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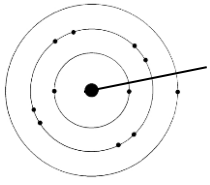
MODUL PINTAS TINGKATAN 5

Peperiksaan Percubaan Tahun 2019

Skema Jawapan Chemistry

Kertas 2 4541/2

Section A
Bahagian A

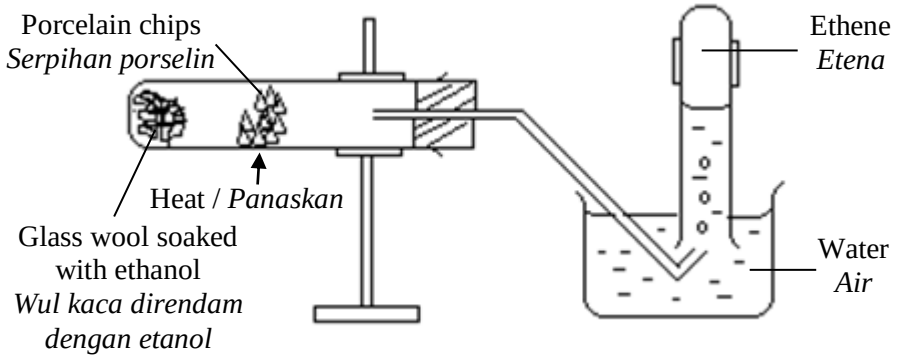
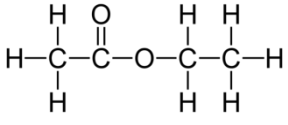
Question *Soalan*			Answer *Jawapan*	Marks *Markah*
1.	(a)		Increasing of proton number. *Pertambahan nombor proton.*	1
	(b)		Nucleon number of an element is the total number of protons and neutrons in the nucleus of its atom. *Nombor nukleon suatu unsur adalah jumlah proton dan neutron dalam nukleus atomnya.*	1
	(c)		 Nucleus sodium 11 protons + 12 neutrons *Nukleus natrium* 11 *proton* + 12 *neutron* • Number of shells and electrons *Bilangan petala dan elektron* • Label nucleus *Label nukleus*	 1 1
	(d)	(i)	Fluorine is more electronegative than nitrogen. *Fluorin lebih elektronegatif daripada nitroge*n.	1
		(ii)	1. The number of protons in the nucleus of fluorine atom is more than nitrogen atom. 2. The strength of proton in the nucleus to attract electrons in the valence shell in fluorine atom is stronger than nitrogen atom. 1. *Bilangan proton dalam nukleus atom fluorin adalah lebih banyak daripada atom nitrogen.* 2. *Kekuatan proton dalam nukleus atom fluorin untuk menarik elektron di petala valens adalah lebih kuat daripada atom nitro*gen.	1 1
	(e)		1. Argon atom has achieved stable octet electron arrangement. 2. It does not have to donate, gain or share electrons. 1. *Atom argon telah mencapai susunan elektron oktet yang stabil* 2. *Ia tidak perlu menderma, menerima atau berkongsi elektron*.	1 1
			TOTAL / *JUMLAH*	9

Question *Soalan*			Answer *Jawapan*	Marks *Markah*
2.	(a)		Empirical formula is a chemical formula that shows the simplest ratio of number of atoms of each element in a compound. *Formula empirik adalah formula kimia yang menunjukkan nisbah paling ringkas bagi bilangan atom setiap unsur yang terdapat dalam sebatian*.	1
	(b)		To allow oxygen from the air flow in to react with magnesium. *Untuk membenarkan oksigen daripada udara masuk dan bertindak balas dengan magnesium*.	1
	(c)		The process of heating, cooling and weighing is repeated until a constant mass is obtained. *Proses pemanasan, penyejukan dan penimbangan diulang beberapa kali sehingga jisim tetap diperoleh*.	1
	(d)	(i)	Magnesium / *Magnesium* : 256.29 – 250.05 = 6.24 g Oxygen / *Oksigen* : 260.45 – 256.29 = 4.16 g	1 1
		(ii)	Number of mole of magnesium / *Bilangan mol magnesium* : 6.24 / 24 = 0.26 mol Number of mole of oxygen / *Bilangan mol oksigen* : 4.16 / 16 = 0.26 mol	1 1

