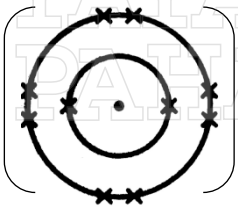
MARKING SCHEME PAPER 2 SET 2 JUJ CHEMISTRY 2019

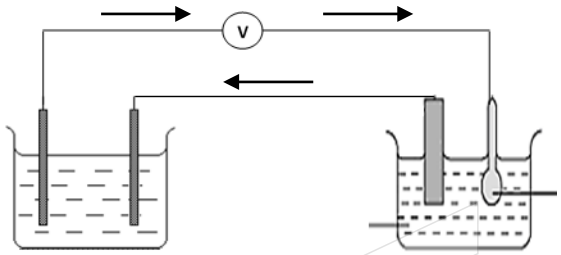
Question No.		Mark Scheme	Sub Mark	ΣMark
1(a)	(i)	The horizontal row of elements in the periodic table of the elements	1	1
	(ii)	Period 3	1	1
(b)		A	1	1
(c)		T	1	1
(d)		- Form coloured compound - Form complex ion - Act as a catalyst - HasMore than one oxidation number [Any **one**]	1	1
(e)	(i)	M, E, D	1	1
	(ii)	1. Distance between nucleus and valence electron is nearer. 2. The force of attraction between nucleus and valence electron is stronger	1 1	2
	(iii)	Ionic compound	1	1
			TOTAL	9

Question No.		Mark Scheme	Sub Mark	ΣMark
2(a)	(i)	Nucleon number	1	1
	(ii)	1. Proton 2. Neutron	1 1	2
	(iii)		1	1
(b)	(i)	17	1	1
	(ii)	Atom has same number of valence electron	1	1
(c)	(i)	Gas	1	1
	(ii)	1. Particles far apart from each others 2. Particles move randomly	1 1	2
			TOTAL	9

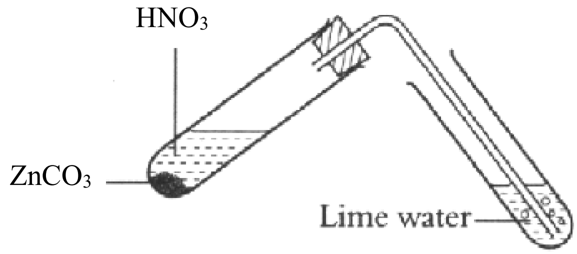
Question No.		Mark Scheme	Sub Mark	ΣMark
3(a)	(i)	Chemical substance that ionise/dissociate in water to produce H^+ ion.	1	1
(b)		1	1	1
(c)	(i)	1 mol of acid ionise in water to produce 1 mol of H^+ ion	1	1

	(ii)	HA acid : Hydrochloric acid/ Nitric acid HB acid : Ethanoic acid	1 1	2
	(iii)	1. HA acid is strong acid while HB acid is a weak acid. 2. Concentration of H^+ ion in acid HA is higher	1 1	2
(d)		1. Number of mole of HA acid 2. Ratio of mole 3. Correct concentration of NaOH with unit n HA = $\frac{0.1 \times 20}{1000}$ // 0.002 1 mol HA acid reacts with 1 mol NaOH// 0.0002 mol HA acid reacts with 0.002 mol NaOH Concentration = $\frac{0.002 \times 1000}{25}$ mol dm^{-3} //0.08 mol dm^{-3}	1 1 1	3
			TOTAL	10

Question No.		Mark Scheme	Sub Mark	ΣMark
4(a)		Yellow/pale yellow	1	1
(b)	(i)	0.01//0.2 x 0.05// $\frac{0.2 \times 50}{1000}$	1	1
	(ii)	0.005 // $\frac{5.0}{1000}$ // $\frac{1 \times 5.0}{1000}$	1	1
(c)		Sulphuric acid	1	1
(d)	(i)	1. catalyst 2. concentration 3.temperature	1 1 1	3
	(ii)	<u>Catalyst</u>: 1. Lower the activation energy// provide an alternative route/path with lower activation energy 2. Frequency of effective collision between $S_2O_3^{2-}$ and H^+ ions/ particles increases <u>Concentration:</u> 1. Concentration of the solution higher// number of $S_2O_3^{2-}$ /H^+ per unit volume higher 2. Frequency of effective collision between $S_2O_3^{2-}$ and H^+ ions/Particles increases <u>Temperature</u>: 1. When temperature increases, the kinetic energy of particles increases//when the temperature increases, particles moves faster. 2. Frequency of effective collision between $S_2O_3^{2-}$ and H^+ ions/ particles increases	1 1 1 1 1 1	2
			TOTAL	10

