MARKING SCHEME PAPER 2 SET 2 JUJ CHEMISTRY 2018

Question No.		Mark Scheme	Sub Mark	ΣMark
1 (a)	(i)	Sodium chloride	1	1
	(ii)	Ionic bond	1	1
	(iii)	1. Sodium atom released one electron 2. Chlorine atom received one electron	1 1	2
1 (b)	(i)	2.4	1	1
	(ii)	2.8	1	1
1 (c)	(i)	CCl_4	1	1
	(ii)	1. Low melting point // boiling point // Cannot conduct electricity in molten and aqueous state 2. Weak force of attraction between molecule // No free moving ion	1 1	2
		TOTAL	**9**	

Question No.		Mark Scheme	Sub Mark	ΣMark
2(a)	(i)	Silicone dioxide	1	1
	(ii)	Ethene	1	1
	(iii)	1. The presence of zinc atom will distrupt the orderly arrangement in pure copper. 2. The atoms not easily slide.	1 1	2
(b)	(i)	Flavouring	1	1
	(ii)	Can cause formation of emulsion	1	1
	(iii)	Pandan leaf/Telang flower/Roselle/dragon fruit [any suitable natural colouring]	1	1
(c)		Analgesic Antibiotic	1 1	2
		TOTAL	**9**	

Question No.		Mark Scheme	Sub Mark	ΣMark
3(a)		Increasing order of proton number	1	1
(b)		Oxygen //chlorine // bromine // argon	1	1
(c)		1. Sodium atom has one valence electron 2. three shells filled with electron	1 1	2
(d)		1. Argon atom achieve stable octet electron arrangement 2. cannot donate, receive or share electron with other atoms	1 1	2

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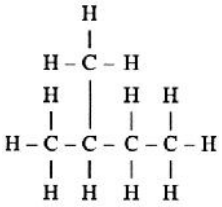
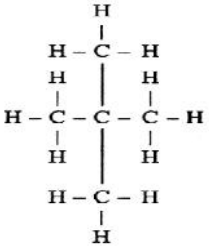
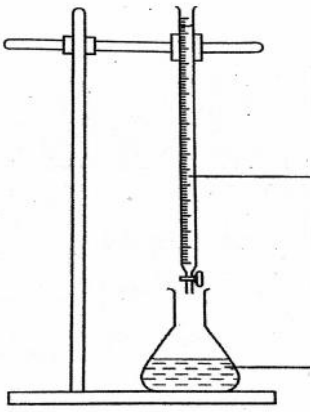
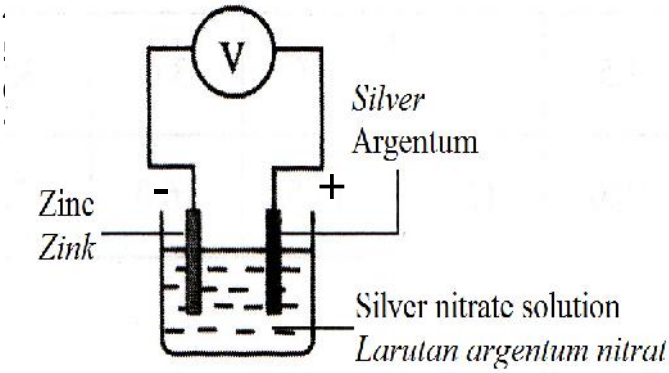
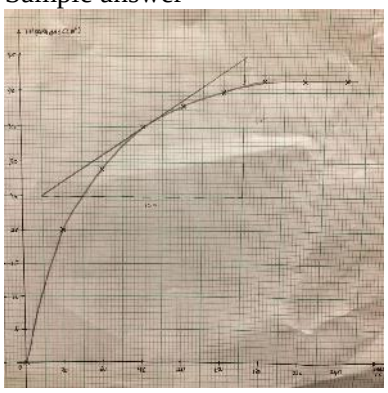
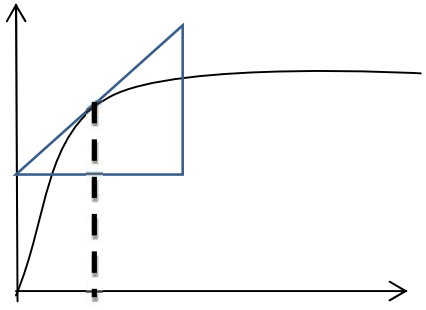
Question No.		Mark Scheme	Sub Mark	ΣMark
(e)	(i)	1. Correct formula of reactant and product 2. Balanced $2Mg + O_2 \longrightarrow 2MgO$	1 1	2
	(ii)	1. Mole ratio 2. Correct answer with correct unit 2 mol Mg: 2 mol MgO/ 0.1 mol Mg: 0.1 mol MgO Jisim MgO = 0.1 x 40 = 4g	1 1	2
		TOTAL	**10**	

