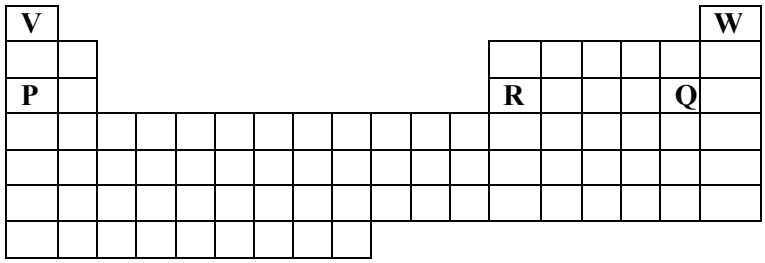
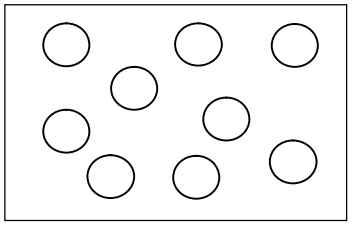
SKEMA PEMARKAHAN KIMIA KERTAS 2

Question Number		Answer	Mark
1	(a)	oxidation and reduction happens at the same time	1
	(b)(i)	Oxidation: $H_2S \longrightarrow 2H^+ + S + 2e$ Reduction: $Fe^{3+} + e \longrightarrow Fe^{2+}$	1 1
	(ii)	+3 to +2	1
	(c)	Hidrogen sulphide	1
	(d)	Yellow solid	1
	(e)	Zinc/aluminium/magnesium/KI/KCl/	1
	(f)	Add NaOH/NH_3 solution/Potassium hexaxyanoferrate(III) solution Green precipitate/dark blue precipitate	1 1
		Total	**9**

Question Number		Answer	Mark
2	(a)(i)	$Pb(NO_3)_2 + 2NaI \longrightarrow PbI_2 + 2NaNO_3$	1 + 1
	(ii)	Quantitative: 1 mole of $Pb(NO_3)_2$ react with 2 mole of NaI to produce 1 mole of PbI_2 and 2 mole of $NaNO_3$ Qualitative: The reactant are $Pb(NO_3)_2$ and NaI The product are PbI_2 and $NaNO_3$	1 1
	(b)	yellow	1
	(c)	Soluble in water//colourless solution	1
	(d)	Mole of $Pb(NO_3)_2$ = 50 x 1/1000= 0.05(excess) Mole of NaI = 50 x 1 /1000= 0.05 Ratio NaI : PbI_2 2 mole : 1 mole 0.05mole : 0.025 mole Mass of PbI_2 = 0.025 x [207 + 254] = 0.025 x 461 = 11. 525 g	1 1 1
		Total	**9**

Question Number		Answer	Mark
3	(a)	The increament of proton number /*Pertambahan nombor proton*	1
	(b)	Group: The number of electrovalens / *Bilangan elektrovalens* Period: Number of shells that occupied by electrons/ *Bilangan petala yang berisi elektron.*	1 1
	(c)		1 + 1
	(d)(i) (ii)	R^{3+} Atom R release 3 electron to form R^{3+} ion / *Atom R membebaskan 3 elektron untuk membentuk ion* R^{3+}.	1 1
	(e)(i)	Helium gas is light and inert./ *Gas helium ringan dan lengai.*	1
	(ii)	Cannot. Hydrogen gas is flameable and it will explode with the presence of oxygen gas at high temperature. *Tidak boleh.Kerana gas hidrogen mudah terbakar dan meletup dengan kehadiran gas oksigen pada suhu yang tinggi.*	1 1
		Total	**10**

Question Number		Answer	Mark
4	(a)	Resapan	1
	(b)(i)	Cecair	1
	(ii)		1
	(c)	Kurang daripada 10 minit	1
	(d)	- Proses resapan - zarah-zarah kecil dan diskrit // zarah bergerak rawak - zarah bergerak daripada kawasan berkepekatan tinggi ke kepekatan rendah	1 1 1
	(e)(i)	= 0.1 mol x 80 g mol^{-1} = 8 g	1
	(ii)	= 0.1 mol x 24 dm^3 mol^{-1} = 2.4 dm^3	1
	(iii)	= 0.1 mol x 2 x 6.02 x 10^{23} mol^{-1} = 1.02 x 10^{23} atom	1
		Total	**10**

No			Jawapan	Markah
5	a	i	Carbon dioxide /Karbon dioksida/ CO_2	1
		ii	White	1
		iii	Lead (II) oxide/ Plumbum(II) oksida	1
	b	i	Process I: Decomposition	1
			Process II: Double decomposition	1
		ii	Reagent X: nitric acid	1
			Reagent Y: sodium hydroxide solution	1
		iii	White precipitate: lead(II)sulphate	1
		iv	$Pb^{2+} + SO_4^{2-} \longrightarrow PbSO_4$	2
		v	lead(II) ion // Pb^{2+} // H^+	1
			nitrate ion // NO_3^- // OH^-	

