



**MAJLIS PENGETUA SEKOLAH MALAYSIA
NEGERI SEMBILAN**

<https://cikguadura.wordpress.com/>

**PROGRAM PENINGKATAN AKADEMIK TINGKATAN 5
SEKOLAH-SEKOLAH MENENGAH NEGERI SEMBILAN
2019**

CHEMISTRY 4541

PERATURAN PEMARKAHAN

KERTAS 1, 2 DAN 3

UNTUK KEGUNAAN PEMERIKSA SAHAJA

AMARAN

Peraturan pemarkahan ini **SULIT** dan **Hak Cipta MPSM NSDK**.

Kegunaannya khusus untuk pemeriksa yang berkenaan sahaja. Sebarang maklumat dalam peraturan pemarkahan ini tidak boleh dimaklumkan kepada sesiapa. Peraturan pemarkahan ini tidak boleh dikeluarkan dalam bentuk apa jua bentuk media.



**MAJLIS PENGETUA SEKOLAH MENENGAH MALAYSIA
CAWANGAN NEGERI SEMBILAN**

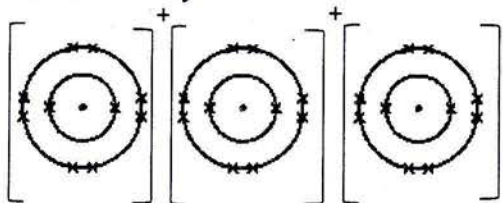
**PEPERIKSAAN PERCUBAAN BERSAMA
SIJIL PELAJARAN MALAYSIA 2019
CHEMISTRY KERTAS 1**

No.	Key	No.	Key
1	A	26	D
2	B	27	C
3	A	28	D
4	B	29	D
5	D	30	A
6	C	31	B
7	A	32	A
8	C	33	A
9	C	34	A
10	B	35	B
11	B	36	D
12	D	37	A
13	A	38	B
14	C	39	C
15	B	40	A
16	B	41	C
17	D	42	C
18	A	43	C
19	B	44	D
20	C	45	B
21	D	46	D
22	B	47	D
23	D	48	D
24	B	49	C
25	C	50	A

A	12
B	13
C	12
D	13

CHEMISTRY KERTAS 2

No.	https://cikguadura.wordpress.com/ Mark Scheme	Mark	Total mark
1(a)(i)	<i>Able to state number of valence electrons of sodium correctly</i> <u>Answer:</u> 1	1	
(a)(ii)	<i>Able to state number of shells filled with electrons correctly</i> <u>Answer:</u> 3	1	
(a)(iii)	<i>Able to state the property of sodium oxide</i> <u>Answer:</u> Basic <i>Bersifat bes</i>	1	3
(b)(i)	<i>Able to state the use of argon correctly</i> <u>Sample answer:</u> Gas in the light bulb// Provide inert atmosphere during welding <i>Gas dalam mentol //</i> <i>Menyediakan atmosfera lengai semasa pengimpalan</i>	1	1
(b)(ii)	<i>Able to give a reason why argon is chemically inert correctly</i> <u>Sample answer:</u> Atom has octet electron arrangement <i>Atom mempunyai susunan elektron oktet</i>	1	1
(c)(i)	<i>Able to name of the group for chlorine in Periodic Table of Element correctly</i> <u>Answer:</u> Halogen	1	1
(c)(ii)	<i>Able to state the chemical formula for chlorine correctly</i> <u>Answer:</u> Cl ₂	1	1
(c)(iii)	<i>Able to explain the answer correctly</i> <u>Sample answers:</u> 1. Chlorine has more proton 2. the attraction force between the nucleus and valence electron is stronger 1. Klorin mempunyai lebih banyak proton 2. daya tarikan antara nukleus dengan elektron valens lebih kuat	1 1	2
		Total	9