Question No.		Mark Scheme	Sub Mark	ΣMark
4 (a)		Alkane	1	1
(b)		Pentane	1	1
(c)		 	1 1	2
(d)	(i)	$C_5H_{12} + 8O_2 \rightarrow 5CO_2 + 6H_2O$ 1. Correct formula and reactant 2. Correct balanced	 1 1	 2
	(ii)	Carbon dioxide	1	1
	(iii)	1. Number of mol 2. Correct mol ratio 3. Correct answer with correct unit 1. mol = $\frac{7.2}{72}$ // 0.1 2. C_5H_{12} : CO_2 1 mol : 5 mol 0.1 mol : 0.5 mol 3. Volume of R = 0.5 x 24 dm^3 // 12 dm^3	1 1 1	3
		TOTAL	**10**	

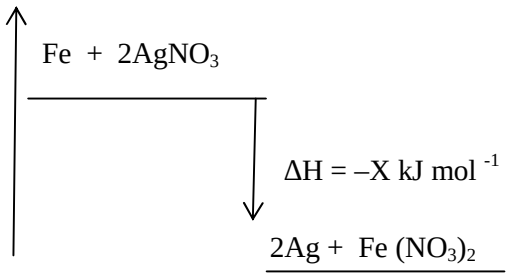
Question No.		Mark Scheme	Sub Mark	ΣMark
5 (a)		Standard solution is a solution in which its concentration is accurately known	1	1
5 (b)	(i)	1. Number of mol 2. Correct answer with correct unit 1. mol = $\frac{(2)(100)}{1000}$ // 0.2 2. Mass NaOH = (0.2)(40) g // 8 g	1 1	2
	(ii)	1. (2)(100) = 200 M_2 2. M_2 = 1.0 mol dm^{-3}	1 1	2
5 (c)	(i)	 Sulphuric acid *Asid sulfurik* Sodium hydroxide solution + phenolphthalein *Larutan natrium hidroksida + fenolftalein* 1. Functional diagram 2. Label	 1 1	 2
	(ii)	Pink to colourless	1	1
5(d)		1. Antiseptic kills the germs 2. Keep the alkaline pH of saliva // keep an alkaline condition in the mouth 3. Neutralized the acid in the mouth	1 1 1	3
		TOTAL	**11**	

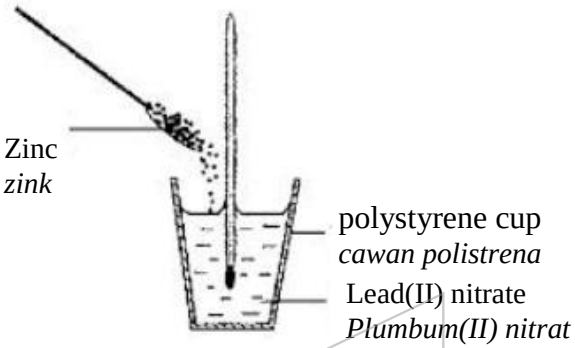
Question No.		Mark Scheme	Sub Mark	ΣMark
6(a)		Process whereby compounds in molten or aqueous state broken down into their elements by passing electricity through it.	1	1
(b)		SO_4^{2-} dan OH^-	1	1
(c)	(i)	1. Put blue litmus paper into the test tube 2. Blue litmus paper turns to red then white/bleached	1 1	2
	(ii)	Electroplating // purification // extraction	1	1
(d)		$Mg \rightarrow Mg^{2+} + 2e$ $Cu^{2+} + 2e \rightarrow Cu$	1 1	2
(e)		The intensity blue colour of copper(II) sulphate solution in cell I and cell II is the same/not change.	1	1
(f)		1. Functional apparatus 2. Label electrolyte (any suitable electrolyte) 3. Correct label for : (i) zinc and silver (ii) positive and negative terminal  	1 1 1	3
		TOTAL	**11**	

