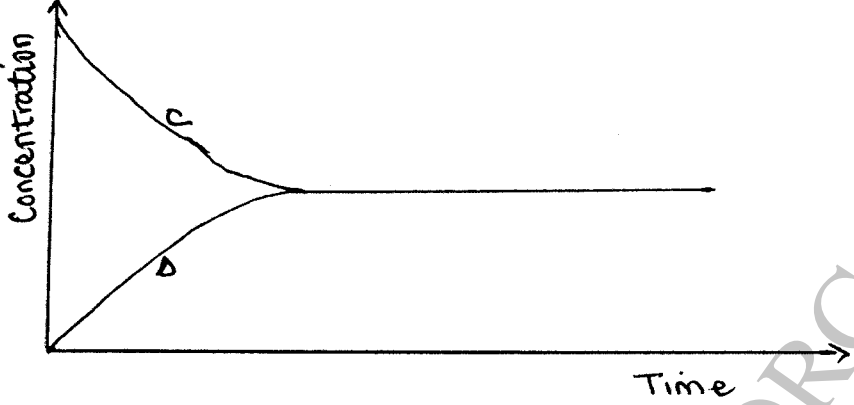


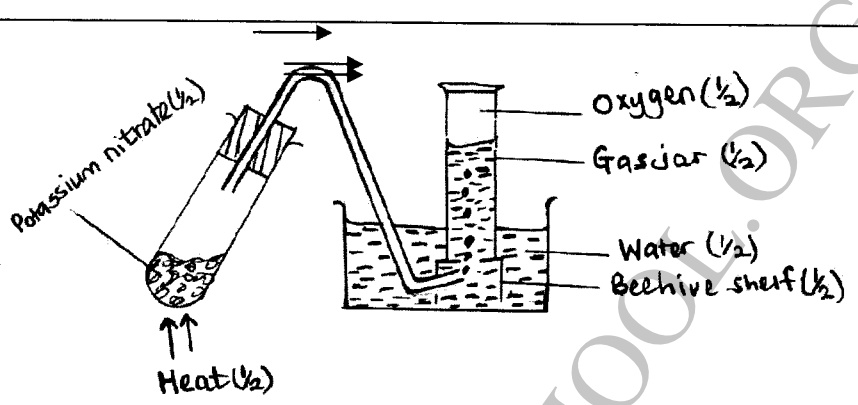
4.7 CHEMISTRY (233)

4.7.1 Chemistry Paper 1 (233/1)

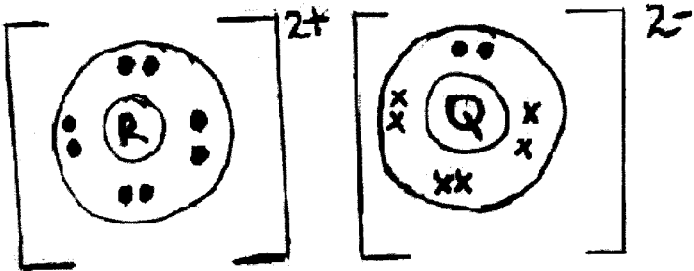
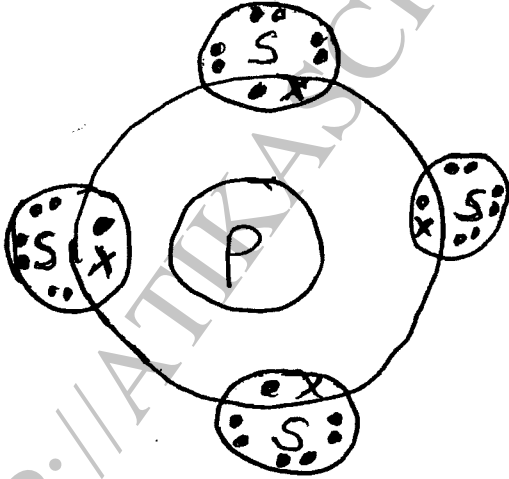
#		Responses	Marks								
1.	(a)	- Ionisation energy decreases down the group 1 elements. - This is because atomic radii increases from A to C (down the group) /outermost electron is far from nucleus hence requires less energy to be lost during reaction.	(1 mark)								
	(b)	Electron configuration of ion of C- 2.8.8	(1 mark)								
2.		$x = 231$	(1 mark)								
		$y = 90$	(1 mark)								
3.	(a)	Carbon electrode (Anode) / Graphite electrode.	(1 mark)								
	(b)	To allow movement of ions / to have it as an electrolyte. When dry, the ions are immobile.	(1 mark)								
	(c)	It is the cathode / negative electrode.	(1 mark)								
4.	(a)	To ensure all the oxide was reduced.	(1 mark)								
	(b)	Mass of oxygen $6.69 - 6.21 = 0.48\text{g}$	(½ mark)								
		<table style="margin-left: 20px;"> <tr> <td>Pb</td> <td>O</td> </tr> <tr> <td>$\frac{6.21}{207}$</td> <td>$\frac{0.48}{16}$</td> </tr> <tr> <td>$\frac{0.03}{0.03}$</td> <td>$\frac{0.03}{0.03}$</td> </tr> <tr> <td>1</td> <td>: 1</td> </tr> </table>	Pb	O	$\frac{6.21}{207}$	$\frac{0.48}{16}$	$\frac{0.03}{0.03}$	$\frac{0.03}{0.03}$	1	: 1	(½ mark)
		Pb	O								
		$\frac{6.21}{207}$	$\frac{0.48}{16}$								
		$\frac{0.03}{0.03}$	$\frac{0.03}{0.03}$								
1	: 1										
E.F - PbO	(½ mark)										
		(½ mark)									
			(½ mark)								
5.	(a)	B is sodium propanoate Accept formula : $\text{C}_2\text{H}_5\text{COONa}$ / $\text{CH}_3\text{CH}_2\text{COONa}$	(1 mark)								
	(b)	$2\text{C}_2\text{H}_6(g) + 7\text{O}_2(g) \rightarrow 4\text{CO}_2(g) + 6\text{H}_2\text{O}(l)$	(1 mark)								
	(c)	<ul style="list-style-type: none"> • as Fuel, 	(1 mark)								

