

MODUL PINTAS
TINGKATAN 5
aDiN
KIMIA
Kertas 2

4541/2

2 $\frac{1}{2}$ jam

Dua jam tiga puluh minit

PERATURAN PEMARKAHAN
KIMIA K2
4541/2

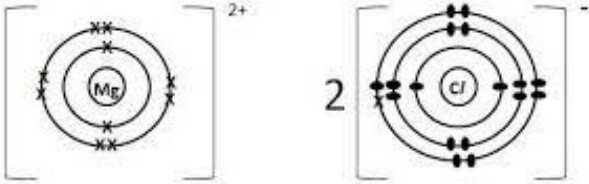
Bahagian A
Section A

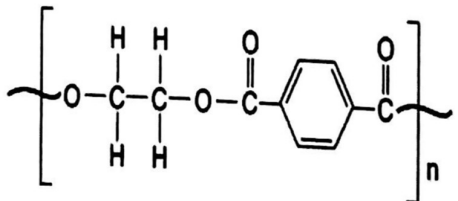
Soalan <i>Question</i>		Jawapan <i>Answer</i>	Markah <i>Marks</i>
1.	(a)	Jumlah bilangan proton dan neutron di dalam nukleus sesuatu atom. <i>The total number of protons and neutrons in the nucleus of an atom.</i>	1
	(b)	12	1
	(c)	•T dan U •Atom-atom dari unsur yang sama dan mempunyai bilangan proton yang sama tetapi bilangan neutron yang berbeza.	1
		•T and U •Atoms from the same element and have the same number of protons but different number of neutrons.	1
	(d)	Untuk mengesan kebocoran paip bawah tanah. <i>To detect the leakage of underground pipe.</i>	1
		JUMLAH / TOTAL	5

aDiN

Soalan <i>Question</i>			Jawapan <i>Answer</i>	Markah <i>Marks</i>
2.	(a)	(i)	Gangsa <i>Bronze</i>	1
		(ii)	<ul style="list-style-type: none"> •Saiz atom stanum yang berlainan mengganggu susunan atom yang teratur dalam logam tulen. •Lapisan atom di dalam aloi sukar menggelongsor di atas satu sama lain apabila dikenakan daya. •<i>The different atomic sizes of tin disturbs the orderly arrangement of atoms in pure metals.</i> •<i>The atomic layers in an alloy are difficult to slide on top of each other when subjected to a force.</i> 	1 1
	(b)		Y: Konkrit diperkukuhkan <i>Reinforced concrete</i> Z: Keluli <i>Steel</i>	1 1
			JUMLAH / <i>TOTAL</i>	5

Soalan <i>Question</i>			Jawapan <i>Answer</i>				Markah <i>Marks</i>
3.	(a)	(i)	Formula kimia yang menunjukkan nisbah mol teringkas bagi bilangan atom setiap unsur dalam suatu molekul sebatian. <i>A chemical formula that shows the simplest mole ratio for the number of atoms of each element in a molecule of a compound.</i>				1
		(ii)	Atom <i>Atom</i>	C	H	O	1 1 1
			Jisim, g <i>Mass, g</i>	40.00	6.67	53.33	
			Bilangan mol, mol <i>Number of mole, mol</i>	$\frac{40.00}{12}$ = 3.33	$\frac{6.67}{1}$ = 6.67	$\frac{53.33}{16}$ = 3.33	
			Nisbah mol teringkas <i>Simplest mole ratio</i>	$\frac{3.33}{3.33}$ = 1	$\frac{6.67}{3.33}$ = 2	$\frac{3.33}{3.33}$ = 1	
			Formula empirik = CH ₂ O <i>Empirical formula</i>				
	(b)	$(\text{CH}_2\text{O})_n = 180$ $[12 + 2(1) + 16]_n = 180$ $30n = 180$ $n = 6$ Formula molekul P = C ₆ H ₁₂ O ₆ <i>Molecular formula P = C₆H₁₂O₆</i>				1 1	
			JUMLAH / TOTAL				6

Soalan <i>Question</i>		Jawapan <i>Answer</i>	Markah <i>Marks</i>
4.	(a)	Kala 3 <i>Period 3</i>	1
	(b)	2.8	1
	(c)	(i) <ul style="list-style-type: none"> •Natrium oksida: Na₂O •<i>Sodium oxide</i>: Na₂O •Sulfur dioksida: SO₂ •<i>Sulphur dioxide</i>: SO₂ 	1 1
		(ii) Natrium oksida bersifat bes manakala sulfur dioksida bersifat asid. <i>Sodium oxide is basic while sulphur dioxide is acidic.</i>	1
	(d)	 <ul style="list-style-type: none"> •Bilangan petala dan elektron yang betul •<i>Correct number of shells and electrons</i> •Label nukleus •<i>Label nucleus</i> 	1 1
aDiN		JUMLAH / <i>TOTAL</i>	7

