



**MODUL PINTAS
TINGKATAN 5**

4541/2

**KIMIA
Kertas 2**

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

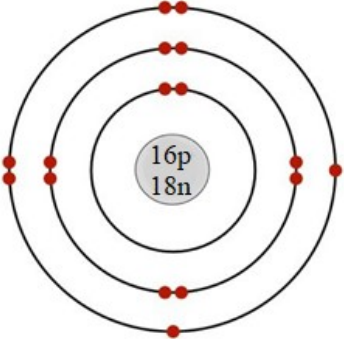
Dua jam tiga puluh minit

PERATURAN PEMARKAHAN

KIMIA K2

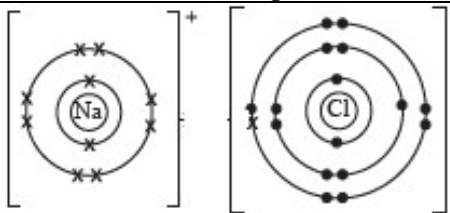
4541/2

Bahagian A
Section A

Soalan <i>Question</i>		Jawapan <i>Answer</i>	Markah <i>Marks</i>
1.	(a)	Isotop ialah atom-atom bagi unsur yang sama dengan mempunyai bilangan proton / nombor proton yang sama tetapi bilangan neutron / nombor nukleon yang berbeza. <i>Isotopes are atoms of the same element with the same number of protons / proton number but different number of neutrons / nucleon number.</i>	1
	(b)	17	1
	(c)	 <p>P1: Nukleus ditunjukkan dan bilangan petala elektron yang betul P2: Bilangan elektron yang betul dan labelkan proton dan neutron dalam nukleus <i>P1: Nucleus is shown and correct number of electron shell</i> <i>P2: Correct number of electron and label proton and neutron in the nucleus</i></p>	2
	(d)	32	1
JUMLAH / TOTAL			5

Soalan <i>Question</i>			Jawapan <i>Answer</i>	Markah <i>Marks</i>
2.	(a)	(i)	Bahan komposit <i>Composite material</i>	1
		(ii)	Pembinaan bangunan / jambatan <i>Construction of buildings / bridges</i>	1
	(b)		Ringan dan kuat <i>Light and strong</i>	1
	(c)	(i)	Seramik termaju <i>Advanced ceramic</i>	1
		(ii)	Keras / Tahan kepada lelasan <i>Hard / resistant to abrasion</i>	1
			JUMLAH / <i>TOTAL</i>	5

Soalan <i>Question</i>		Jawapan <i>Answer</i>		Markah <i>Marks</i>												
3.	(a)	Formula kimia yang menunjukkan nisbah teringkas bagi bilangan atom setiap unsur yang terdapat dalam sebatian. <i>Chemical formula that shows the simplest ratio of number of atoms of each element in a compound.</i>		1												
	(b)	<table border="1"> <thead> <tr> <th>Unsur <i>Element</i></th> <th>Cu</th> <th>O</th> </tr> </thead> <tbody> <tr> <td>Jisim (g) <i>Mass (g)</i></td> <td>147.95 – 135.15 = 12.8</td> <td>151.15 – 147.95 = 3.2</td> </tr> <tr> <td>Bilangan mol, mol <i>Number of mole, mol</i></td> <td>$\frac{12.8}{64}$ = 0.2</td> <td>$\frac{3.2}{16}$ = 0.2</td> </tr> <tr> <td>Nisbah mol teringkas <i>Simplest mole ratio</i></td> <td>1</td> <td>1</td> </tr> </tbody> </table>	Unsur <i>Element</i>	Cu	O	Jisim (g) <i>Mass (g)</i>	147.95 – 135.15 = 12.8	151.15 – 147.95 = 3.2	Bilangan mol, mol <i>Number of mole, mol</i>	$\frac{12.8}{64}$ = 0.2	$\frac{3.2}{16}$ = 0.2	Nisbah mol teringkas <i>Simplest mole ratio</i>	1	1	 Formula empirik: CuO <i>Empirical formula</i>	1 1 1 1
Unsur <i>Element</i>	Cu	O														
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Nisbah mol teringkas <i>Simplest mole ratio</i>	1	1														
	(c)	Magnesium adalah lebih reaktif daripada hidrogen. <i>Magnesium is more reactive than hydrogen.</i>		1												
JUMLAH / TOTAL				6												