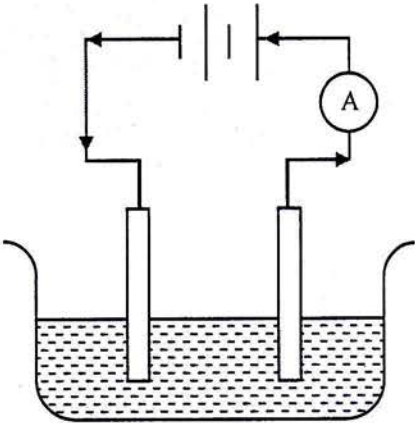
No.	Mark scheme	Mark	Total Mark
2 (a)	<i>Able to state the meaning of nucleon number correctly</i> <u>Sample answer:</u> Total number of proton and neutron in the an atom <i>Jumlah bilangan proton dan neutron di alam sesuatu atom</i>	1	1
(b)	<i>Able to write the electron arrangement correctly</i> <u>Answer:</u> 2.4/ 2,4	1	1
(c)	<i>Able to state the number of electron correctly</i> <u>Answer:</u> 10	1	1
(d)	<i>Able to state the period of element R correctly</i> <u>Answer:</u> Period 3 <i>Kala 3</i>	1	1
(e)(i)	<i>Able to identify the isotopes correctly</i> <u>Answer:</u> R and S <i>R dan S</i>	1	1
(e)(ii)	<i>Able to give a reason correctly</i> <u>Sample answer:</u> Same proton number/number of proton but different nucleon number/number of neutron <i>Nombor/Bilangan proton yang sama tetapi berbeza nombor nukleon/bilangan neutron</i>	1	1
(f)(i)	<i>Able to state the type of bond correctly</i> <u>Answer:</u> Ionic bond <i>Ikatan ion</i>	1	1
(f)(ii)	<i>Able to draw the arrangement of electrons in the compound formed correctly</i>  Sodium ion Sodium ion Oxide ion 1. Correct number of shells and electrons 2. Correct charge and labelled	1 1	2
Total		9	

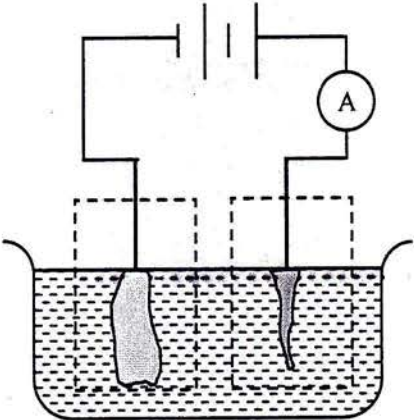
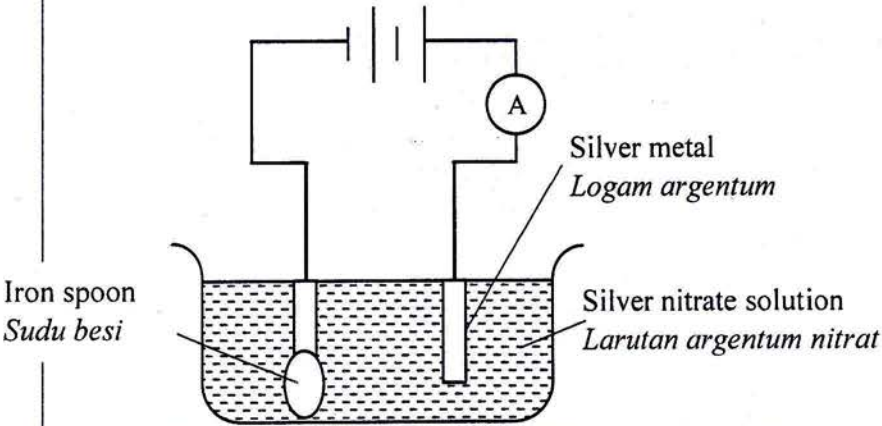
No.	Mark scheme	Mark	
		Sub	Total
3 (a)(i)	<i>Able to state the name of the reaction to prepare soap correctly</i> <u>Answer:</u> Saponification <i>Saponifikasi</i>	1	1
(a)(ii)	<i>Able to complete the chemical equation correctly</i> <u>Answer:</u> $\text{CH}_3(\text{CH}_2)_{16}\text{COOH} + \text{NaOH} \rightarrow \underline{\text{CH}_3(\text{CH}_2)_{16}\text{COONa}} + \underline{\text{H}_2\text{O}}$	1+1	2
(a)(iii)	<i>Able to state two additives that are added to detergent to enhance the effectiveness in the cleansing action correctly</i> <u>Sample answers:</u> 1. Whitening // <i>Pemutih</i> 2. Biological enzyme // <i>Enzim biologi</i> [any suitable answer]	1 1	2
(b)(i)	<i>Able to state the name of P correctly</i> <u>Answer:</u> Aspirin	1	1
(b)(ii)	<i>Able to name the types of medicine Q and R correctly</i> <u>Answer:</u> Q: Antibiotic // <i>Antibiotik</i> R: Antipsychotic// <i>Antipsikotik</i>	1 1	2
(b)(iii)	<i>Able to state the medicine and give one effect if the medicine not taken until finish correctly</i> <u>Sample answer:</u> 1. Q // Penicillin 2. Bacteria may become more resistant towards the medicine// the medicine no longer effective 1. Q // <i>Penisilin</i> 2. <i>Bakteria menjadi lebih tahan terhadap ubat// ubat tidak lagi berkesan</i>	1 1	2
		Total	10