Soalan <i>Question</i>			Jawapan <i>Answer</i>	Markah <i>Marks</i>
5.	(a)	(i)	X: Getah tak tervulkan <i>Unvulcanised rubber</i> Y: Getah tervulkan <i>Vulcanised rubber</i>	1 1
		(ii)	<ul style="list-style-type: none"> •Pembentukan •<i>Vulcanisation</i> •Sulfur dipanaskan bersama dengan getah asli / Jalur getah direndam dengan larutan disulfur diklorida dalam metilbenzena untuk beberapa jam dan kemudian dikeringkan. •<i>Sulphur is heated together with natural rubber / Rubber stripe is soaked in disulphur dichloride solution in methylbenzene for a few hours and then dried.</i> 	1 1
		(iii)	Getah Y lebih kenyal / lebih keras / lebih tahan suhu yang tinggi daripada getah X <i>Rubber Y is more elastic / more harder / more resistant to high heat than rubber X</i>	1
	(b)	(i)	Pempolimeran kondensasi <i>Condensation polymerisation</i>	1
		(ii)	 <ul style="list-style-type: none"> •Melukis formula struktur polimer dengan betul •<i>Draw the structural formula of the polymer correctly</i> •Menulis [] dan n •<i>Write [] and n</i> 	1 1
JUMLAH / <i>TOTAL</i>				8

Soalan <i>Question</i>			Jawapan <i>Answer</i>	Markah <i>Marks</i>
6.	(a)	(i)	Kosmetik ialah bahan atau produk yang digunakan secara luaran untuk membersihkan, melindungi atau mencantikkan penampilan seseorang. <i>Cosmetics are materials or products that are used externally to cleanse, protect or enhance one's appearances.</i>	1
		(ii)	Pewarna / air / pengawet / pelembab / pewangi / pengemulsi / pemekat (pilih mana-mana dua) <i>Dyes / water / preservatives / moisturisers / fragrances / emulsifiers / thickeners (choose any two)</i>	1 + 1
	(b)	(i)	Kulit merengsa / kerosakan ginjal / pengurangan pigmentasi mengakibatkan pendedahan kulit kepada sinaran UV / kulit menjadi hipersensitif (pilih mana-mana dua) <i>Skin irritation / kidney damage / reduction of pigmentation results in skin exposure to UV rays / skin becomes hypersensitive (choose any two)</i>	1 + 1
		(ii)	Guna kosmetik buatan sendiri yang mengandungi bahan semulajadi / baca label dan faham kandungan sesuatu kosmetik sebelum menggunakannya <i>Use homemade cosmetics that contain natural ingredients / read the label and understand the content of a cosmetic before using it</i>	1
	(c)	(i)	Asid benzoik menghalang sos cili daripada rosak dengan memperlahankan pertumbuhan mikroorganisma. <i>Benzoic acid prevents chili sauces from being spoilt by slowing down the growth of microorganism.</i>	1
		(ii)	Keguguran rambut / pening kepala <i>Falling hair / headache</i>	1
		(iii)	Melambatkan pengoksidaan lemak dalam makanan. <i>Slow down the oxidation of fats in food.</i>	1
			JUMLAH / TOTAL	9