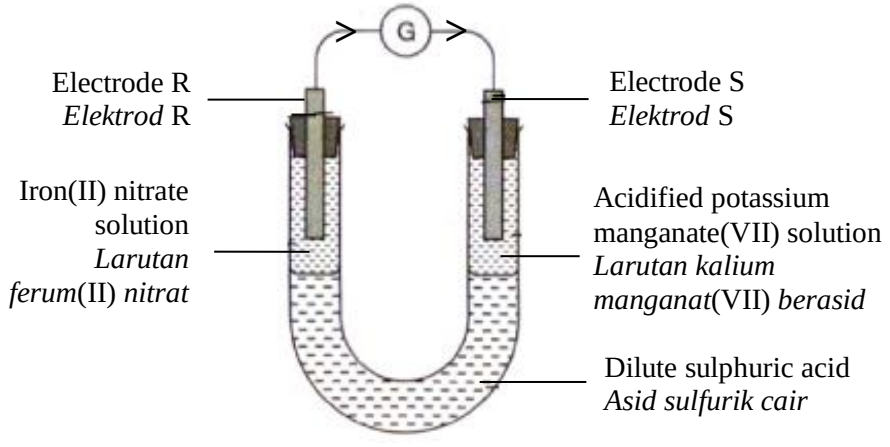
	(e)	(i)	Copper(II) oxide // lead(II) oxide // tin(II) oxide
			Kuprum(II) *oksida* // *plumbum*(II) *oksida* // *stanum*(II) *oksida*
				1

		(ii)	Copper / lead / tin is below hydrogen in the metal reactivity series // Copper / lead / tin is less reactive than hydrogen // Hydrogen is able to reduce copper(II) oxide / lead(II) oxide / tin(II) oxide to form copper / lead / tin. *Kuprum* / *plumbum* / *stanum berada di bawah hidrogen dalam siri kereaktifan logam* // *Kuprum* / *plumbum* / *stanum kurang reaktif daripada hidrogen* // *Hidrogen dapat menurunkan kuprum*(II) *oksida* / *plumbum*(II) *oksida* / *stanum*(II) *oksida membentuk kuprum* / *plumbum* / *stanum.*	1
			TOTAL / *JUMLAH*	9

Question *Soalan*			Answer *Jawapan*	Marks *Markah*
3.	(a)	(i)	Sodium benzoate prevents tomato sauce from being spoilt // Slow down the growth of microorganisms. *Natrium benzoat mengelakkan sos tomato daripada rosak // Memperlahankan pertumbuhan mikroorganisma*.	1
		(ii)	Cause headache // Falling hair. *Menyebabkan sakit kepala // Rambut gugur*.	1
		(iii)	Prevent oxidation // Rancid fats and brown fruits. *Menghalang pengoksidaan // Lemak tengik dan buah menjadi perang*.	1
	(b)	(i)	Soy lecithin *Lesitin soya*	1
		(ii)	Ice cream separated into two layers. *Ais krim terpisah kepada dua lapisan.*	1
		(iii)	1. Sugar 2. Aspartame 1. *Gula* 2. *Aspartam*	1 1
	(c)	(i)	1. Paracetamol 2. Does not cause internal bleeding. 1. *Parasetamol* 2. *Tidak menyebabkan pendarahan dalaman*.	1 1
		(ii)	Bacteria can become resistance to the antibiotic // To avoid become ill again. *Bakteria akan menjadi imun terhadap antibiotik // Mengelakkan badan menjadi sakit semula*.	1
			TOTAL / *JUMLAH*	10

Question *Soalan*			Answer *Jawapan*	Marks *Markah*
4.	(a)	(i)	$C_2H_5OH + 3O_2 \rightarrow 2CO_2 + 3H_2O$ • Correct chemical formulae of reactants and products *Formula kimia bagi bahan dan hasil tindak balas yang betul* • Balanced chemical equation *Persamaan kimia seimbang*	1 1
		(ii)	 • Functional diagram *Gambarajah berfungsi* • Label materials *Label bahan*	 1 1
		(iii)	The orange colour of acidified potassium dichromate(VI) solution turns green // product smells like vinegar. *Warna jingga larutan kalium dikromat*(VI) *berasid bertukar menjadi hijau // hasil berbau seperti cuka.*	1
		(iv)		1
	(b)	(i)	Solution P : Formic acid // methanoic acid // ethanoic acid *Larutan* P : *Asid formik // asid metanoik // asid etanoik* Solution Q : Ammonia solution // ammonium hydroxide solution *Larutan Q* : *Larutan ammonia // larutan ammonium hidroksida*	1 1
		(ii)	1. Bacteria from the air enter the latex. 2. Activity of bacteria in the latex produce lactic acid that contains hydrogen ions which causes coagulation of latex. 1. *Bakteria dari udara masuk ke dalam lateks.* 2. *Aktiviti bakteria di dalam lateks menghasilkan asid laktik yang mengandungi ion hidrogen yang menyebabkan penggumpalan lateks.*	1 1
			TOTAL / *JUMLAH*	10