#		Responses	Marks
		<ul style="list-style-type: none"> • production of ethene gas; • production of hydrogen gas. 	
6.	(a)	Charles' Law The volume of a fixed mass of a gas is directly proportional to the absolute temperature at constant pressure.	(1 mark)
	(b)	As the volume decreases, there is increased bombardment / collisions of the molecules against the walls of the container, hence increased pressure.	(2 marks)
7.		<ul style="list-style-type: none"> • Add aqueous barium nitrate / barium chloride to sample; Followed by dilute nitric(V) acid or HCl; • If white precipitate persists, then SO_4^{2-} ions are present; • If the precipitate dissolves then SO_4^{2-} ions are absent. <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> • Add lead(II) nitrate solution 	(1 mark) (1 mark) (½ mark) (½ mark)
8.	(a)	The concentrations of reactants and products remain constant or Rate of forward reaction is equal to the rate of backward reaction.	(1 mark)
	(b)	<p style="text-align: center;">OR</p>	(1 mark) (1 mark)

#	Responses	Marks
		
9.	<p>(a)(i) $Cu(OH)_2(s) + 4NH_3(aq) \rightarrow [Cu(NH_3)_4]^{2+}(aq) + 2OH^-(aq)$</p> <p style="text-align: center;">OR</p> <p>$Cu^{2+}(aq) + 4NH_3(aq) \longrightarrow [Cu(NH_3)_4]^{2+}(aq)$</p> <p>(ii) Tetraamine copper(II)ion</p> <p>(b) CH_4 is a hydrocarbon, non-polar hence does not ionize in water. HCl is polar hence ionizes in water.</p>	(1 mark) (1 mark) (½ mark) (½ mark)
10.	<p>Molar mass of ethanoic acid (CH_3COOH) = 60g</p> <p>Mass of ethanoic acid = $20 \times 1.05g/cm^3$ = 21g</p> <p>Moles of ethanoic = $\frac{21}{60}$ = 0.35 moles</p> <p>Molarity = $\frac{0.35}{400/1000}$ = 0.875M</p>	(½ mark) (½ mark) (½ mark) (½ mark) (1mark)

#		Responses	Marks
11.	(a)	$2K + (5 \times -2) = 0$ $2K = +10$ $K = +5$	(½ mark)
	(b)	Group 5	(½ mark)
			(1 mark)
12.		 <ul style="list-style-type: none"> • Heating - 1 mark • method of collection - 1 mark • workability - 1 mark 	(3 marks)
13.		<p>A dark grey / brown solid is deposited / the solution turns black; chlorine is more reactive / a stronger oxidizing agent than iodine; Therefore displaces it from a solution of its ions.</p> <p style="text-align: center;">OR</p> $\text{Cl}_2 (\text{g}) + 2\text{I}^- (\text{aq}) \longrightarrow 2 \text{Cl}^- (\text{aq}) + \text{I}_2 (\text{S})$	(1 mark)
			(1 mark)
			(1 mark)
14.	(a)	Phosphorus and chlorine	(1 mark)
	(b)	$\text{CaO}_{(\text{s})} + 2\text{HCl}_{(\text{aq})} \rightarrow \text{CaCl}_{2(\text{aq})} + \text{H}_2\text{O}_{(\text{l})}$	(1 mark)
	(c)	<ul style="list-style-type: none"> - used to neutralize acidic soil / liming; - drying agent; (Any 1 correct @ 1 mark)	(1 mark)