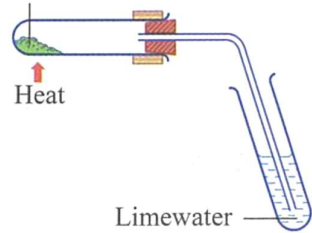
Soalan <i>Question</i>		Jawapan <i>Answer</i>	Markah <i>Marks</i>
4.	(a)	P1: Argon / Ar P2: Atom argon telah mencapai susunan elektron oktet yang stabil <i>P1: Argon / Ar</i> <i>P2: Atom of argon has achieved a stable octet electron arrangement</i>	1 1
	(b)	P1: Nombor proton bertambah satu unit dari natrium ke klorin P2: Daya tarikan proton dalam nukleus terhadap elektron dalam petala semakin kuat <i>P1: The proton number increases by one unit from sodium to chlorine</i> <i>P2: The force of attraction of the proton in the nucleus to the electrons in the shells becomes stronger</i>	1 1
	(c) (i)	 <p>P1: Bilangan elektron dan petala yang betul P2: Label nukleus <i>P1: Correct number of electrons and shells</i> <i>P2: Label nucleus</i></p>	2
	(ii)	Larut dalam air / <i>Soluble in water</i> Tidak larut dalam pelarut organik / <i>Insoluble in organic solvents</i> Mempunyai takat lebur dan takat didih yang tinggi / <i>High melting and boiling point</i> Boleh mengkonduksikan elektrik dalam keadaan lebur dan akueus / <i>Can conduct electricity in molten state and aqueous</i>	1
		JUMLAH / <i>TOTAL</i>	7

Soalan <i>Question</i>		Jawapan <i>Answer</i>	Markah <i>Marks</i>
5.	(a)	X: Magnesium / Aluminium / Zink Y: Timah / Plumbum / Kuprum / Argentum <i>X: Magnesium / Aluminium / Zinc Y: Tin / Lead / Copper / Silver</i>	1 1
	(b)	P1: Logam X adalah lebih elektropositif daripada besi P2: Logam X dioksidakan tetapi bukan besi, pengurangan dicegah <i>P1: Metal X is more electropositive than iron P2: Metal X is oxidised instead of iron, rusting is prevented</i>	1 1
	(c)	$\text{Fe} \rightarrow \text{Fe}^{2+} + 2\text{e}^-$	1
	(d)	Y, Fe, X	1
	(e)	P1: Besi lebih elektropositif daripada timah P2: Besi terdedah kepada oksigen dan air apabila lapisan timah terkoyak, pengurangan berlaku <i>P1: Iron is more electropositive than tin P2: Iron is exposed to oxygen and water when the tin later is torn, rusting occurs</i>	1 1
			JUMLAH / <i>TOTAL</i>

Soalan <i>Question</i>		Jawapan <i>Answer</i>	Markah <i>Marks</i>
6.	(a)	Haba peneutralan ialah perubahan haba apabila satu mol air terbentuk daripada tindak balas peneutralan antara asid dan alkali <i>The heat of neutralisation is the heat change when one mole of water is formed from the reaction between an acid and an alkali</i>	1
	(b)	$H^+ + OH^- \rightarrow H_2O$	1
	(c)	P1: Perubahan haba / <i>Heat change</i> = $(100 \times 4.2 \times 13.5) \text{ J}$ // 5670 J P2: Bilangan mol air / <i>Number of moles of water</i> = $(50 \times 2) / 1000$ // 0.1 mol P3: Haba peneutralan / <i>Heat of neutralisation</i> = $5670 / 0.1$ = $-56700 \text{ J mol}^{-1}$ / $-56.7 \text{ kJ mol}^{-1}$	1 1 1
	(d)	P1: Kenaikan suhu bagi Set I lebih tinggi daripada Set II P2: Asid Y merupakan asid lemah yang mengion separa dalam air dan sebahagiannya kekal sebagai molekul P3: Sebahagian haba dibebaskan semasa peneutralan diserap dan digunakan untuk mengion molekul asid lemah di dalam air <i>P1: The temperature increase for Set I is higher than Set II</i> <i>P2: Acid Y is a weak acid which ionise partially in water and some remain as molecules</i> <i>P3: Some of the heat released during neutralisation is absorbed and used to ionise the weak acid in water</i>	1 1 1
	(e)	Ulang Set I dengan menggunakan 50 cm^3 asid X 4.0 mol dm^{-3} dan 50 cm^3 larutan natrium hidroksida 4.0 mol dm^{-3} <i>Repeat Set I by using 50 cm^3 of 4.0 mol dm^{-3} acid X and 50 cm^3 of 4.0 mol dm^{-3} sodium hydroxide solution</i>	1
		JUMLAH / <i>TOTAL</i>	9