Question *Soalan*			Answer *Jawapan*	Marks *Markah*
5.	(a)		Lead(II) carbonate *Plumbum*(II) *karbonat*	1
	(b)		$CO_2 + Ca(OH)_2 \rightarrow CaCO_3 + H_2O$ • Correct chemical formula of reactants and products *Formula kimia bagi bahan dan hasil tindak balas yang betul* • Balanced chemical equation *Persamaan kimia yang seimbang*	 1 1
	(c)	(i)	Nitrate ion // NO_3^- *Ion nitrat* // NO_3^-	1
		(ii)	1. 2 cm^3 of dilute sulphuric acid is added to 2 cm^3 solution W followed by 2 cm^3 of iron(II) sulphate solution and the mixture is shaken. 2. The test tube is slanted and held with a test tube holder, a few drops of concentrated sulphuric acid are added along the wall of the test tube and is held upright. 3. A brown ring is formed. Anion present is nitrate ion. 1. 2 cm^3 *asid sulfurik cair ditambah kepada* 2 cm^3 *larutan* W *diikuti dengan* 2 cm^3 *larutan ferum*(II) *sulfat dan campuran digoncang.* 2. *Tabung uji dicondongkan dan dipegang dengan pemegang tabung uji, beberapa titis asid sulfurik pekat dititiskan melalui dinding tabung uji dan ditegakkan.* 3. *Cincin perang terbentuk. Anion yang hadir adalah ion nitrat.*	1 1 1
	(d)		1. Number of moles of $Pb(NO_3)_2 = (0.5 \times 50) / 1000 = 0.025$ mol Number of moles of KI = $(0.5 \times 50) / 1000 = 0.025$ mol 2. 2 mol of KI produce 1 mol of PbI_2 0.025 mol of KI produce 0.0125 mol of PbI_2 3. Mass of $PbI_2 = 0.0125 \times [207 + 2(127)] = 5.7625$ g 1. *Bilangan mol* $Pb(NO_3)_2 = (0.5 \times 50) / 1000 = 0.025$ mol *Bilangan mol* KI = $(0.5 \times 50) / 1000 = 0.025$ mol 2. 2 mol KI *menghasilkan* 1 mol PbI_2 0.025 mol KI *menghasilkan* 0.0125 mol PbI_2 3. *Jisim* $PbI_2 = 0.0125 \times [207 + 2(127)] = 5.7625$ g	1 1 1 1
			TOTAL / *JUMLAH*	11

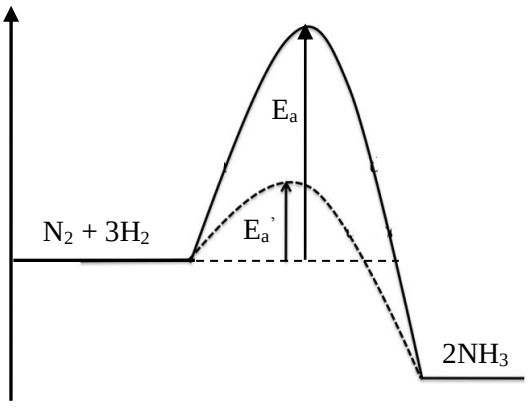
Question *Soalan*			Answer *Jawapan*	Marks *Markah*
6.	(a)	(i)	Allows the ions flow through it to complete the electrical circuit. *Membenarkan ion-ion mengalir melaluinya untuk melengkapkan litar elektrik.*	1
		(ii)	$Fe^{2+} \rightarrow Fe^{3+} + e$	1
			The green colour of iron(II) nitrate solution turns brown. *Warna hijau larutan ferum*(II) *nitrat bertukar menjadi perang.*	1
			1. Add a few drops of sodium hydroxide solution. 2. A brown precipitate is formed. 1. *Tambahkan beberapa titis larutan natrium hidroksida.* 2. *Mendakan perang terbentuk.*	1 1
		(iii)	$MnO_4^- + 8H^+ + 5e \rightarrow Mn^{2+} + 4H_2O$ • Correct chemical formula of reactants and products *Formula kimia bagi bahan dan hasil tindak balas yang betul* • Balanced half equation *Persamaan setengah yang seimbang*	 1 1
			Decreases from +7 to +2 *Berkurang daripada* +7 *kepada* +2	1
		(iv)		1
	(b)	(i)	Oxidising agent *Agen pengoksidaan*	1
		(ii)	Increases from -1 to 0 *Meningkat daripada* -1 *kepada* 0	1
			TOTAL / *JUMLAH*	11

