

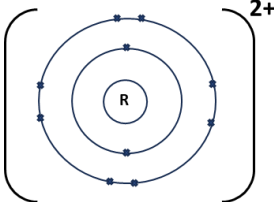
MODUL PENINGKATAN PRESTASI MURID TINGKATAN 5
TAHUN 2024

KIMIA
KERTAS 2
PERATURAN PEMARKAHAN

Bahagian A

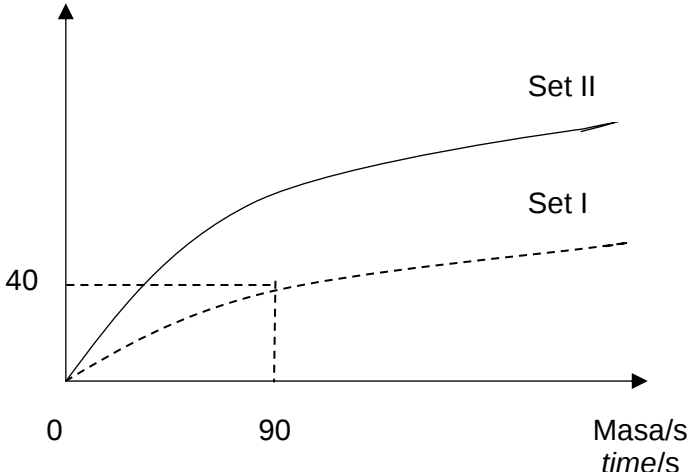
SOALAN / QUESTION			JAWAPAN / ANSWER	PECAHAN MARKAH / SUB MARK	JUMLAH / TOTAL
1.	(a)		Untuk mencapai susunan elektron duplet atau oktet yang stabil. <i>To achieve a stable octet or duplet electron arrangement.</i>		1
	(b)	(i)	M ₂ N		1
		(ii)	Ikatan kovalen / <i>Covalent bond</i>		1
		(iii)	2.6		1
		(iv)	Sebatian B / <i>Compound B</i>		1
Jumlah / Total					5

2.	(a)		Formula kimia yang menunjukkan bilangan sebenar atom setiap jenis unsur yang terdapat di dalam satu molekul sesuatu sebatian. <i>Chemical formula that shows the actual number of atoms of each element found in a molecule of a compound.</i>		1				
	(b)	(i)	Karbon, hidrogen,oksigen,nitrogen <i>Carbon, hydrogen,oxygen,nitrogen</i>		1				
		(ii)	<table><tr><td>Formula molekul bagi kafeina <i>Molecular formula of caffeine</i></td><td>Formula empirik bagi kafeina <i>Empirical formula of caffeine</i></td></tr><tr><td>C₈H₁₀N₄O₂</td><td>C₄H₅N₂O</td></tr></table>	Formula molekul bagi kafeina <i>Molecular formula of caffeine</i>	Formula empirik bagi kafeina <i>Empirical formula of caffeine</i>	C ₈ H ₁₀ N ₄ O ₂	C ₄ H ₅ N ₂ O	1+1	2
Formula molekul bagi kafeina <i>Molecular formula of caffeine</i>	Formula empirik bagi kafeina <i>Empirical formula of caffeine</i>								
C ₈ H ₁₀ N ₄ O ₂	C ₄ H ₅ N ₂ O								
	(c)		Molekul <i>Molecule</i>		1				
			Jumlah / Total		5				

3	(a)		Proton,neutron dan elektron <i>Proton, neutron and electron</i>		1
	(b)	(i)	Mempunyai bilangan elektron valens yang sama <i>Have same number of valence electron</i>		1
		(ii)	 1. Nukleus berlabel / <i>Labelled nucleus</i> 2. Bilangan petala yang berisi jumlah elektron yang betul berserta cas yang betul / <i>Number of shell contain correct total of electron with charge</i>	1 1	2
	(c)		$35.5 = \frac{(75 \times 35) + (25 \times y)}{100}$ $= 37$	1 1	2
Jumlah / Total					6

4	(a)		Disusun mengikut pertambahan nombor proton <i>Arranged according to increasing proton number</i>		1
	(b)	i) Kumpulan 1 <i>Group 1</i> ii) kedua-duanya mempunyai bilangan elektron valens yang sama / satu elektron valens. <i>both have the same number of valence electrons / one valence electron.</i>		1 1	2
	(c)	i) $2Y + 2H_2O \rightarrow 2YOH + H_2$ P1 = Formula kimia <i>Chemical formula</i> P2 = Persamaan seimbang <i>Balanced equation</i>		1 1	2
		ii) 2 mol Y menghasilkan 1 mol gas H_2 0.2 mol Al bertindak balas dengan 0.1 mol gas H_2 <i>2 mol Y produces 1 mol H_2 gas</i> <i>0.2 mol Al react with 0.1 mol H_2 gas</i> Isipadu gas / <i>Volume of gas</i> = $0.1 \times 24 \text{ dm}^3$ // 2.4 dm^3 P1 = Nisbah		1	2