Soalan <i>Question</i>		Jawapan <i>Answer</i>	Markah <i>Marks</i>
7.	(a)	<ul style="list-style-type: none"> •Gambarajah berfungsi •<i>Functional diagram</i> •Gambarajah berlabel •<i>Labelled diagram</i> 	1 1
	(b) (i)	$Q = (200)(4.2)(62 - 28)$ $= 28560 \text{ J} / 28.56 \text{ kJ}$	1
	(ii)	$\text{Bilangan mol, etanol} = \frac{1.15}{2(12) + 5(1) + 16 + 1} = 0.025 \text{ mol}$ <i>Number of moles, ethanol</i>	1
	(iii)	$\Delta H = -1142.4 \text{ kJ mol}^{-1}$	1
	(iv)	Sebahagian haba hilang ke persekitaran. <i>Some of the heat is lost to the surrounding.</i>	1
	(c) (i)	Nilai haba pembakaran bagi diesel lebih tinggi daripada gasolin. <i>The value of heat of combustion for diesel is higher than gasoline.</i>	1
	(ii)	<ul style="list-style-type: none"> •Bilangan atom karbon dalam molekul diesel lebih banyak berbanding dengan gasolin. •Bilangan molekul karbon dioksida dan air yang dihasilkan semasa pembakaran diesel lebih tinggi berbanding dengan gasolin. •Lebih banyak ikatan dalam molekul karbon dioksida dan air terbentuk semasa pembakaran diesel maka lebih banyak haba dibebaskan. •<i>The number of carbon atoms in a diesel molecule is more than that of gasoline.</i> •<i>The number of molecules of carbon dioxide and water produced during the combustion of diesel is higher than that of gasoline.</i> •<i>The more bonds in the carbon dioxide and water molecules are formed during diesel combustion the more heat is released.</i> 	1 1 1
		JUMLAH / TOTAL	10

Soalan <i>Question</i>			Jawapan <i>Answer</i>	Markah <i>Marks</i>
8.	(a)	(i)	Air <i>Water</i>	1
		(ii)	Molekul HCl mengion dalam air untuk menghasilkan ion hidrogen dan ion klorida yang bebas bergerak. <i>HCl molecules ionize in water to produce free moving hydrogen ions and chloride ions.</i>	1
	(b)	(i)	$H_2SO_4 + 2KOH \rightarrow K_2SO_4 + 2H_2O$ •Formula kimia bahan dan hasil tindak balas yang betul • <i>Correct chemical formula of reactants and products</i> •Persamaan kimia yang seimbang • <i>Balanced chemical equation</i>	1 1
		(ii)	Bilangan mol KOH = $\frac{(0.1)(50)}{1000} = 0.005 \text{ mol}$ <i>Number of moles KOH</i> 1 mol H ₂ SO ₄ : 2 mol KOH 0.0025 mol H ₂ SO ₄ : 0.005 mol KOH Kemolaran H ₂ SO ₄ = $\frac{(0.0025)(1000)}{25} = 0.1 \text{ mol dm}^{-3}$ <i>Molarity H₂SO₄</i>	1 1 1
		(iii)	•Tambah 2 cm ³ asid hidroklorik cair ke dalam tabung uji yang mengandungi 2 cm ³ larutan garam. • <i>Add 2 cm³ of dilute hydrochloric acid into the test tube containing 2 cm³ of salt solution.</i> •Tambah larutan barium klorida ke dalam tabung uji. • <i>Add barium chloride solution into the test tube.</i> •Mendakan putih terbentuk mengesahkan kehadiran ion SO ₄ ²⁻ . • <i>White precipitate formed confirms the present of SO₄²⁻ ions.</i>	1 1 1
			JUMLAH / TOTAL	10

Bahagian B
Section B

Soalan <i>Question</i>		Jawapan <i>Answer</i>	Markah <i>Marks</i>
9.	(a)	P1: Situasi B <i>Situation B</i> P2: Saiz kepingan daging / Jumlah luas permukaan yang terdedah <i>Size of meat slice / Total surface area exposed</i>	1 1
	(b)	(i) P1: Perubahan isi padu gas Y per unit masa. <i>Change of volume of gas Y per unit time.</i>	1
		(ii) $\text{CaCO}_3 + 2\text{HCl} \rightarrow \text{CaCl}_2 + \text{CO}_2 + \text{H}_2\text{O}$ P1: Formula bahan dan hasil tindak balas yang betul <i>Correct formula of reactants and products</i> P2: Persamaan kimia yang seimbang <i>Balanced chemical equation</i> P3: Gas Y - Karbon dioksida <i>Gas Y - Carbon dioxide</i> P4: Bilangan mol HCl = $\frac{(1.0)(50)}{1000} = 0.05 \text{ mol}$ <i>Number of moles HCl</i> P5: 2 mol HCl : 1 mol CO ₂ 0.05 mol HCl : 0.025 mol CO ₂ P6: Isi padu CO ₂ = $0.025 \times 24 = 0.6 \text{ dm}^3$ <i>Volume CO₂</i>	1 1 1 1 1 1
		(iii) P1: Set I = $2 \text{ cm}^3 \text{ s}^{-1}$ P2: Set II = $1 \text{ cm}^3 \text{ s}^{-1}$	1 1
		(iv) P1: Kadar tindak balas Set I lebih tinggi daripada Set II. <i>Rate of reaction of Set I is higher than Set II.</i> P2: Kepekatan asid hidroklorik dalam Set I lebih tinggi daripada Set II. <i>Concentration of hydrochloric acid in Set I is higher than Set II.</i> P3: Bilangan ion H ⁺ per unit isi padu dalam Set I lebih tinggi daripada Set II. <i>Number of H⁺ ions per unit volume in Set I is higher than Set II.</i> P4: Frekuensi perlanggaran antara kalsium karbonat dan ion H ⁺ lebih tinggi dalam Set I. <i>Frequency of collision between calcium carbonate and H⁺ ions is higher in Set I.</i> P5: Frekuensi perlanggaran berkesan antara kalsium karbonat dan ion H ⁺ lebih tinggi dalam Set I. <i>Frequency of effective collision between calcium carbonate and H⁺ ions is higher in Set I.</i>	1 1 1 1 1
		(v) P1: Tenaga kinetik zarah semakin bertambah apabila suhu meningkat. <i>The kinetic energy of particles increases when temperature increases.</i> P2: Frekuensi perlanggaran antara kalsium karbonat dan ion H ⁺ meningkat. <i>Frequency of collision between calcium carbonate and H⁺ ions increases.</i> P3: Frekuensi perlanggaran berkesan antara kalsium karbonat dan ion H ⁺ meningkat. <i>Frequency of effective collision between calcium carbonate and H⁺ ions increases.</i> P4: Kadar tindak balas meningkat. <i>Rate of reaction increases.</i>	1 1 1 1
		JUMLAH / TOTAL	20