Section B
***Bahagian* B**

Question *Soalan*			Answer *Jawapan*	Marks *Markah*
7.	(a)	(i)	1. Anode – Chlorine 2. Cathode – Copper 1. *Anod – Klorin* 2. *Katod – Kuprum*	1 1
		(ii)	1. List the ions attracted to the anode – hydroxide ion / OH^- ion and chloride ion / Cl^- ion. 2. Name the ion selectively discharged at anode – chloride ion. 3. The reason why the ion is selectively discharged at anode – the concentration of chloride ion is higher than hydroxide ion. 4. Half equations for the reaction occurred at anode – $2Cl^- \rightarrow Cl_2 + 2e$. 5. The observation at anode – greenish yellow gas is released. 1. *Senaraikan ion-ion yang tertarik ke anod – ion hidroksida, ion* OH^- *dan ion klorida, ion* Cl^-. 2. *Namakan ion yang dipilih untuk dinyahcas pada anod – ion klorida.* 3. *Sebab ion ini dipilih untuk dinyahcas pada anod – kepekatan ion klorida lebih tinggi daripada ion hidroksida.* 4. *Persamaan setengah bagi tindak balas yang berlaku pada anod –* $2Cl^- \rightarrow Cl_2 + 2e$. 5. *Pemerhatian pada anod – gas kuning kehijauan dibebaskan.*	1 1 1 1 1
	(b)	(i)	1. R, Q, P, S 2. Reaction between metal P and Q nitrate solution occurs. Metal P is more electropositive than metal Q. 3. Reaction between metal P and R nitrate solution occurs. Metal P is more electropositive than metal R. 4. Reaction between metal P and S nitrate solution does not occur. Metal P is less electropositive than S / Metal S is more electropositive than P. 5. Reaction between metal R and Q nitrate solution does not occur. Metal R is less electropositive than Q / Metal Q is more electropositive than R. 1. R, Q, P, S 2. *Tindak balas antara logam* P *dan larutan* Q *nitrat berlaku. Logam* P *lebih elektropositif berbanding logam* Q. 3. *Tindak balas antara logam* P *dan larutan* R *nitrat berlaku. Logam* P *lebih elektropositif berbanding logam* R. 4. *Tindak balas antara logam* P *dan larutan* S *nitrat tidak berlaku. Logam* P *kurang elektropositif berbanding logam* S / *Logam* S *lebih elektropositif berbanding logam* P. 5. *Tindak balas antara logam* R *dan larutan* Q *nitrat tidak berlaku. Logam* R *kurang elektropositif berbanding logam* Q / *Logam* Q *lebih elektropositif berbanding logam* R.	1 1 1 1 1
		(ii)	Reaction takes place. *Tindak balas berlaku.*	1
	(c)	(i)	1. Positive terminal – silver. 2. Negative terminal – magnesium.	1 1

			1. *Terminal positif – argentum.* 2. *Terminal negatif – magnesium.*	
		(ii)	Colourless gas bubbles are released. *Gelembung-gelembung gas tidak berwarna terbebas.*	1
		(iii)	1. Positive terminal – $2H^+ + 2e \rightarrow H_2$ 2. Negative terminal – $Mg \rightarrow Mg^{2+} + 2e$ 1. *Terminal positif* – $2H^+ + 2e \rightarrow H_2$ 2. *Terminal negatif* – $Mg \rightarrow Mg^{2+} + 2e$	1 1
		(iv)	$Mg + 2H^+ \rightarrow Mg^{2+} + H_2$ • Correct chemical formula of reactants and products. *Formula kimia bagi bahan dan hasil tindak balas yang betul.* • Balanced ionic equation. *Persamaan ion yang seimbang.*	 1 1
			TOTAL / *JUMLAH*	20