Soalan <i>Question</i>			Jawapan <i>Answer</i>	Markah <i>Marks</i>
7.	(a)	(i)	Kadar tindak balas ialah perubahan isi padu gas hidrogen per unit masa. <i>The rate of reaction is the change of volume of hydrogen gas per unit time.</i>	1
		(ii)	$Zn + 2HCl \rightarrow ZnCl_2 + H_2$ P1: Formula bahan dan hasil tindak balas yang betul P2: Persamaan kimia seimbang <i>P1: Correct formula of reactants and products</i> <i>P2: Balanced chemical equation</i>	2
		(iii)	Larutan kuprum(II) sulfat ditambahkan / Eksperimen dijalankan pada suhu yang lebih tinggi <i>Copper(II) sulphate solution is added / Experiment is carried out at higher temperature</i>	1
		(iv)	Larutan kuprum(II) sulfat ditambahkan P1: Mangkin menyediakan satu lintasan alternatif yang memerlukan tenaga pengaktifan yang lebih rendah bagi tindak balas Set II. P2: Lebih banyak zarah berlanggar dapat mencapai tenaga pengaktifan yang lebih rendah dalam Set II. P3: Frekuensi perlanggaran berkesan antara atom zink dan ion hidrogen lebih tinggi dalam Set II. <i>Copper(II) sulphate solution is added</i> <i>P1: Catalyst provides an alternative pathway that requires a lower activation energy for the reaction in Set II.</i> <i>P2: More colliding particles can achieve the lower activation energy in Set II.</i> <i>P3: Frequency of effective collisions between zinc atom and hydrogen ions is higher in Set II.</i> Eksperimen dijalankan pada suhu yang lebih tinggi P1: Tenaga kinetik zarah-zarah yang terdedah kepada perlanggaran lebih tinggi dalam Set II. P2: Frekuensi perlanggaran antara atom zink dan ion hidrogen lebih tinggi dalam Set II. P3: Frekuensi perlanggaran berkesan antara atom zink dan ion hidrogen lebih tinggi dalam Set II. <i>Experiment is carried out at higher temperature</i> <i>P1: The kinetic energy of the particles that exposed to collision is higher in Set II.</i> <i>P2: Frequency of collisions between zinc atom and hydrogen ions is higher in Set II.</i> <i>P3: Frequency of effective collisions between zinc atom and hydrogen ions is higher in Set II.</i>	1 1 1
	(b)		P1: Situasi B P2: Jumlah luas permukaan daging adalah lebih besar P3: Daging dapat menyerap lebih haba untuk masak cepat <i>P1: Situation B</i> <i>P2: The total surface area of meat is larger</i> <i>P3: The meat can absorb more heat to cook faster</i>	1 1 1
			JUMLAH / TOTAL	10

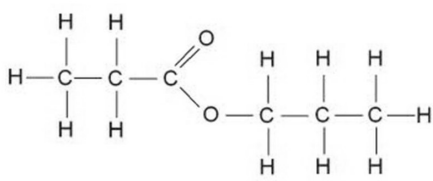
Soalan <i>Question</i>			Jawapan <i>Answer</i>	Markah <i>Marks</i>
8.	(a)	(i)	Antibiotik <i>Antibiotic</i>	1
		(ii)	Mesti menghabiskan semua antibiotik yang dipreskripsi oleh doktor. <i>Must take full course of the antibiotic prescribed by the doctor.</i>	1
	(b)	(i)	Saponifikasi <i>Saponification</i>	1
		(ii)	P1: 1 mol $\text{CH}_3(\text{CH}_2)_{14}\text{COOH}$: 1 mol $\text{CH}_3(\text{CH}_2)_{14}\text{COONa}$ 0.5 mol $\text{CH}_3(\text{CH}_2)_{14}\text{COOH}$: 0.5 mol $\text{CH}_3(\text{CH}_2)_{14}\text{COONa}$ P2: Jisim / Mass = 0.5×278 = 139 g	1 1
		(iii)	P1: Agen pencuci Y / Detergen P2: Air laut mengandungi ion kalsium / ion magnesium P3: Apabila agen pencuci Y bertindak balas dengan ion kalsium / ion magnesium, tiada kekat terbentuk <i>P1: Cleaning agent Y / Detergent</i> <i>P2: Sea water contains calcium ions / magnesium ions</i> <i>P3: When cleaning agent Y reacts with calcium ions / magnesium ions, no scum is formed</i>	1 1 1
		(iv)	P1: Agen pencuci X / Sabun P2: Terbiodegradasi, tidak menyebabkan pencemaran <i>P1: Cleaning agent X / Soap</i> <i>P2: Biodegradable, does not cause pollution</i>	1 1
			JUMLAH / TOTAL	10