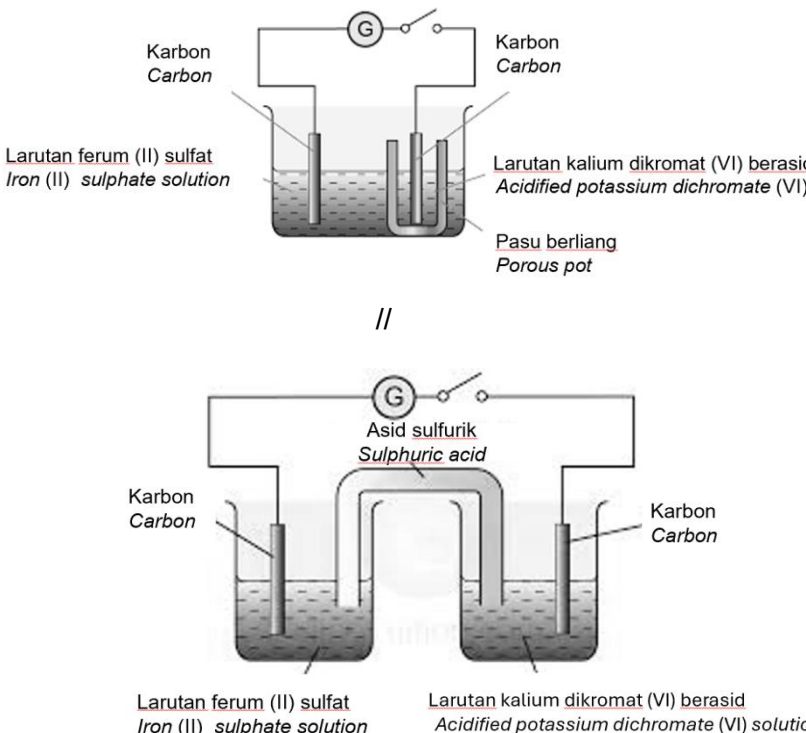
		P2 = Jawapan dengan unit yang betul	1	
			Jumlah/Total	7

5	(a)	Jisim zink <i>Mass of zinc</i>		1
	(b)	Isipadu gas hidrogen/cm³ <i>Volume of hydrogen gas/cm³</i>  Rajah 5 / Diagram 5 Bentuk graf yang betul <i>Correct graph shape</i>		1
	(c)	(i) 1. Formula bahan dan hasil betul <i>Correct formula of reactant and product</i> 2. Seimbang <i>Balanced</i> $\text{Zn} + 2\text{H}^+ \longrightarrow \text{Zn}^{2+} + \text{H}_2$	1 1	2
		(ii) Set I : $\frac{40 \text{ cm}^3}{90 \text{ s}}$ / $0.44 \text{ cm}^3 \text{ s}^{-1}$ Set II : $\frac{40 \text{ cm}^3}{40 \text{ s}}$ / $1.00 \text{ cm}^3 \text{ s}^{-1}$ [minimum 2 titik perpuluhan] / [<i>minimum 2 decimal places</i>]	1 1	2
		(iii) 1. Kadar tindak balas set II lebih tinggi daripada set I <i>Rate of reaction of set II is higher than set I</i> 2. Kepekatan ion H⁺ dalam set II adalah dua kali daripada set I / HX adalah asid monoprotik manakala H₂Y adalah asid diprotik.	1 1	2

			Concentration of H^+ in set II is double than set I / HX is monoprotic acid while H_2Y is diprotic acid.		
			Jumlah/Total		8

6	(a)		C_nH_{2n}		1
	(b)		Heksanol // hexanol		1
	(c)	(i)	$2C_2H_5COOH + Na_2CO_3 \rightarrow 2C_2H_5COONa + H_2O + CO_2$ 1. Formula bahan dan hasil betul <i>Correct formula of reactant and product</i> 2. Seimbang <i>Balanced</i>	1 1	2
		(ii)	1. Nisbah mol / <i>mole ratio</i> 2. Bilangan molekul / <i>number of molecule</i> $2 \text{ mol } C_2H_5COOH : 1 \text{ mol } CO_2$ $0.5 \text{ mol } C_2H_5COOH : 0.25 \text{ mol } CO_2$ $0.25 \times N_A // 1.505 \times 10^{23}$	1 1	2
	(d)		1. Larutan ungu bertukar menjadi tidak berwarna bagi kedua-dua tindak balas // <i>purple solution turns to colourless for both reaction.</i> 2. sebatian X mengalami tindak balas penambahan // <i>compound X undergoes addition reaction</i> 3. sebatian Z mengalami tindak balas pengoksidaan // <i>compound Z undergoes oxidation reaction</i>	1 1 1	3
			Jumlah/Total		9