#		Responses	Marks
15.		To copper turnings, add 50% concentration H_2SO_4 or HNO_3 / Heat copper turnings to form copper(II) oxide and add dilute H_2SO_4 or HNO_3 or HCl ; To the resulting mixture, add excess sodium carbonate (soluble) Filter mixture; Rinse residue with water and dry between filter papers.	(1 mark) (1 mark) (½ mark) (½ mark)
16.		The mixture changed from green to yellow / formation of a brown gas; Iron(II) ions is oxidized by nitric(V) acid to Iron(III) ions / nitric(V) acid is reduced to nitrogen(II) oxide which is oxidized by oxygen to nitrogen(IV) oxide.	(1 mark) (1 mark)
17.	(a)	Sodium hydroxide solution or Potassium hydroxide solution;	(1 mark)
	(b)	$2Cu_{(s)} + O_{2(g)} \rightarrow 2CuO_{(s)}$	(1 mark)
	(c)	Argon, Neon,(Inert gases)	(1 mark)
18.	(a)	Moderately concentration nitric(V) acid / 50% concentrated nitric(V) acid.	(1 mark)
	(b)	Colourless nitrogen(II) oxide (NO) is oxidized to brown nitrogen(IV) oxide (NO_2).	(1 mark)
	(c)	$3Cu (s) + 8HNO_3 (aq) \rightarrow 3Cu (NO_3)_2 (aq) + 4H_2O + 2NO$	(1 mark)
19.	(a)	- Concentration of acid and base ; - Volume of acid used.	(½ mark) (½ mark)
	(b)	- Improves accuracy; - Polystyrene is a plastic and will not absorb heat /minimum heat loss;	(½ mark) (½ mark)
20.	(a)	K – Ethanoic acid / (CH_3COOH) L –Ethene	(1 mark) (1 mark)
	(b)	Acidified potassium dichromate(VI) OR acidified potassium manganate(VII)	(1 mark)

#		Responses	Marks
21.	(i)		(1 mark)
	(ii)		(1 mark)
	(b)	<p>R and Q form an ionic compound with strong ionic bonds while R and S form a covalent compound with weak Van der Waals forces.</p>	<p>(½ mark) (½ mark)</p>

#		Responses	Marks
22.	(a)	Inert electrode is one which does not participate in the reaction / does not affect the products of electrolysis / does not react;	(1 mark)
	(b)	Anode - chlorine; Cathode - Hydrogen;	(1 mark) (1 mark)
23.		-Measure the boiling point / freezing point;	(1 mark)
		-If the boiling point /freezing point is sharp, then liquid is pure.	(1 mark)
24.	(a)	$4M_{(s)} + K_{2(g)} \rightarrow 2M_2K_{(s)}$ OR $4K(s) + O_2(g) \rightarrow 2K_2O(s)$	(1 mark)
	(b)	L	(1 mark)
	(c)	J should be placed in period 3, group 5 of the periodic table.	(1 mark)
25.		- Graphite consists of layers of carbon atoms;	(1 mark)
		- The layers are held together by the weak Van der Waals forces of attraction;	(1 mark)
		- These layers therefore slide over each other thus preventing machine to machine contact.	(1 mark)
26.	(a)	Removal of original colour from a substance and the remaining substance is white / colourless ;	(1 mark)
	(b)	NaClO / NaOCl	(1 mark)
	(c)	Kill germs / bacteria / microorganisms	(1 mark)
27.	(a)	• rock salt /NaCl / trona ;	(½ mark)
		• salt petre/ NaNO ₃ .	(½ mark)
	(b)	To lower the melting point from 800°C to about 600°C;	(1 mark)
(c)	<ul style="list-style-type: none"> • street lighting; • coolant in nuclear reactors; • extraction of titanium; • extraction of gold; • manufacture of sodium cyanide; • manufacture of sodium peroxide. (Any one correct @ 1mk)	(1 mark)	
28.	(a)(i)	$\text{>C} = \text{C} <$ OR $-\text{C} \equiv \text{C} -$ absent Alkene, alkyne/ unsaturated hydrocarbon absent	(1 mark)
	(ii)	-OH / R - OH present	(1 mark)
	(b)	Lower a burning splint to the gas, a 'pop' sound should be produced showing it is hydrogen.	(1 mark)