Question *Soalan*			Answer *Jawapan*	Marks *Markah*
8.	(a)	(i)	$CaCO_3 + H_2SO_4 \rightarrow CaSO_4 + CO_2 + H_2O$ • Correct chemical formula of reactants and products. *Formula kimia bagi bahan dan hasil tindak balas yang betul.* • Balanced chemical equation. *Persamaan kimia yang seimbang.*	 1 1
		(ii)	1. Number of moles of $CaCO_3$ = 0.2 / [40 + 12 + 3(16)] = 0.002 mol 2. 1 mol of $CaCO_3$ produce 1 mol of CO_2 0.002 mol of $CaCO_3$ produce 0.002 mol of CO_2 3. Maximum volume of CO_2 = 0.002 × 24 = 0.048 dm^3 / 48 cm^3 1. *Bilangan mol* $CaCO_3$ = 0.2 / [40 + 12 + 3(16)] = 0.002 mol 2. 1 mol $CaCO_3$ *menghasilkan* 1 mol CO_2 0.002 mol $CaCO_3$ *menghasilkan* 0.002 mol CO_2 3. *Isi padu maksimum* CO_2 = 0.002 × 24 = 0.048 dm^3 / 48 cm^3	1 1 1
		(iii)	1. Set I = 48 / 100 = 0.48 cm^3s^{-1} 2. Set II = 48 / 60 = 0.80 cm^3s^{-1} 3. Set III = 48 / 30 = 1.60 cm^3s^{-1}	1 1 1
		(iv)	1. The higher the temperature of sulphuric acid, the higher the kinetic energy of hydrogen ions in collision. 2. The frequency of collision between calcium carbonate molecules and hydrogen ions increases. 3. The frequency of effective collision between calcium carbonate molecules and hydrogen ions increases. 4. The rate of reaction increases. 1. *Semakin tinggi suhu asid sulfurik, semakin tinggi tenaga kinetik ion-ion hidrogen dalam perlanggaran.* 2. *Frekuensi perlanggaran di antara molekul kalsium karbonat dan ion-ion hidrogen meningkat.* 3. *Frekuensi perlanggaran berkesan di antara molekul kalsium karbonat dan ion-ion hidrogen meningkat.* 4. *Kadar tindak balas meningkat.*	 1 1 1 1
		(v)	1. Rate of reaction in Set II is higher than Set I. 2. The size of calcium carbonate used in Set II is smaller than Set I. 3. The total surface area of calcium carbonate exposed to collision in Set II is larger than Set I. 4. The frequency of collision between calcium carbonate molecules and hydrogen ions in Set II is higher than Set I. 5. The frequency of effective collision between calcium carbonate molecules and hydrogen ions in Set II is higher than Set I. 1. *Kadar tindak balas dalam* Set II *lebih tinggi daripada* Set I. 2. *Saiz kalsium karbonat yang digunakan dalam* Set II *lebih kecil daripada* Set I. 3. *Jumlah luas permukaan kalsium karbonat terdedah kepada perlanggran dalam* Set II *lebih besar daripada* Set I. 4. *Frekuensi perlanggaran di antara molekul kalsium karbonat dan ion-ion hidrogen dalam* Set II *lebih tinggi daripada* Set I. 5. *Frekuensi perlanggaran berkesan di antara molekul kalsium karbonat dan ion-ion hidrogen dalam* Set II *lebih tinggi daripada* Set I.	1 1 1 1 1

	(b)		Energy *Tenaga*  • Exothermic graph *Graf eksotermik* • Label E_a and E_a' *Label E_a dan E_a'* • Chemical equation *Persamaan kimia*	1 1 1
			TOTAL / *JUMLAH*	20

Section C
***Bahagian* C**

<table>
<tr><th colspan="3">Question
Soalan</th><th>Answer
Jawapan</th><th>Marks
Markah</th></tr>
<tr><td>9.</td><td>(a)</td><td></td><td>
<table>
<tr><th>Reaction I</th><th>Reaction II</th></tr>
<tr><td>The reaction is endothermic.</td><td>The reaction is exothermic.</td></tr>
<tr><td>Heat energy is absorbed from the surroundings during the reaction.</td><td>Heat energy is released to the surroundings during the reaction.</td></tr>
<tr><td>Heat of reaction, ΔH = + kJmol^{-1}</td><td>Heat of reaction, ΔH = - kJmol^{-1}</td></tr>
<tr><td>Total energy content of the products is more than total energy content of the reactants.</td><td>Total energy content of the products is less than total energy content of the reactants.</td></tr>
<tr><td>The quantity of heat energy absorbed for bond breaking in the reactants is higher than heat energy released for the formation of bonds in the products.</td><td>The quantity of heat energy absorbed for bond breaking in the reactants is lower than heat energy released for the formation of bonds in the products.</td></tr>
</table>