7	(a)	(i)	Anod /anode: A Katod/Cathode : B	1 1	2
		(ii)	Anod : $Fe^{2+} \longrightarrow Fe^{3+} + e$ Anode : $Fe^{2+} \longrightarrow Fe^{3+} + e$ Katod : $Cr_2O_7^{2-} + 14H^+ + 6e \longrightarrow 2Cr^{3+} + 7H_2O$ Cathode : $Cr_2O_7^{2-} + 14H^+ + 6e \longrightarrow 2Cr^{3+} + 7H_2O$ 1. Formula bahan dan hasil betul	1 1	

		Correct formula of reactant and product 2.Seimbang Balanced	1	3
(b)	Agen penurunan : larutan ferum(II) sulfat FeSO_4 <i>Reducing agent : iron(II) sulphate FeSO_4 solution</i> Cadangan/suggestion : Kalium bromida, KBr / Kalium iodida, KI <i>Potassium bromide, KBr / Potassium iodide, KI</i>	1 1	2	
(c)	Elektron mengalir dari A ke B / dari larutan ferum(II) sulfat FeSO_4 ke larutan kalium dikromat(VI) $\text{K}_2\text{Cr}_2\text{O}_7$ berasid melalui litar luar <i>Electrons flow from A to B / iron(II) sulphate FeSO_4 solution to acidified potassium dichromate(VI) $\text{K}_2\text{Cr}_2\text{O}_7$ solution through outer circuit</i> [arah aliran elektron MESTI ditanda pada rajah / flow of electron MUST marked on diagram]		1	
(d)	 P1 : rajah yang berfungsi / functional apparatus P2 : Label dengan betul / labelled correctly	1 1	2	
Jumlah/Total			10	

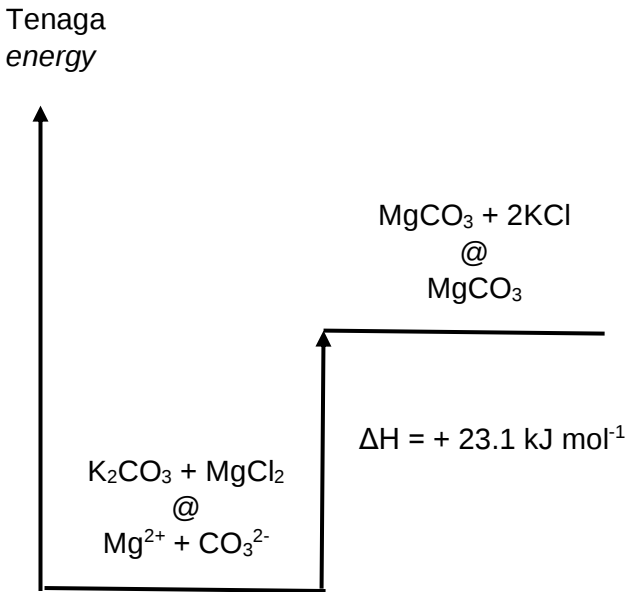
8	(a)	(i)	Polimer sintetik// <i>synthetic polymer</i>		1
		(ii)	$ \begin{array}{cc} \text{H} & \text{Cl} \\ & \\ \text{C} = & \text{C} \\ & \\ \text{H} & \text{H} \end{array} $		1
		(iii)	1. Formula bahan dan hasil betul <i>Correct formula of reactant and product</i> 2. kedudukan n betul <i>Correct position of n</i> $ n \begin{array}{cc} \text{H} & \text{Cl} \\ & \\ \text{C} = & \text{C} \\ & \\ \text{H} & \text{H} \end{array} \longrightarrow \left[\begin{array}{cc} \text{H} & \text{Cl} \\ & \\ -\text{C} - & \text{C}- \\ & \\ \text{H} & \text{H} \end{array} \right]_n $	1 1	2
		(iv)	Paip // baju hujan // tapak kasut // penebat dawai eletrik // kegunaan lain yang sesuai <i>Pipe // rain coat // shoe sole // electric wire insulator //</i> <i>others uses that suitable</i>		1
	(b)		P= Asid etanoik//sebarang asid <i>Ethanoic acid//any acid</i> Q=Ammonia//sebarang alkali <i>Ammonia //any alkali</i>	1 1	2
	(c)		1.S 2.Terbiodegradasi <i>Biodegradable</i> 3.Mudah dilupuskan//pelupusan sempurna tidak menyebabkan pencemaran <i>easy to dispose// proper disposal will not cause pollution</i>	1 1 1	3
Jumlah/Total					10