Question Number		Answer	Mark
6.	a)	Heat energy released when 1 mol of precipitate is formed.	1
	b)	Exothermic	1
	c)	$AgNO_3 + NaCl \rightarrow AgCl + NaNO_3$	1
	d)	Mol of $AgNO_3$ / NaCl $= \frac{0.1\ moldm^{-3} \times 25\ cm^3}{1000} = 0.025$ mol 1 mol $AgNO_3 \rightarrow$ 1 mol AgCl 0. 025 mol $AgNO_3 \rightarrow$ 0. 025 mol AgCl	1

		Heat of precipitation: $\Delta H = \frac{mc\Theta}{mol} = \frac{50g \times 4.2\ J\ g^{-1}\ ^0C^{-1} \times 8\ ^0C}{0.025\ mol}$ $= -67200\ Jmol^{-1}$ @ $-67.2\ kJmol^{-1}$	1 1
	e)	Energy $AgNO_3 + NaCl$ $\Delta H = -67.2\ kJmol^{-1}$ $AgCl + NaNO_3$ - Axes with label energy and levels - Correct position of reactants and products - $\Delta H = -67.2\ kJmol^{-1}$	 1 1 1
	f)	- The theoritical value of heat of neutralisation is higher. - There are heat loss to surrounding when conduct the experiment.	1 1
		Total	**11**

Section B

<table>
<tr><th colspan="2">Question number</th><th>Answer</th><th>Mark</th></tr>
<tr><td>7</td><td>(a)(i)</td><td>Electrode P: chloride ion/Cl^- and hydroxide ion/OH^-
Electrode Q: hydrogen ion/H^+ and sodium ion/Na^+</td><td>1
1</td></tr>
<tr><td></td><td>(ii)</td><td>Electrode P: oxygen molecule/ gas//oxygen
Electrode Q: hydrogen molecule/gas//hydrogen
r: formula</td><td>
1
1</td></tr>
<tr><td></td><td>(iii)</td><td>Electrode P: Chlorine gas // Chlorine
Electrode Q: hydrogen molecule/gas//hydrogen

equation:
P: $2Cl^- \longrightarrow Cl_2 + 2e$

Q: $2H^+ + 2e \longrightarrow H_2$
Confirmatory test at P:
- Collect the gas liberated from electrode P into a test tube ,
- insert damp blue litmus paper
- blue litmus paper turns red and decolourised.</td><td>
1
1

1

1

1

1</td></tr>
<tr><td></td><td>(b)</td><td>
<table>
<tr><td></td><td>Cell X</td><td>Cell Y</td></tr>
<tr><td>Type of cell</td><td>Electrolytic cell</td><td>Voltaic cell</td></tr>
<tr><td>The energy change</td><td>Electrical energy to chemical energy</td><td>Chemical energy to electrical energy</td></tr>
<tr><td>The terminal of the cell</td><td>Positive terminal / anode: Copper
Negative terminal / cathode: copper</td><td>Positive terminal / cathode: copper
Negative terminal / anode: aluminium</td></tr>
<tr><td>Ions present in the electrolyte</td><td colspan="2">Cu^{2+}, H^+
SO_4^{2-}, OH^-</td></tr>
<tr><td>Observation</td><td>Anode:
Thinner

Cathode:
brown deposit//brown solid is deposited//thicker</td><td>Negative terminal/Aluminium plate: thinner

Positive terminal/Copper plate: brown deposit//brown solid is deposited//thicker</td></tr>
</table>
</td><td>1

1

1

1

1

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

		Half equation for both electrodes	Anode: $Cu \rightarrow Cu^{2+} + 2e$ Cathode: $Cu^{2+} + 2e \rightarrow Cu$	Al plate/- terminal: $Al \rightarrow Al^{3+} + 3e$ Cu plate//+ terminal: $Cu^{2+} + 2e \rightarrow Cu$	1 1
		Name of the process occurred at both electrodes/terminal	Anode/Al plate:Oxidation Cathode/Copper plate//negative terminal: Reduction		1
					10
				Total	**20**

Question number		Answer	Mark
8	(a) (i)	Composite material, Adding steel rod into the concrete	1 1
	(ii)	$nC_2H_4 \longrightarrow \left(C_2H_4 \right)_n$ Polyethene	1+1 1
	(iii)	-Alloy Q/brass is harder than it pure metal/copper -the presence of zinc atom in alloy Q disrupts the orderly arrangement of copper atom - These make the atomic layers of atoms harder to slide over on another -in pure metal/copper the atoms are arranged packed closely and in orderly manner. -this allow the layers of atoms are easily to slide one another	1 1 1 1 1
	(b)	-Penicillin//streptomycin - The student can be attacked again by the disease. -Therefore, drugs that have a higher dose should be given to him	1 1 1

