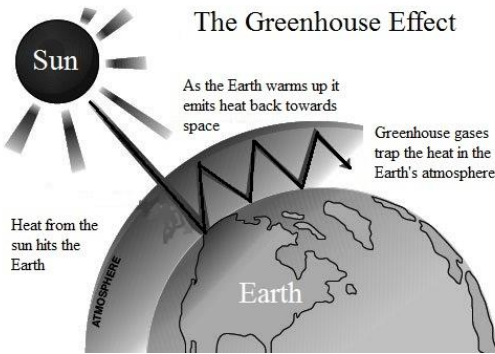
**Annual Examinations for Secondary Schools 2014**

**FORM 5 CHEMISTRY MARKING SCHEME**

Question	Requirements	Marks	Additional Guidelines
1a.	soot	1	
1b.	graphite	1	
1c.	carbonic acid	1	
1d.	carbon	1	
1e.	calcium carbonate	1	
1f.	coke	1	
1g.	carbon monoxide	1	
1h.	diamond	1	
1i.	carbon dioxide	1	
1j.	methane	1	
2a.	Any suitable transition metal's symbol	1	
2b.	Any alkali metal's symbol	1	
2c.	H	1	Accept H <sub>2</sub>
2d.	Any suitable group 5 element's symbol	1	
2e.	S	1	
2f.	Any halogen's symbol	1	
2g.	Any alkali earth metal's symbol	1	
2h.	Na	1	
2i.	Cl	1	Accept Cl <sub>2</sub>
2j.	Ar	1	

3a.	(i)	Reaction A – magnesium Reaction B – aluminium Reaction C – zinc Reaction D – iron	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	Accept symbols instead of metal names
3a.	(ii)	$\text{Mg}_{(s)} + \text{H}_2\text{SO}_{4(aq)} \longrightarrow \text{MgSO}_{4(aq)} + \text{H}_{2(g)}$	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 $\frac{1}{2}$ mark if only 1 state symbol is incorrect
3b.	(i)	Same concentration of acid Same mass of metal	1 1	Also accept: Same state of subdivision of metals Same volume of acid
3b.	(ii)	The reaction would be very vigorous and thus dangerous	1	Accept if only danger is mentioned
3b.	(iii)	$2\text{H}_2 + \text{O}_2 \longrightarrow 2\text{H}_2\text{O}$	2	1 mark if all formulae are correct 1 mark if all balancing is correct
4a.	(i)	A – round-bottomed flask B – delivery tube C – Wolf bottle or wash bottle D – concentrated sulfuric acid	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	Do not accept ‘sulfuric acid’ only
4a.	(ii)	$2\text{HCl} + \text{K}_2\text{SO}_3 \longrightarrow 2\text{KCl} + \text{H}_2\text{O} + \text{SO}_2$	2	1 mark if all formulae are correct 1 mark if all balancing is correct
4a.	(iii)	Sulfur dioxide (or $\text{SO}_2$ )	1	
4b.	(i)	 <p>Downward delivery (upward displacement of air)</p> <p>This method is used as <math>\text{SO}_2</math> is denser (or heavier) than air</p>	4	1 mark for correct drawing of diagram $\frac{1}{2}$ mark for labelling gas jar $\frac{1}{2}$ mark for labelling delivery tube 1 mark for naming method of collection 1 mark for explanation
4b.	(ii)	Liquid D is used as a drying agent for the gas	1	Do not accept ‘dehydrating agent’

5a.	(i)	Acts as catalyst	1	
	(ii)	Cracking is used to break long-chained hydrocarbons to smaller-chained ones ... that are in higher demand	1	
5b.	(i)	Octane Ethene	1 1	
	(ii)	'A' in the upper part of the inverted test-tube 'B' in the colourless liquid collected at the bottom of the second test-tube	1 1	
5c.	(i)	Alkenes	1	
5c.	(ii)	$\begin{array}{c} \text{H} & & \text{H} \\ & \diagdown & / \\ & \text{C} = \text{C} \\ & / & \diagdown \\ \text{H} & & \text{H} \end{array}$ $\begin{array}{cccccccc} \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} \\   &   &   &   &   &   &   &   \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{C}-\text{C}-\text{C}-\text{C}-\text{C}-\text{H} \\   &   &   &   &   &   &   &   \\ \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} \end{array}$	1 1	Accept any other structural isomers of octane
6a.	(i)	$2\text{HNO}_3 + \text{CaCO}_3 \longrightarrow \text{Ca}(\text{NO}_3)_2 + \text{H}_2\text{O} + \text{CO}_2$	2	1 mark if all formulae are correct 1 mark if all balancing is correct
	(ii)	To prevent loss of reactants due to splashing	1	
6b.	(i)	116 g	1	
6b.	(ii)	150 s	1	Accept an error of $\pm 5$ s
6b.	(iii)	100 g	1	
6c.	(i)	16 g	1	
6c.	(ii)	$\text{CO}_2$ gas escaping from the reactants	1	
6c.	(iii)	'A', since there is the largest decrease in mass per unit time	1	Also accept: '...since the gradient is steepest'
6d.			1	Allot no marks if the answer curve (dotted line in the graph) does not reach exactly the 100 g mark