<table>
<tr><th colspan="2">Question No</th><th>Mark Scheme</th><th>Sub Mark</th><th>Mark</th></tr>
<tr><td>7</td><td>(a)</td><td>1. Halogen X : chlorine water // bromine water
2. Name of product : Iodine
3. change of oxidation number of Chlorine//bromine : 0 → -1
4. change of oxidation number of iodine : -1 → 0
5. type of reaction occurred for chlorine//bromine : reduction
6. type of reaction occurred for iodide ion/ potassium iodide : oxidation
7. Role of chlorine//bromine water : oxidising agent
8. Role of iodide ion/potassium iodide : reducing agent
9. Half equation : $Cl_2 + 2e \rightarrow 2Cl^-$
10. Half equation : $2I^- \rightarrow I_2 + 2e$</td><td>1
1
1
1
1
1
1
1
1
1</td><td>10</td></tr>
<tr><td></td><td>(b)</td><td>1. Metal Y : Mg//Magnesium // Zn//Zinc // (any suitable metal higher than Cu in reactivity series)
2. Sample answer : Mg + CuO → MgO + Cu
3. Mg gain oxygen
4. Mg undergoes oxidation
5. CuO loss oxygen
6. CuO undergoes reduction</td><td>1
1
1
1
1
1</td><td>6</td></tr>
<tr><td></td><td>(c)</td><td><table><tr><td></td><td>Situation I</td><td>Situation II</td></tr><tr><td>1. Type of reaction</td><td>Oxidation</td><td>Oxidation</td></tr><tr><td>2. Condition</td><td>Present of oxygen</td><td>Present of oxygen and water</td></tr></table>4. paint the body // alloy the iron // (any suitable method)</td><td>1
1 +1
1</td><td>4</td></tr>
<tr><td colspan="3"></td><td>TOTAL</td><td>20</td></tr>
</table>

Question No		Mark scheme	Sub mark	mark
8	(a) (i)	Draw a graph volume of carbon dioxide gas liberated against time. 1. Axes are labelled with correct unit 2. Suitable scales are used and size of graph more than half graph paper 3. All points are plotted correctly 4. Smooth curve of graphs Sample answer 	 1 1 1 1	 4
	(ii)	• Calculate the rate of reaction at 90s correctly 1. Shown the tangent in graph paper 2. State answer with unit Sample answer: Volume of gas / cm^3  Time / s 90 = $\frac{20}{150}$ cm^3s^{-1} // 0.133 cm^3s^{-1} ± 0.05 • Calculate the average rate of reaction with unit = $\frac{38 - 29}{120-60}$ cm^3s^{-1} // $0.15cm^3s^{-1}$	 1 1 1	 3
	(iii)	1. Size of marble powder in experiment II is smaller than size of marble chips in experiment I 2. total surface area of marble in experiment II is larger compare to experiment I 3. Frequency of collision between hydrogen ions and calcium carbonate particle in Experiment II is higher than in experiment I 4. Frequency of effective collision in Experiment II is higher than in experiment I 5. Rate of reaction in experiment II is higher than experiment I	1 1 1 1 1	 5

Question No		Mark scheme	Sub mark	mark
	(b)	1. 83.00 cm^3 // double / twice the volume of experiment II	1	
		2. The concentration of H^+ in experiment III is twice than in experiment II	1	
		3. number of hydrogen ions per unit volume in experiment III is bigger than in experiment II	1	
		4. Frequency of collision between hydrogen ions and calcium carbonate particle in Experiment III is higher	1	
		5. Frequency of effective collision in Experiment III is higher	1	5
	(c)	1. To allow size to be smaller	1	
		2. total surface area of antacid to react is larger.	1	
		3. Rate of absorption increases	1	3
		TOTAL MARKS		**20**