<table>
<tr><th>Tindak balas I</th><th>Tindak balas II</th></tr>
<tr><td>Tindak balas endotermik.</td><td>Tindak balas eksotermik.</td></tr>
<tr><td>Tenaga haba diserap dari persekitaran semasa tindak balas.</td><td>Tenaga haba dibebaskan ke persekitaran semasa tindak balas.</td></tr>
<tr><td>Haba tindak balas, ΔH = + kJmol^{-1}</td><td>Haba tindak balas, ΔH = - kJmol^{-1}</td></tr>
<tr><td>Jumlah kandungan tenaga hasil tindak balas lebih daripada jumlah kandungan tenaga bahan tindak balas.</td><td>Jumlah kandungan tenaga hasil tindak balas kurang daripada jumlah kandungan tenaga bahan tindak balas.</td></tr>
<tr><td>Kuantiti tenaga haba yang diserap untuk pemecahan ikatan dalam bahan tindak balas adalah lebih tinggi daripada tenaga haba yang dibebaskan untuk pembentukan ikatan dalam hasil tindak balas.</td><td>Kuantiti tenaga haba yang diserap untuk pemecahan ikatan dalam bahan tindak balas adalah lebih rendah daripada tenaga haba yang dibebaskan untuk pembentukan ikatan dalam hasil tindak balas.</td></tr>
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Max 3</td></tr>
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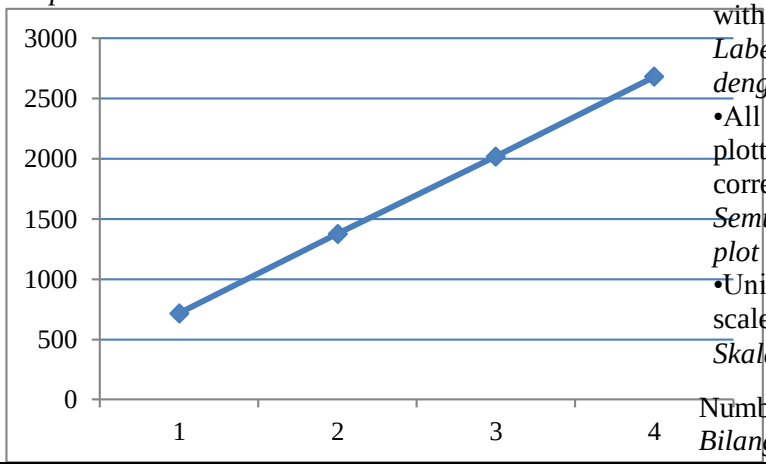
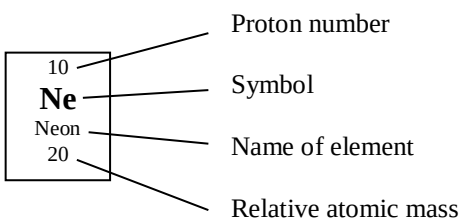
	(b)	(i)	Heat of combustion / kJmol^{-1} *Haba pembakaran* / kJmol^{-1}  Number of carbon atoms *Bilangan atom karbon*	•Label axis with unit *Label paksi dengan unit* •All points plotted correctly *Semua titik plot betul* •Uniform scale *Skala seragam*	1 1 1
		(ii)	When the number of carbon atoms per molecule of alcohol increases, the heat of combustion increases. *Apabila bilangan atom karbon per molekul alkohol bertambah, haba pembakaran bertambah.*	1
		(iii)	1. Fuel value of ethanol is 1376 / 46 = 29.91 kJg^{-1}. 2. Fuel value of butanol is 2679 / 74 = 36.20 kJg^{-1}. 3. Butanol is more efficient. 1. *Nilai bahan api bagi etanol adalah* 1376 / 46 = 29.91 kJg^{-1}. 2. *Nilai bahan api bagi butanol adalah* 2679 / 74 = 36.20 kJg^{-1}. 3. *Butanol merupakan bahan api yang lebih efisien.*	1 1 1
	(c)		Alcohol used: Methanol // Ethanol // Propanol *Alkohol yang digunakan*: *Metanol* // *Etanol* // *Propanol* Procedures: 1. 100 cm^3 of water is measured with measuring cylinder and poured into the copper can. 2. A thermometer is placed into the water and the initial temperature, T_1 is recorded. 3. A lamp is filled with methanol / ethanol / propanol. The lamp is weighed and the initial mass, m_1 is recorded. 4. The lamp is placed near the base of the copper can and the wick is lighted. 5. The water is stirred continuously with the thermometer until its temperature increased by 30 ℃, the flame is put off and the highest temperature, T_2 reached by the water is recorded. 6. The final mass of the lamp and its content, m_2 is weighed immediately and recorded. *Prosedur:* 1. 100 cm^3 *air disukat dengan silinder penyukat dan dituang ke dalam tin kuprum.* 2. *Termometer diletakkan di dalam air dan suhu awal,* T_1 *dicatat.* 3. *Pelita diisikan dengan metanol / etanol / propanol dan ditimbang. Jisim awalnya,* m_1 *dicatat.*	1 1 1 1 1 1 1

			4. *Pelita diletak dekat dengan tin kuprum dan sumbu pelita dinyalakan.* 5. *Air dikacau berterusan dengan termometer sehingga suhunya meningkat sebanyak* 30 ℃, *api dipadamkan dan suhu tertinggi,* T_2 *dicapai oleh air dicatat.* 6. *Jisim akhir pelita dan kandungannya,* m_2 *segera ditimbang dan dicatat.* Calculation: Number of moles of methanol = $(m_1 - m_2) / 32$ = n mol Heat given out = $mc(T_2 - T_1)$ = x J = x / 1000 kJ = y kJ Heat of combustion of methanol = y / n = - z $kJmol^{-1}$ *Pengiraan:* *Bilangan mol bagi metanol* = $(m_1 - m_2) / 32$ = n mol *Haba yang dibebaskan* = $mc(T_2 - T_1)$ = x J = x / 1000 kJ = y kJ *Haba pembakaran bagi metanol* = y / n = -z $kJmol^{-1}$	 1 1 1
			TOTAL / *JUMLAH*	20