Question No.		Mark Scheme	Sub Mark	ΣMark
5(a)		Chemical cell // voltage cell	1	1
(b)	(i)	Colourless gas bubbles released	1	1
	(ii)	1. Correct formula of reactant and product 2. Balanced equation $2H^+ + 2e \rightarrow H_2$	1 1	2
	(iii)	1. Put burning splinter at the mouth of test tube. Pop sound produced. 2. Hydrogen gas present	1 1	2
(c)			1	1
(d)		1. Replace zinc electrode in beaker A with magnesium electrode // Replace copper electrode in beaker A with silver electrode 2. The further the pair of metal in electrochemical series the greater the potential difference produced	1 1	2
(e)		1. Correct formula of reactant and product 2. Balanced equation $Cu \rightarrow Cu^{2+} + 2e$	1 1	2
			TOTAL	11

Question No.		Mark Scheme	Sub Mark	ΣMark
6(a)		Soluble	1	1
(b)	(i)	S : Sodium / potassium carbonat // Na_2CO_3 // K_2CO_3 T : Sodium chloride // potassium chloride // NaCl // KCl U : zinc nitrate // $Zn(NO_3)_2$	1 1 1	3
	(ii)	Double decomposition reaction	1	1
	(iii)	1. Correct formula of reactants 2. Correct formula of products $ZnCl_2 + Na_2CO_3 \rightarrow ZnCO_3 + 2NaCl$	1 1	2
	(iv)	Mass $ZnCO_3 = 0.1 \times 125$ g // 12.5 g	1	1

(c)		1. Functional diagram 2. Label $ZnCO_3$ and HNO_3 3. Apparatus set-up to test colourless gas W 	1 1 1	 3
			TOTAL	11

Question No		Mark Scheme	Sub Mark	ΣMark
7 (a)	(i)	1. Homologous series : Ester 2. Compound Z : Methyl butanoate 3. Low melting/ boiling point 4. Forces of attraction between molecules in compound Z is weak.	1 1 1 1	 4
	(ii)	1. Alcohol X : Methanol // CH_3OH 2. Carboxylic acid Y: Butanoic acid // C_3H_7COOH 3.Correct formula of reactants and products $C_3H_7COOH + CH_3OH \rightarrow C_3H_7COOCH_3 + H_2O$ 4. No of mole of CH_3OH 5. Ratio of mole 6. Mass of Z with unit n $CH_3OH = \frac{2}{(12+4+16)}$ // $\frac{2}{32}$ // 0.0625 1 mol of CH_3OH produced 1 mol of $C_3H_7COOCH_3$ // 0.0625 mol of CH_3OH produced 0.0625 mol of $C_3H_7COOCH_3$ Mass = 0.0625 x [12(5) + 10 + 32] g // 0.0625 x 102 // 6.375 g	1 1 1 1 1 1	6
(b)	(i)	1. Ammonia / NH_3 solution 2. Type A : Unvulcanised rubber // Natural rubber 3. Type B : Vulcanised rubber	1 1 1	

Question No		Mark Scheme	Sub Mark	ΣMark
	(ii)	Able to compare four properties of type A & type B rubber		

	Unvulcanised rubber // Type A	Vulcanised rubber // Type B	
4	Softer	Harder	1
5	Cannot withstand high temperature	Can withstand high temperature	1
6	Less easily oxidised	Easily oxidised	1
7	Less elastic	More elastic	1

Able to explain type B is more suitable to make tyre compare to type A

8. presence of cross-linkage of sulphur atoms between rubber molecules in type B rubber — 1
9. prevent rubber molecules slide each other easily — 1
10. Type A rubber easily becomes sticky/soft/easily change shape when high heat/pressure — 1 | 10

		TOTAL	20

Question No.		Mark Scheme	Sub Mark	ΣMark
8(a)		1. K : Analgesics	1	
		2. L : Antibiotic	1	
		3. M : Psychothearapeutic	1	
		4. Ramli = Paracetamol	1	
		5. Hamid = P	1	
		6. Amins' daughter =enicillin Antidepressen	1	6
(b)		1. Plastic B	1	
		2. Improper disposal cause blockage of drainage /flash flood	1	
		3. Burning of plastic release poisonous / toxic / acidic gas	1	
		4. Reduce, reused and recycle // burn in incinerator	1	4
(c)	(i)	1. Substance P : H_2SO_4 // sulpuric acid	1	
		2. Substance Q : NH_3 // ammonia	1	
		3. Fertilizer R = $(NH_4)_2SO_4$	1	
		4. Fertilizer S = NH_4NO_3	1	
		5. Correct formula of reactants	1	
		6. Correct formula of products	1	6
		$H_2SO_4 + NH_3 \rightarrow (NH_4)_2SO_4$ //		
		$HNO_3 + NH_3 \rightarrow NH_4NO_3$		