Bahagian B

9.	(a)	(i)	Haba yang dibebaskan apabila 1 mol logam disesarkan daripada larutan garamnya oleh logam yang lebih elektropositif. <i>Heat released when 1 mole of metal is displaced from it's salt solution by a more electropositive metal.</i>		1
		(ii)	Tindak balas eksotermik <i>Exothermic reaction</i>		1
		(iii)	P1.Cadangan logam W – Magnesium / Aluminium <i>Suggestion of metal W – Magnesium / Aluminium</i> P2.Warna – perang <i>Colour - brown</i>	1 1	2
		(iv)	<u>Set I</u> P1.Bil mol/ no.of mol P2.Nilai haba terbebas / <i>Value of heat released</i> P3.Nilai haba penyesaran,symbol dan unit betul / <i>Correct value of heat displacement, symbol and unit</i> $n = \frac{MV}{1000}$ $= \frac{0.5 \times 100}{1000}$ $= 0.05 \text{ mol}$ $Q = mc\theta$ $= 100 \times 4.2 \times 6$ $= 2520 \text{ J / 2.52 kJ}$ $\Delta H = \frac{-Q}{n}$ $= \frac{-2500}{0.05}$ $= -50400 \text{ J mol}^{-1} // -50.4 \text{ kJmol}^{-1}$	1 1 1	

			<u>Set II</u> P4. Bil mol/ <i>no.of mol</i> P5.Nilai haba terbebas / <i>Value of heat released</i> P6.Nilai haba penyesaran,symbol dan unit betul / <i>Correct value of heat displacement, symbol and unit</i> $n = \frac{MV}{1000}$ $= \frac{0.5 \times 100}{1000}$ $= 0.05 \text{ mol}$ $Q = mc\theta$ $= 100 \times 4.2 \times 20$ $= 8400 \text{ J / 8.40 kJ}$ $\Delta H = \frac{-Q}{n}$ $= \frac{-8400}{0.05}$ $= -168000 \text{ J mol}^{-1} // -168 \text{ kJmol}^{-1}$	1 1 1	6
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	P4.Bahan dan hasil tindak balas betul / <i>Correct reactant and product</i> P5.Seimbang dan ΔH betul / <i>Balanced and correct ΔH</i> Persamaan termokimia Set I: <i>Thermochemical equation of Set I :</i> $\text{BaCl}_2 + \text{ZnSO}_4 \rightarrow \text{BaSO}_4 + \text{ZnCl}_2 \quad \Delta H = - 42.0 \text{ kJmol}^{-1}$ // $\text{Ba}^{2+} + \text{SO}_4^{2-} \rightarrow \text{BaSO}_4 \quad \Delta H = - 42.0 \text{ kJmol}^{-1}$ P6.Label tenaga dan kedudukan aras tenaga betul <i>Energy labels and energy level positions are correct</i> P7.Persamaan pada bahan tindak balas dan hasil tindak balas betul serta tulis ΔH <i>correct equations for the reactants and products of the reaction and write ΔH</i> Gambar rajah aras tenaga eksperimen Set II: <i>Energy level diagram for experiment Set II:</i> 	1 1 1 1 7	
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	(ii)	P1. Sebahagian haba hilang ke persekitaran // Sebahagian haba diserap oleh cawan polistirena <i>Some of the heat is lost to the environment // Some of the heat is absorbed by the polystyrene cup</i> Kaedah / <i>method</i>: P2.Tutup cawan polistirena dengan penutup. <i>Cover the polystyrene cup with a lid.</i> P3.Larutan barium klorida/kalium karbonat dituang dengan cepat ke dalam larutan zink sulfat/ magnesium klorida. <i>The barium chloride / potassium carbonate solution is quickly poured into the zinc sulphate/magnesium chloride solution</i>	1 1 1	3
		JUMLAH/TOTAL	20	