Question *Soalan*			Answer *Jawapan*	Marks *Markah*
10	(a)		Experiment I 1. Solvent X: Water. 2. Hydrogen chloride gas ionises in water to produce hydrogen ions and chloride ions. 3. The presence of hydrogen ions causes the hydrochloric acid to react with magnesium to produce hydrogen gas. Experiment II 4. Solvent Y: Propanone // methylbenzene // trichloromethane // tetrachloromethane 5. In organic solvent, hydrogen chloride still exists as molecules. 6. Without the presence of hydrogen ion, the reaction does not occur. *Eksperimen* I 1. *Pelarut* X: *Air* 2. *Gas hidrogen klorida mengion dalam air untuk menghasilkan ion hidrogen dan ion klorida.* 3. *Kehadiran ion hidrogen menyebabkan asid hidroklorik bertindak balas dengan magnesium untuk menghasilkan gas hidrogen*. *Eksperimen* II 4. *Pelarut* Y: *Propanon // metilbenzena // triklorometana // tetraklorometana* 5. *Dalam pelarut organik, hidrogen klorida kekal wujud sebagai molekul*. 6. *Tanpa kehadiran ion hidrogen, tindak balas tidak berlaku*.	1 1 1 1 1 1
	(b)		1. Acid reacts with a base or alkali to produce salt and water. Hydrochloric acid reacts with sodium hydroxide solution to produce sodium chloride and water. $HCl + NaOH \rightarrow NaCl + H_2O$ *Asid bertindak balas dengan bes atau alkali untuk menghasilkan garam dan air.* *Asid hidroklorik bertindak balas dengan larutan natrium hidroksida untuk menghasilkan natrium klorida dan air.* $HCl + NaOH \rightarrow NaCl + H_2O$ 2. Acid reacts with a reactive metal to produce salt and hydrogen gas. Nitric acid reacts with magnesium to produce magnesium nitrate and hydrogen gas. $2HNO_3 + Mg \rightarrow Mg(NO_3)_2 + H_2$ *Asid bertindak balas dengan logam reaktif untuk menghasilkan garam dan gas hidrogen.* *Asid nitrik bertindak balas dengan magnesium untuk menghasilkan magnesium nitrat dan gas hidrogen.* $2HNO_3 + Mg \rightarrow Mg(NO_3)_2 + H_2$ 3. Acid reacts with a metal carbonate to produce salt, carbon dioxide gas and water. Sulphuric acid reacts with calcium carbonate to produce calcium sulphate, carbon dioxide gas and water. $H_2SO_4 + CaCO_3 \rightarrow CaSO_4 + CO_2 + H_2O$ *Asid bertindak balas dengan logam karbonat untuk menghasilkan garam, gas karbon dioksida dan air.*	1 1 1 + 1 Any Set Max 4

			Asid sulfurik bertindak balas dengan kalsium karbonat untuk menghasilkan kalsium sulfat, gas karbon dioksida dan air. $H_2SO_4 + CaCO_3 \rightarrow CaSO_4 + CO_2 + H_2O$ Note: Example of strong acid: HCl, HNO_3, H_2SO_4 *Nota: Contoh asid kuat:* HCl, HNO_3, H_2SO_4	
	(c)		Materials: Solid sodium hydroxide and distilled water Apparatus: 250 cm^3 volumetric flask, 50 cm^3 beaker, weighing bottle, electronic balance, glass rod and filter funnel *Bahan: Pepejal natrium hidroksida dan air suling* *Radas: Kelalang volumetrik* 250 cm^3, *bikar* 50 cm^3, *botol penimbang, penimbang elektronik, rod kaca dan corong turas* Calculation: Number of moles of NaOH = MV / 1000 = (1 × 250) / 1000 = 0.25 mol Mass of NaOH needed = 0.25 × [23 + 16 + 1] = 10 g *Pengiraan:* *Bilangan mol bagi* NaOH = MV / 1000 = (1 × 250) / 1000 = 0.25 mol *Jisim* NaOH *yang diperlukan* = 0.25 × [23 + 16 + 1] = 10 g Steps: 1. 10.0 g of solid sodium hydroxide is weighed in a dry weighing bottle. 2. Solid sodium hydroxide is transferred into a beaker containing 25 cm^3 of distilled water and the mixture is stirred to dissolve the solid. 3. The solution from the beaker is then carefully poured into a 250 cm^3 volumetric flask through a filter funnel. 4. The weighing bottle and the beaker are rinsed with a small amount of distilled water and poured into the volumetric flask. 5. Distilled water is poured into the volumetric flask until the calibration mark. 6. The volumetric flask is then closed with a stopper and inverted a few times to get homogenous solution. *Langkah-langkah:* 1. 10.0 g *pepejal natrium hidroksida ditimbang dalam botol penimbang yang kering.* 2. *Pepejal natrium hidroksida dipindahkan ke dalam bikar yang mengandungi* 25 cm^3 *air suling dan campuran itu dikacau untuk melarutkan pepejal.* 3. *Larutan daripada bikar dituang dengan berhati-hati ke dalam satu kelalang volumetrik* 250 cm^3 *melalui satu corong turas.* 4. *Botol penimbang dan bikar dibilas dengan sedikit air dan dituang ke dalam kelalang volumetrik.* 5. *Air suling dituang ke dalam kelalang volumetrik sehingga tanda senggatan.* 6. *Kelalang volumetrik kemudiannya ditutup dengan penutup dan diterbalikkan beberapa kali untuk mendapatkan larutan homogen.*	1 1 1 1 1 1 1 1 1 1
			TOTAL / *JUMLAH*	20