	(ii)	1. Percent of N_2 fertilizer R $\frac{28}{132}$ x 100 = 21.2 %	1	
		2. Percent of N_2 fertilizer S $\frac{28}{80}$ x 100 = 35%	1	
		3. Fertilizer S	1	
		4. Percentage of nitrogen by mass fertilizer S is higher.	1	4
			TOTAL	20

<table>
<tr><th colspan="2">Question No.</th><th>Mark Scheme</th><th>Sub Mark</th><th>ΣMark</th></tr>
<tr><td>9.</td><td>(a)

(i)</td><td>Exothermic reaction

a: neutralisation

Heat of neutralisation between strong acid and strong alkali is 57.3 kJmol^{-1}

<table><tr><th>Expt I</th><th>Expt II</th></tr><tr><td>HCl is a strong acid //

Ionises completely in water</td><td>CH_3COOH is a weak acid

Ionises partially in water

Some of the heat is used to ionise the molecules</td></tr></table></td><td>1

1

1+1

1

1</td><td>1

5</td></tr>
<tr><td></td><td>(b)

(i)

(ii)</td><td>n = $\frac{1.0 \times 50}{1000}$ // 0.05

0.05 x 57.3

2865 J

Temp change = $\frac{2865}{100 \times 4.2}$ [Total volume = 100 cm^3]

= 6.82 C</td><td>1

1

1

1+1

1</td><td>

3

3</td></tr>
<tr><td></td><td>(c)</td><td>Plastic cup , thermometer , 50 cm^3 measuring cylinder, [balance]

Procedure :

1. Measure 50 cm^3 silver nitrate solution

2. Pour into a plastic cup.

3. Measure the initial temperature, T_1</td><td>1

1</td><td></td></tr>
</table>

		4. Add 5.0 g / a little magnesium powder and stir. 5. Measure the highest temperature, T_2 To calculate: Temp rise = $T_2 - T_1 = T$ H= 50 x c x T = P Heat of displacement = P / mol n = $\frac{50 \times 1.0}{1000}$ Precaution: stir Measure the highest reading	1 1 1 1 1 1 1	Max 8
				20

Question No.		Mark Scheme	Sub Mark	ΣMark
10	(a)	1. Add chlorine/ bromine water to the solution. 2. $Cl_2 + 2Fe^{2+} \rightarrow 2Fe^{3+} + 2Cl^-$ // $Fe^{2+} \rightarrow Fe^{3+} + e$ 3. Fe^{2+} is oxidize to Fe^{3+} 4. Fe^{2+} gives green colour and Fe^{3+} brown colour.	1 1 1 1	4
	(b) (i)	al X is more electropositive than copper. 2. Atom X oxidizes 3. Cu^{2+} ion reduces to copper 4. Number of Cu^{2+} decreases. 5. Metal Y is less electropositive than copper.	1 1 1 1 1	5
	(ii)	Y, Cu, X	1	1
	(c) (i)	Materials and apparatus: 1. 1 mol dm^{-3} of P nitrate, Q nitrate, R nitrate and S nitrate solutions. 2. Metals P, Q, R and S strips. 3. Sandpaper 4. Test tubes and test tube rack Procedure: 1. Clean/rub the metal strips with the sandpaper. 2. Pour 5 cm^3 of solutions P nitrate, Q nitrate, R nitrate and S nitrate into four separate test tubes. 3. Place a strip of metal A into each of solution into the test tubes. 4. Record any observation after 5 minutes. 5. Repeats steps 2 to 4 using strips of metals Q, R and S to replace metal P.	1+1 1 1 1 1	7
	(iii)	Results;		3

		<table><tr><td rowspan="2">Metal</td><td colspan="4">A solution containig</td></tr><tr><td>Metal ion P</td><td>Metal ion Q</td><td>Metal ion R</td><td>Metal ion S</td></tr><tr><td>P</td><td></td><td>x</td><td>x</td><td>x</td></tr><tr><td>Q</td><td>√</td><td></td><td>x</td><td>x</td></tr><tr><td>R</td><td>√</td><td>√</td><td></td><td>x</td></tr><tr><td>S</td><td>√</td><td>√</td><td>√</td><td></td></tr></table> √ = reaction occurs x = no reaction Or S can displace all metals P, Q and R. P cannot displace any metals. R can displace metal Q and P. Conclusion: S is most electropositive, P is least electropositive and R is more electropositive than Q.	1 1 1 1 Max 10/11	
		Total	20	