Soalan <i>Question</i>			Jawapan <i>Answer</i>	Markah <i>Marks</i>
10.	(a)	(i)	P1: Molekul yang mempunyai formula molekul yang sama tetapi formula struktur yang berbeza. <i>Molecules that have the same molecular formula but different structural formula.</i>	1
		(ii)	P1: $\begin{array}{cccc} \text{H} & \text{H} & \text{H} & \text{H} \\ & & & \\ \text{H}-\text{C} & -\text{C} & =\text{C} & -\text{C}-\text{H} \\ & & & \\ \text{H} & & & \text{H} \end{array}$ P2: But-2-ena <i>But-2-ene</i> P3: $\begin{array}{ccc} & \text{H} & \\ & & \\ \text{H} & -\text{C} & -\text{H} \\ & & \\ \text{H} & & \text{H} \\ & & \\ \text{H}-\text{C} & =\text{C} & -\text{C}-\text{H} \\ & & \\ & & \text{H} \end{array}$ P4: 2-metilpropena <i>2-methylpropene</i>	1 1 1
		(iii)	C ₄ H ₈ + 6O ₂ → 4CO ₂ + 4H ₂ O P1: Formula kimia bahan dan hasil tindak balas yang betul <i>Correct chemical formula of reactants and products</i> P2: Persamaan kimia yang seimbang <i>Balanced chemical equation</i> P3: $\frac{1.2}{24} = 0.05 \text{ mol}$ P4: 1 mol C ₄ H ₈ : 6 mol O ₂ 0.05 mol C ₄ H ₈ : 0.3 mol O ₂ P5: $0.3 \times 24 = 7.2 \text{ dm}^3 / 7200 \text{ cm}^3$	1 1 1 1 1
	(b)		P1: Proses I - Pendehidratan <i>Process I - Dehydration</i> P2: Proses II - Penghidrogenan <i>Process II - Hydrogenation</i> P3: Proses III - Pengoksidaan <i>Process III - Oxidation</i> P4: Proses IV - Pengesteran <i>Process IV - Esterification</i> P5: Sebatiannya P - Alkena <i>Compound P - Alkenes</i> P6: Sebatiannya Q - Alkana <i>Compound Q - Alkanes</i> P7: Sebatiannya R - Asid karboksilik <i>Compound R - Carboxylic acid</i> P8: Sebatiannya S - Ester <i>Compound S - Ester</i> P9: Sebatiannya P <i>Compound P</i> $\begin{array}{ccc} & \text{H} & \\ & & \\ \text{H} & -\text{C} & -\text{C}-\text{H} \\ & & \\ \text{H} & & \text{H} \end{array}$	1 1 1 1 1 1 1 1