END OF ANSWER PAPER / *JAWAPAN TAMAT*



																2 **He** Helium 4
3 **Li** Lithium 7	4 **Be** Beryllium 9										5 **B** Boron 11	6 **C** Carbon 12	7 **N** Nitrogen 14	8 **O** Oxygen 16	9 **F** Fluorine 19	10 **Ne** Neon 20
11 **Na** Sodium 23	12 **Mg** Magnesium 24										13 **Al** Aluminium 27	14 **Si** Silicon 28	15 **P** Phosphorus 31	16 **S** Sulphur 32	17 **Cl** Chlorine 35	18 **Ar** Argon 40
19 **K** Potassium 39	20 **Ca** Calcium 40	21 **Sc** Scandium 45	22 **Ti** Titanium 48	23 **V** Vanadium 51	24 **Cr** Chromium 52	25 **Mn** Manganese 55	26 **Fe** Iron 56	27 **Co** Cobalt 59	28 **Ni** Nickel 59	29 **Cu** Copper 64	30 **Zn** Zinc 65	31 **Ga** Gallium 70	32 **Ge** Germa-nium 73	33 **As** Arsenic 75	34 **Se** Selenium 79	35 **Br** Bromine 80	36 **Kr** Krypton 84
37 **Rb** Rubidium 86	38 **Sr** Strontium 88	39 **Y** Yttrium 89	40 **Zr** Zirconium 91	41 **Nb** Niobium 93	42 **Mo** Molyb-denum 96	43 **Tc** Technetium 98	44 **Ru** Ruthenium 101	45 **Rh** Rhodium 103	46 **Pd** Palladium 106	47 **Ag** Silver 108	48 **Cd** Cadmium 112	49 **In** Indium 115	50 **Sn** Tin 119	51 **Sb** Antimony 122	52 **Te** Tellurium 128	53 **I** Iodine 127	54 **Xe** Xenon 131
55 **Cs** Caesium 133	56 **Ba** Barium 137	57 **La** Lanthanum 139	72 **Hf** Hafnium 179	73 **Ta** Tantalum 181	74 **W** Tungsten 184	75 **Re** Rhenium 186	76 **Os** Osmium 190	77 **Ir** Iridium 192	78 **Pt** Platinum 195	79 **Au** Gold 197	80 **Hg** Mercury 201	81 **Tl** Thallium 204	82 **Pb** Lead 207	83 **Bi** Bismuth 209	84 **Po** Polonium 210	85 **At** Astatine 210	86 **Rn** Radon 222
87 **Fr** Francium 223	88 **Ra** Radium 226	89 **Ac** Actinium 227	104 **Unq** Unnil–quadium 257	105 **Unp** Unnil–pentium 260	106 **Unh** Unnil-hexium 263	107 **Uns** Unni-lseptium 262	108 **Uno** Unni-loctium 265	109 **Une** Unni-lennium 266									

58 **Ce** Cerium 140	59 **Pr** Praseo–dymium 141	60 **Nd** Neodymium 144	61 **Pm** Promethium 147	62 **Sm** Samarium 150	63 **Eu** Europium 152	64 **Gd** Gadoliniu m 157	65 **Tb** Terbium 167	66 **Dy** Dyprosium 163	67 **Ho** Holmium 165	68 **Er** Erbium 167	69 **Tm** Thulium 169	70 **Yb** Ytterbium 173	71 **Lu** Lutetium 175
90 **Th** Thorium 232	91 **Pa** Protactinium 231	92 **U** Uranium 238	93 **Np** Neptunium 237	94 **Pu** Plutonium 244	95 **Am** Americium 243	96 **Cm** Curium 247	97 **Bk** Berkelium 247	98 **Cf** Califor-nium 249	99 **Es** Einsteinium 254	100 **Fm** Fermium 253	101 **Md** Mendele-vium 256	102 **No** Nobelium 254	103 **Lr** Lawren-cium 257