Question No		Mark scheme	Sub mark	mark
9	(a)	1. Exothermic reaction // displacement reaction	1	
		2. Label energy and draw correct level of energy for reactant and product	1	
		3. Write correct equation for reactant, product and $\Delta H = -X$ kJ mol^{-1}	1	3
		answer: Energy  		
	(b) (i)	1. Number of mol = $\frac{0.1\ (200)}{1000}$ // 0.02	1	
		2. heat change = 0.02x 210000 J // 4200J	1	
		3. $\theta = \frac{4200}{200\ (4.2)}$	1	
		4. $\theta = 5^0C$	1	4

Question No		Mark scheme	Sub mark	mark
	(ii)	<table><tr><td>Experiment II</td><td>Experiment III</td></tr><tr><td>Exothermic reaction</td><td>Endothermic reaction</td></tr><tr><td>Heat is released</td><td>Heat is absorbed</td></tr><tr><td>Temperature of surroundings increases</td><td>Temperature of surroundings decreases</td></tr><tr><td>Total energy content of reactant is higher than total energy content of product</td><td>Total energy content of product is higher than total energy content of reactant</td></tr></table> *any three	1 1 1	3
	(iii)	1. Suggested material : $Pb(NO_3)_2$ 2. Measure 200 cm^3 of 0.1 mol dm^{-3} lead(II) nitrate and pour into polystyrene cup. 3. Measure and record the initial temperature of the solution 4. Add 2 spatula zinc into the same polystyrene cup 5. The mixture is stirred 6. Record the highest temperature Able to draw : 1. Functional diagram 2. Labelled  Two precautions: 1. The initial temperature area taken after a few minute 2. The higher temperature must the highest temperature in the solution 3. Metal powders are used instead of metal granules to reduce the heat loss to surrounding. 4. Use polystyrene cup to reduce the heat lost *any two	1 1 1 1 1 1 1 1 1 1	10
			TOTAL MARKS	**20**

Question No		Mark Scheme	Sub Mark	Mark
10	(a)	1. ion Y^- : Chloride ion // nitrate ion 2. ammonia solution 3. hydrochloric acid // nitric acid 4. $NH_3 + HCl \rightarrow NH_4Cl$ // $NH_3 + HNO_3 \rightarrow NH_4NO_3$	1 1 1 1	4
	(b)	Able to identify NH_4^+ ion 1. Put 2 cm^3 of solution Q into two test tube, A and B 2. In test tube A, put a few drops of Nessler's reagent 3. brown precipitate form 4. confirm NH_4^+ ion present Alternative answer to identify NH_4^+ ion 1. Put 2 cm^3 of solution Q into two test tube, A and B 2. In test tube A, put a few drops of NaOH solution and heat 3. pungent smell gas formed that turns red litmus paper to blue 4. confirm NH_4^+ ion present Able to identify Cl^- ion 5. In test tube B, put 1 cm^3 nitric acid solution and 1 cm^3 silver nitrate solution 6. White precipitate formed. Confirm Cl^- ions. If NO_3^- ion 5. In test tube B, put 1 cm^3 sulphuric acid solution and 1 cm^3 iron (II) sulphate solution 6. Put a few drops of concentrated sulphuric acid slowly 7. Brown ring formed. Confirm NO_3^- ions.	 1 1 1 1 1 1 1 1 1 1 1 1 1	Max 6
	(c)	Sample answer 1. Pipette [20-50 cm^3] of ammonia solution [0.5-2.0 $moldm^{-3}$] into a conical flask 2. Add 2-3 drops of phenolphthalein into the conical flask 3. Fill burette with [0.5-2.0 $moldm^{-3}$] hydrochloric acid and record the initial reading 4. Titrate dilute hydrochloric acid from the burette slowly and swirl the solution until pink colour change to colourless. 5. Record the final burette reading and calculate the volume of hydrochloric acid required for complete neutralisation. 6. Repeat the experiment by using the exact volume of hydrochloric acid without indicator. 7. Transfer the salt solution into evaporating dish and heat untill it is saturated 8. Cool to room temperature 9. Filter the solution 10.Dry the salt crystal by using filter paper	 1 1 1 1 1 1 1 1 1 1	10
			TOTAL MARKS	**20**

END OF MARKING SCHEME