		<p>P10: Sebatian S Compound S</p>	1
		JUMLAH / TOTAL	20

Bahagian C
Section C

Soalan <i>Question</i>			Jawapan <i>Answer</i>	Markah <i>Marks</i>															
11.	(a)	(i)	P1: Tindak balas pengoksidaan dan penurunan berlaku serentak. <i>The oxidation and reduction reactions occur simultaneously.</i>	1															
		(ii)	P1: Larutan ferum(II) sulfat - Agen penurunan <i>Iron(II) sulphate solution - Reducing agent</i>	1															
			P2: Larutan kalium manganat(VII) berasid - Agen pengoksidaan <i>Acidified potassium manganate(VII) solution - Oxidising agent</i>	1															
			MnO ₄ ⁻ + 8H ⁺ + 5e ⁻ → Mn ²⁺ + 4H ₂ O P3: Formula kimia bahan dan hasil tindak balas yang betul <i>Correct chemical formula of reactants and products</i>	1															
			P4: Setengah persamaan yang seimbang <i>Balanced half equation</i>	1															
	(b)		P1: Elektrod karbon X - Nilai E ⁰ <i>Carbon electrode X - E⁰ value</i>	1															
			P2: Elektrod karbon Y - Kepekatan ion dalam larutan <i>Carbon electrode Y - Concentration of ions in solution</i>	1															
			<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Elektrod <i>Electrodes</i></th> <th style="text-align: center;">X</th> <th style="text-align: center;">Y</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Ion-ion yang tertarik ke elektrod <i>Ions that attracted to electrodes</i></td> <td style="text-align: center;">P3: Na⁺, H⁺</td> <td style="text-align: center;">P4: OH⁻, Cl⁻</td> </tr> <tr> <td style="text-align: center;">Ion yang dipilih untuk dinyahcas <i>Ions that are selectively discharged</i></td> <td style="text-align: center;">P5: H⁺</td> <td style="text-align: center;">P6: Cl⁻</td> </tr> <tr> <td style="text-align: center;">Sebab ion dipilih untuk dinyahcas <i>Reason ions are selectively discharged</i></td> <td style="text-align: center;">P7: Nilai E⁰ ion H⁺ adalah lebih positif daripada nilai E⁰ ion Na⁺ <i>E⁰ value of H⁺ ion is more positive than E⁰ value of Na⁺ ion</i></td> <td style="text-align: center;">P8: Kepekatan ion Cl⁻ lebih tinggi daripada ion OH⁻ dalam larutan <i>Concentration of Cl⁻ ions is higher than OH⁻ ions in the solution</i></td> </tr> <tr> <td style="text-align: center;">Setengah persamaan <i>Half equations</i></td> <td style="text-align: center;">P9: 2H⁺ + 2e⁻ → H₂</td> <td style="text-align: center;">P10: 2Cl⁻ → Cl₂ + 2e⁻</td> </tr> </tbody> </table>	Elektrod <i>Electrodes</i>	X	Y	Ion-ion yang tertarik ke elektrod <i>Ions that attracted to electrodes</i>	P3: Na ⁺ , H ⁺	P4: OH ⁻ , Cl ⁻	Ion yang dipilih untuk dinyahcas <i>Ions that are selectively discharged</i>	P5: H ⁺	P6: Cl ⁻	Sebab ion dipilih untuk dinyahcas <i>Reason ions are selectively discharged</i>	P7: Nilai E ⁰ ion H ⁺ adalah lebih positif daripada nilai E ⁰ ion Na ⁺ <i>E⁰ value of H⁺ ion is more positive than E⁰ value of Na⁺ ion</i>	P8: Kepekatan ion Cl ⁻ lebih tinggi daripada ion OH ⁻ dalam larutan <i>Concentration of Cl⁻ ions is higher than OH⁻ ions in the solution</i>	Setengah persamaan <i>Half equations</i>	P9: 2H ⁺ + 2e ⁻ → H ₂	P10: 2Cl ⁻ → Cl ₂ + 2e ⁻	1 + 1
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				1 + 1															
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	(c)		P1: Bersihkan / gosok dengan kertas pasir <i>Clean / rub with sand paper</i>	1															
			P2: Untuk menanggalkan karat <i>To remove the rust</i>	1															
			P3: Semburkan gris / cecair antirust <i>Spray grease / antirust liquid</i>	1															
			P4: Sapukan cat pada permukaan pemegang tangga <i>Apply / coated paint at the stair holder surface</i>	1															
			P5: Untuk mengelakkan besi berkarat <i>To prevent rusting of iron</i>	1															
aDiN			JUMLAH / TOTAL	20															

JAWAPAN TAMAT
END OF ANSWER PAPER