		<p>P1: Rajah berfungsi P2: Label Copper(II) carbonate powder</p>  <p>Limewater</p> <p><i>P1: Functional diagram P2: Label</i></p>	1 1
	(iii)	<p>$\text{CuCO}_3 \rightarrow \text{CuO} + \text{CO}_2$ P1: Formula kimia bahan dan hasil tindak balas yang betul P2: Persamaan kimia seimbang <i>P1: Correct chemical formulae of reactants and products P2: Balanced chemical equation</i></p>	1 1
	(iv)	<p>P1: 1 mol CuCO_3 : 1 mol CO_2 0.3 mol CuCO_3 : 0.3 mol CO_2 P2: Isi padu / Volume $= 0.3 \times 24$ $= 7.2 \text{ dm}^3 / 7200 \text{ cm}^3$</p>	1 1
	(v)	<p>Untuk memastikan semua asid nitrik telah bertindak balas lengkap <i>To make sure that all nitric acid has reacted completely</i></p>	1
	(vi)	<p>P1: Campuran dituraskan ke dalam mangkuk penyejat untuk mengeluarkan serbuk kuprum(II) oksida yang berlebihan. P2: Campuran dipanaskan sehingga tepu dan disejukkan ke suhu bilik. P3: Hablur garam kuprum(II) nitrat yang terbentuk dituras dan dikeringkan antara kertas turas. <i>P1: The mixture is filtered into the evaporating dish to separate the copper(II) oxide powder that is in excess. P2: The mixture is heated until saturated and cooled to room temperature. P3: The salt crystals of copper(II) nitrate formed are filtered and dried between filter paper.</i></p>	1 1 1
		JUMLAH / TOTAL	20

Soalan <i>Question</i>			Jawapan <i>Answer</i>	Markah <i>Marks</i>				
10.	(a)	(i)	Polimer ialah molekul berantai panjang yang terhasil daripada pencantuman banyak ulangan unit asas <i>A polymer is a long chain molecule that is made from a combination of many repeating basic units</i>	1				
		(ii)	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">Pempolimeran penambahan <i>Addition polymerisation</i></td> <td style="text-align: center;">Pempolimeran kondensasi <i>Condensation polymerisation</i></td> </tr> <tr> <td style="text-align: center;">Q, R</td> <td style="text-align: center;">P, S</td> </tr> </table> <p>1 betul / <i>correct</i> – 0 2-3 betul / <i>correct</i> – 1 4 betul / <i>correct</i> – 2</p>	Pempolimeran penambahan <i>Addition polymerisation</i>	Pempolimeran kondensasi <i>Condensation polymerisation</i>	Q, R	P, S	2
Pempolimeran penambahan <i>Addition polymerisation</i>	Pempolimeran kondensasi <i>Condensation polymerisation</i>							
Q, R	P, S							
		(iii)	Politetrafluoroetilena / Teflon <i>Polytetrafluoroethylene / Teflon</i>	1				
	(b)		P1: Pinggan B P2: Pembakaran plastik membebaskan gas beracun P3: Pembuangan plastik yang tidak sistematik menyebabkan banjir kilat P4: 4R – Reduce, Reuse, Recycle, Reject / Bakar dalam relau <i>P1: Plates B</i> <i>P2: Burning of plastic releases poisonous gases</i> <i>P3: Unsystematic disposal of plastic causes flash floods</i> <i>P4: 4R – Reduce, Reuse, Recycle, Reject / Burn in the incinerator</i>	1 1 1 1				
	(c)		P1: Bakteria dari udara masuk ke dalam lateks P2: Aktiviti bakteria dalam lateks menghasilkan asid laktik yang mengandungi ion hidrogen P3: Ion hidrogen bercas positif daripada asid meneutralkan cas-cas negatif pada permukaan membran protein P4: Zarah-zarah neutral berlanggar antara satu sama lain menyebabkan membran pecah dan molekul getah bergabung antara satu sama lain <i>P1: Bacteria from the air enter the latex</i> <i>P2: The activity of bacteria in the latex produces lactic acid which contains hydrogen ions</i> <i>P3: Positively charged hydrogen ions from acids neutralize negative charges on the surface of protein membranes</i> <i>P4: Neutral particles collide with each other causing the membrane to break and the rubber molecules combine each other</i>	1 1 1 1				
	(d)	(i)	P1: $\begin{array}{c} \text{CH}_3 \\ \\ \text{H}_2\text{C}=\text{C}-\text{CH}=\text{CH}_2 \end{array}$ P2: 2-metilbut-1,3-diena / <i>2-methylbut-1.3-diene</i>	1 1				
		(ii)	P1: Pemvulkanan P2: Sulfur dipanaskan bersama dengan getah asli / Jalur getah asli direndam dalam larutan disulfur diklorida <i>P1: Vulcanisation</i> <i>P2: Sulphur is heated together with natural rubber / Natural rubber stripe is soaked in disulphur dichloride solution</i>	1 1				
		(iii)	Getah Y lebih kenyal / lebih keras / lebih tahan haba daripada getah asli <i>Rubber Y is more elastic / harder / more resistant to heat than natural rubber</i>	1				
	(e)		P1: Lebih tahan terhadap minyak dan pelarut P2: Lebih tahan lasak P3: Lebih tahan haba <i>P1: More resistant to oil and solvent</i> <i>P2: More durable</i> <i>P3: More heat resistant</i>	1 1 1				
JUMLAH / <i>TOTAL</i>				20				

