




Annual Examinations for Secondary Schools 2014

FORM 5

CHEMISTRY

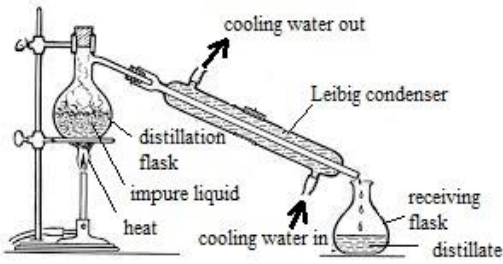
MARKING SCHEME

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 ₂
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 ₂
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 Acid of the same temperature
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 SO_2)	1	
4b.	(i)	 <p>Downward delivery (upward displacement of air)</p> <p>This method is used as SO_2 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 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)	$\begin{array}{c} \text{H} & & \text{H} \\ & \diagdown & / \\ & \text{C} = \text{C} \\ & / & \diagdown \\ \text{H} & & \text{H} \end{array}$ $\begin{array}{cccccccc} \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} \\ & & & & & & & \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{C}-\text{C}-\text{C}-\text{C}-\text{H} \\ & & & & & & & \\ \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} \end{array}$	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 ± 5 s
6b.	(iii)	100 g	1	
6c.	(i)	16 g	1	
6c.	(ii)	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)	Shrubs	1	Accept alternatives like 'undergrowth' or 'dry grass'
7a.	(ii)	Carbon dioxide Water	1 1	
7a.	(iii)	Limewater turns milky when carbon dioxide gas is bubbled through it Anhydrous copper (II) sulfate turns from white to blue in the presence of water	1 1	Accept anhydrous cobalt (II) chloride changes from blue to pink
7a.	(iv)	Dry climate High temperature Presence of trees and vegetation (as fuel) Wind A fire starter like lightening or human activity	1 1 1 1 1	
7a.	(v)	Wind constantly blows in fresh supplies of oxygen-containing air that ... promotes combustion	1 1	
7a.	(vi)	Carbon monoxide Soot	1 1	Accept 'smoke'
7b.	(i)	Carbon dioxide emission increases the Earth's Greenhouse Effect Carbon monoxide emissions are toxic to living things Soot causes respiratory problems / increases the Earth's Greenhouse Effect	1 1 1	Accept any one of the adverse effects of soot Latest research has shown that soot plays a pronounced role in causing Greenhouse Effect
7b.	(ii)	$C_8H_{18(l)} + 12\frac{1}{2} O_{2(g)} \longrightarrow 8CO_{2(g)} + 9H_2O_{(g) \text{ or } (l)}$	3	1 mark if all formulae are correct 1 mark if all balancing is correct (and formulae are correct too) – accept whole number balancing 1 mark if all state symbols are correct $\frac{1}{2}$ mark if only 1 state symbol is incorrect

8a.	(i)	Process: evaporation Factors: wind (or forced ventilation) high temperature	1 1 1	Accept: spreading out of garments (greater surface area exposed to air)
	(ii)	Flammable Poisonous	1 1	Accept: very volatile/ evaporates easily
8b.		Solvent C is most suitable because: <ul style="list-style-type: none"> It is very good at dissolving grease It is less dangerous for workers since it is: <ul style="list-style-type: none"> not flammable not poisonous It has the right boiling point (neither too high nor too low) 	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: fractional distillation
8c.	(ii)	 <p>If fractional distillation equipment is drawn, do not allot marks for the fractionating column but follow the same guidelines on the right to award total score</p>	4	2 marks for correct drawing of equipment: <ul style="list-style-type: none"> ½ mark for heat source (accept arrow indicating heat flow) ½ mark for distillation flask (or round-bottomed flask with side-arm) ½ mark for Leibig condenser ½ mark for receiving flask (accept conical flask) 2 marks for labelling: <ul style="list-style-type: none"> ½ mark for each correct pair of labels (total 8 labels) Allot marks to the nearest ½
8c.	(iii)	In distillation flask: <ul style="list-style-type: none"> Liquid boils and vapour rises Impurities are left behind In the condensor: <ul style="list-style-type: none"> Cooling effect of outer water jacket Solvent vapour condenses to a liquid In the receptacle flask: <ul style="list-style-type: none"> Drops of pure solvent are collected 	½ ½ 1 1 1	