10	(a)	(i)	P1: Lengai secara kimia// rintangan haba tinggi // penebat haba// keras dan kuat// penebat elektrik//mudah pecah <i>Chemically inert // high heat resistance //</i> <i>thermal insulation // hard and strong // electrical insulation // break easily</i> [pilih satu sahaja / choose one only] P2: Seramik termaju <i>Advanced ceramics</i>	1	
				1	2
	(a)	(ii)	P1: Seramik zirkonia <i>Zirconia ceramic</i> P2: Digunakan dalam implan gigi // <i>Used in dental implants</i> // P1: Seramik alumina <i>Alumina ceramic</i> P2: Digunakan dalam pembuatan tulang lutut // <i>Used in the manufacture of knee bones</i> // P1: Seramik <i>Ceramics</i> P2: Digunakan dalam mesin pengimejan resonans magnetic <i>Used in resonance imaging machines magnetic</i> **[P1+P2] [Pilih satu / choose one]	1	
				1	
				1	
	(b)		P1: Bahan B : Keluli <i>Material B: Steel</i> P2: Atom X: Karbon // Carbon P3: Bahan B ialah aloi yang mengandungi dua jenis atom yang berlainan saiz <i>Material B is an alloy containing two types different atoms size</i>		

			P5. Anion sabun bertindak balas dengan air liat menghasilkan kekat / mendakan putih <i>Soap anion reacts with hard water to produce white precipitate / scum</i>	1	
			P6. Detergen bertindak balas dengan air liat menghasilkan garam larut / tidak menghasilkan kekat <i>Detergent anion reacts with hard water to produce soluble salt // no scum is produced.</i>	1	6
			JUMLAH/TOTAL		20

11	(a)	P1 : Larutan yang kepekataannya diketahui dengan tepat. : <i>Solution with known concentration.</i> P2 : jisim zat terlarut. : <i>mass of solute.</i> P3 : isipadu air suling. : <i>volume of distilled water.</i>	1 1 1	3
	(b)	Jisim natrium karbonat yang diperlukan : <i>Mass of sodium carbonate needed :</i> P1. $n = \frac{0.5(100)}{1000}$ // 0.05 mol P2 .Jisim // <i>Mass</i> = 0.05 X [23(2)+12+16(3)] // 5.3 g Isipadu air suling yang perlu ditambah : <i>Volume of distilled water need to be added:</i> P3. $(0.5)(50) = (0.2) V_2$ $V_2 = \frac{(0.5)(50)}{0.2}$ // 125 cm³ P4.Isipadu air suling // <i>volume of distilled water</i> = 125 – 50 cm³ = 75 cm³	1 1 1 1	4
	(c)	P1.Pepejal putih R / <i>white solid R</i> : Plumbum (II) karbonat, PbCO₃ / <i>Lead (II) carbonate</i> P2 .Pepejal S / <i>Solid S</i> : Plumbum(II) oksida ,PbO / <i>Lead (II) oxide</i> P3.Gas T : Karbon dioksida,CO₂ / <i>Carbon dioxide</i>, CO₂ P4.Garam U / <i>Salt U</i> : Plumbum (II) nitrat, Pb(NO₃)₂ / <i>Lead(II) nitrate</i> P5.Mendakan kuning V / <i>yellow precipitate V</i> : Plumbum (II) iodida, PbI₂ / <i>Lead(II) iodide</i>, PbI₂	1 1 1 1 1	5
	(d)	Bahan / <i>materials</i> : P1. Ammonia /<i>Ammonia</i> P2. Asid nitrik / <i>nitric acid</i>	1 1	

		Prosedur/ <i>Procedure</i> : P3. Sukat dan tuangkan [25cm³– 100cm³] larutan ammonia [0.1 – 2.0 mol dm⁻³] ke dalam bikar. <i>Measure and pour [25cm³– 100cm³] of [0.1 – 2.0 moldm⁻³] ammonia solution into a beaker</i> P4. Tambahkan [25cm³– 100cm³] asid nitrik [0.1 – 2.0 mol dm⁻³] ke dalam bikar. <i>Add [25cm³– 100cm³] of [0.1 – 2.0 mol dm⁻³] acid into the beaker.</i> P5. Pindahkan campuran larutan tersebut ke dalam mangkuk penyejat dan panaskan campuran sehingga tepu. <i>Transfer the mixture of the solution obtained to evaporating dish and heat the mixture until saturated</i> P6. Sejukkan / <i>Cool</i> P7. Turaskan / <i>Filter</i> P8. Keringkan garam di antara dua kertas turas <i>Dry the salt between two filter papers.</i> *Bil mol bagi kedua-dua bahan mesti sama untuk P3 dan P4 <i>*Number of mole for these two substances should be the same for P3 and P4</i>	1 1 1 1 1 1	8
		JUMLAH/TOTAL		20

PERATURAN PEMARKAHAN TAMAT
END OF MARKING SCHEME