Bahagian C
Section C

Soalan <i>Question</i>		Jawapan <i>Answer</i>	Markah <i>Marks</i>
11.	(a)	P1: C ₃ H ₆ P2: Propena / <i>Propene</i>	1 1
	(b) (i)	P1: Suhu – 300 °C P2: Tekanan – 60 atm P3: Mangkin – Asid fosforik C ₃ H ₆ + H ₂ O → C ₃ H ₇ OH P4: Formula kimia bahan dan hasil tindak balas yang betul P5: Persamaan kimia seimbang <i>P1: Temperature – 300 °C</i> <i>P2: Pressure – 60 atm</i> <i>P3: Catalyst – Phosphoric acid</i> C ₃ H ₆ + H ₂ O → C ₃ H ₇ OH <i>P4: Correct chemical formulae of reactants and products</i> <i>P5: Balanced chemical equation</i>	1 1 1 1 1
	(ii)	C ₃ H ₇ OH + 9/2O ₂ → 3CO ₂ + 4H ₂ O P1: Formula kimia bahan dan hasil tindak balas yang betul P2: Persamaan kimia seimbang <i>P1: Correct chemical formulae of reactants and products</i> <i>P2: Balanced chemical equation</i> P3: Bilangan mol CO ₂ / <i>Number of moles of CO₂</i> = 7.2 / 24 = 0.3 mol P4: 1 mol C ₃ H ₇ OH : 3 mol CO ₂ 0.1 mol C ₃ H ₇ OH : 0.3 mol CO ₂	2 1 1
	(c) (i)	Penghidrogenan <i>Hydrogenation</i>	1
	(ii)	P1: 2 -3 titik air bromin / larutan kalium manganat(VII) berasid ditambahkan ke dalam dua tabung uji yang mengandungi alkena P dan alkana T P2: Alkana T tidak menukarkan warna perang air bromin / ungu larutan kalium manganat(VII) berasid, manakala alkena P melunturkan warna perang air bromin / ungu larutan kalium manganat(VII) berasid <i>P1: 2-3 drops of bromine water / acidified potassium manganate(VII) solution are added to two test tubes containing alkene P and alkane T</i> <i>P2: Alkane T does not change the brown colour of bromine water / purple colour of acidified potassium manganate(VII) solution, while alkene P bleaches the brown colour of bromine water / purple colour of acidic potassium manganate(VII) solution</i>	1 1
	(d) (i)	P1: Asid propanoik P2: Tuang 2 cm ³ asid propanoik glasial ke dalam tabung didih P3: Tambah 4 cm ³ propanol ke dalam asid propanoik glasial P4: Tambah lima titis asid sulfurik pekat pada campuran dengan penitis dan goncang tabung didih P5: Panaskan campuran dengan perlahan dengan nyalaan kecil sehingga mendidih selama dua hingga tiga minit <i>P1: Propanoic acid</i> <i>P2: Pour 2 cm³ glacial propanoic acid into a boiling tube</i> <i>P3: Add 4 cm³ propanol into glacial propanoic acid</i> <i>P4: Add five drops of concentrated sulphuric acid into the mixture using dropper and shake the boiling tube</i> <i>P5: Heat the mixture slowly with small flame until it is boiled for two to three minutes</i>	1 1 1 1 1

		(ii)		1
			JUMLAH / TOTAL	20

JAWAPAN TAMAT
END OF ANSWER PAPER