	(c)	-Cleaning agent Y in experiment II is more effective than cleaning agent X -Cleaning agent Y do not form scum in hard water therefore it can remove oily stain from the cloth -Cleaning agent X in experiment I is not effective in hard water because hard water contain high calcium ion and magnesium ion -these ions will react with cleaning agent X to formed an insoluble precipitate/scum -the formation of scum will reduces the number of cleaning agent A Cleaning agent X is soap Cleaning agent Y is detergent	1 1 1 1 1 1 1
		Total	**10**

No		Rubric	Mark
9	(a)	$Zn + 2HNO_3 \rightarrow Zn(NO_3)_2 + H_2$ No. of moles of $HNO_3 = \frac{0.2 \times 25}{1000} = 0.005$ mol 2 mol of $HNO_3 \rightarrow$ 1 mol H_2 0.005 mol $\rightarrow$ 0.0025 mol H_2 Max volume of $H_2 = 0.0025 \times 24 = 0.06\ dm^3 = 60\ cm^3$	1 1 1 1 4
	(b)(i)	Rate of reaction set II higher than set I The concentration of nitric acid / HNO_3 in set II higher than set I // No. of particles per unit volume in set II is higher. Frequency of effective collision between hydrogen ions/ H^+ and zinc atom/ Zn higher in set II.	1 1 1 3
	(ii)	Rate of reaction set III higher than set I The temperature in set III higher than set I // Kinetic energy of particles in set III is higher. Frequency of effective collision between hydrogen ions/ H^+ and zinc atom/	1 1 1

		Zn higher in set II.	3
	(c)	<u>Size of Reactants:</u> 1 (25-50) cm^3 of (0.1-1.0) mol dm^{-3} of hydrochloric acid is measured and poured into a conical flask. 2 About 5.0 g of zinc granules is weigh. 3. A burette is filled with water and inverted into a basin containing water 4 The water level in the burette is adjusted to 50 cm^3 mark. 5. The granulated zinc is added into the conical flask. 6. Immediately the conical flask is closed and connect it using delivery tube to the burette 7. The stopwatch is started. 8. The conical flask is shaken steadily. 9. Record volume of hydrogen gas every 30 seconds interval. 10. The experiment is repeated using 5.0 g of zinc powder to replace 5.0 g of zinc granules. <u>Catalyst:</u> 1 (25-50) cm^3 of (0.1-1.0) mol dm^{-3} of hydrochloric acid is measured and poured into a conical flask. 2 About 5.0 g of zinc granules is weigh. 3. A burette is filled with water and inverted into a basin containing water 4. The granulated zinc is added into the conical flask. 5. 5 cm^3 of 0.5 mol dm^3 copper(II) sulphate solution is added into the Conical flask. 6. Immediately the conical flask is closed and connect it using delivery tube to the burette 7. The stopwatch is started. 8. The conical flask is shaken steadily. 9. Record volume of hydrogen gas every 30 seconds interval. 10. The experiment is repeated without adding copper (II) sulphate Solution.	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 10
			20

NO		SKEMA	MARKAH
10	(a)	$H_2SO_4 + 2NaOH \longrightarrow Na_2SO_4 + H_2O$	1
		$\frac{22 \times 0.1}{25 \times M_b} = \frac{1}{2}$	2
		$= 0.2\ moldm^{-3}$	1
	(b)	Solvent L is water	1
		Solvent M is propanone, tetrachloromethane, chlorofom, Methylbenzene	1
		In solution A	
		Ethanoic acid ionises in water to poduce H^+ ion	1
		Presence of H^+ shows acidic properties	1
		In solution B	
		Ethanoic acid cannot ionise in water to poduce H^+ ion	1
		No H^+ presence cannot shows acidic properties	1
	(c)	1. Choose suitable carbonate salt (K_2CO_3 , Na_2CO_3) 2. Measure $50cm^3$ of potassium carbonate and zinc nitrate solution 3. Pour both the solutions into a conical flask. Shake the flask well 4. Double decomposition reaction occurs. Zinc carbonate and potassium nitrate are produced. $K_2CO_3 + Zn(NO_3)_2 \longrightarrow ZnCO_3 + 2KNO_3$ $ZnCO_3$ is insoluble salt KNO_3 is soluble salt 5. Filter the products. The residue is $ZnCO_3$ 6. Put the $ZnCO_3$ into a test tube . Pour the hydrochloric acid into the test tube. 7. Reactions occurs $ZnCO_3 + 2HCl \longrightarrow ZnCl_2 + CO_2 + H2O$ 8. Zinc chloride salt is produced. 9. A pure sample zinc chloride salt can be obtained by recrystallisation	10