7a.	(i)	Trees, shrubs	2	1 mark for each answer
7a.	(ii)	Oxygen	1	
7a.	(iii)	Energy from lightning	1	Accept 'lightning'
7a.	(iv)	Wind increased in intensity It brought fresh supplies of oxygen to the fire Oxygen promotes combustion	1 1 1	
7a.	(v)	High temperature Dry conditions	1 1	
7a.	(vi)	Combustion	1	
7a.	(vii)	Carbon monoxide Soot	1 1	Accept 'smoke'
7b.	(i)	$C_8H_{18(l)} + 12\frac{1}{2} O_{2(g)} \longrightarrow 8CO_{2(g)} + 9H_2O_{(g) \text{ or } (l)}$	3	1 mark if missing formula is correct 1 mark if all balancing is correct (and formulae are correct too) – accept whole number balancing 1 mark if the missing state symbol is correct
7b.	(ii)	Carbon dioxide Water vapour	1 1	
7b.	(iii)	 <p>The Greenhouse Effect</p> <p>Heat from the sun hits the Earth</p> <p>As the Earth warms up it emits heat back towards space</p> <p>Greenhouse gases trap the heat in the Earth's atmosphere</p> <p>ATMOSPHERE</p> <p>Earth</p>	3	1½ marks for correct drawing of diagram (heat source, atmosphere, Earth's surface)  1½ marks for correct explanations: <ul style="list-style-type: none"> <li>• Heat from the sun hits Earth</li> <li>• As Earth warms up it emits heat back towards space</li> <li>• Greenhouse gases trap the heat in the atmosphere</li> </ul>

8a.	(i)	Evaporation	1	
	(ii)	Expose to wind (or forced ventilation) Increase the temperature	1 1	Accept: spread out garments (greater surface area exposed to air)
8b.		Solvent C is most suitable because: <ul style="list-style-type: none"> <li>• It is very good at dissolving grease</li> <li>• It is less dangerous for workers since it is: <ul style="list-style-type: none"> <li>○ not flammable</li> <li>○ not poisonous</li> </ul> </li> <li>• It has the right boiling point (neither too high nor too low)</li> </ul>	1 1 1 1 1 1	If students do not deduce the right solvent allot marks where reasons for their choice are valid in the given context
8c.	(i)	Distillation	1	Accept: simple distillation
8c.	(ii)	A – impure solvent B – round-bottomed flask with side-arm C – solvent vapour D – thermometer E – Leibig condensor F – Bunsen burner G – conical flask H – distillate	1 1 1 1 1 1 1 1	Accept ‘distillation flask’       Accept ‘pure solvent’
8c.	(iii)	In the condensor: <ul style="list-style-type: none"> <li>• Cooling effect of outer water jacket</li> <li>• Solvent vapour condenses to a liquid</li> </ul>	1 1	

9a.	(i) (ii) (iii) (iv)	MgSO <sub>4</sub> Mg(OH) <sub>2</sub> MgCl <sub>2</sub> MgBr <sub>2</sub>	2	½ mark for each correct formula
9b.	(i)	The substance D is magnesium hydroxide or magnesia From the given list, magnesium hydroxide is the only insoluble magnesium compound	1 1	
9b.	(ii)	A base is a metal oxide or hydroxide OR a substance that reacts with an acid to produce salt and water only	1	
9b.	(iii)	Dilute hydrochloric acid	1	Accept any suitable acid
9c.	(i)	All four substances contained the same cation, that is, magnesium	1	
9c.	(ii)	$\text{X}^{2+} + \underline{2}\text{OH}^- \rightarrow \underline{\text{X}(\text{OH})_2}$ or $\text{Mg}^{2+} + \underline{2}\text{OH}^- \rightarrow \underline{\text{Mg}(\text{OH})_2}$	2	1 mark for correct formula 1 mark for correct balancing (accept as correct if students put '1' before magnesium and magnesium hydroxide)
9d.		Substance <b>A</b> is magnesium sulfate. <b>Reason:</b> Did not give a (persistent) precipitate with acidified silver nitrate solution  Substance <b>B</b> is magnesium chloride <b>Reason:</b> Gave a (persistent) white precipitate with acidified silver nitrate solution  Substance <b>C</b> is magnesium bromide <b>Reason:</b> Gave a (persistent) pale yellow precipitate with acidified silver nitrate solution	1 1  1 1  1 1	Do not deduct marks if the idea of a 'persistent' precipitate is not included in the answer  Accept as correct if the students write the formulae or the common names of the identified substances instead of the chemical names
9e.	(i)	A white precipitate would be formed from the colourless solutions	2	1 mark for 'white precipitate' 1 mark for 'colourless solutions'
9e.	(ii)	$\text{BaCl}_{2(\text{aq})} + \underline{\text{MgSO}}_{4(\text{aq})} \rightarrow \text{BaSO}_{4(\text{s})} + \text{MgCl}_{2(\text{aq})}$	3	1 mark for correct formula - MgSO <sub>4</sub> 1 mark for correct balancing (no extra numbers should be added) 1 mark for correct missing state symbol