No.	Mark Scheme	Mark	Total Mark
4 (a)(i)	<i>Able to state the homologous series correctly</i> <u>Answer:</u> Ester	1	1
(a)(ii)	<i>Able to state one other physical property correctly</i> <u>Sample answer:</u> Low density // insoluble in water // does not conduct electricity <i>Ketumpatan rendah // tidak larut dalam air // tidak mengkonduksi elektrik</i>	1	1
(a)(iii)	<i>Able to name alcohol and carboxylic acid correctly</i> <u>Answer:</u> Alcohol: Propanol Carboxylic acid: Ethanoic acid <i>Asid etanoik</i>	1 1	2
(a)(iv)	<i>Able to write a chemical equation correctly</i> 1. Correct formulae of reactants 2. Correct formulae of products <u>Answer:</u> $\text{C}_3\text{H}_7\text{OH} + \text{CH}_3\text{COOH} \rightarrow \text{CH}_3\text{COOC}_3\text{H}_7 + \text{H}_2\text{O}$	1 1	2
(b)(i)	<i>Able to state the name of alkene correctly</i> <u>Answer:</u> 2-methylbut-2-ene 2-metilbut-2-ena	1	1
(b)(ii)	<i>Able to state the correct functional group</i> <u>Answer:</u> C = C bond // double bond between two carbon atoms <i>Ikatan C = C // ikatan ganda dua antara dua atom karbon</i>	1	1
(b)(iii)	<i>Able to determine the empirical formula correctly</i> <u>Answer:</u> CH₂	1	1

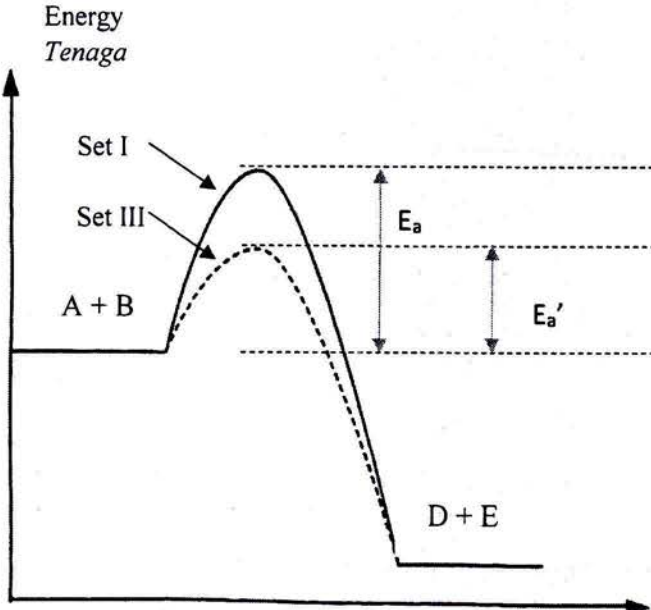
No.	Mark Scheme	Mark	Total Mark
(b)(iv)	<i>Able to draw the structural formula of another isomer correctly</i> <u>Answer:</u> $\begin{array}{ccccccc} & \text{H} & & \text{H} & & \text{H} & & \text{H} & & \text{H} \\ & & & & & & & & & \\ \text{H} & - \text{C} & - & \text{C} & = & \text{C} & - & \text{C} & - & \text{C} & - \text{H} \\ & & & & & & & & & \\ & \text{H} & & & & & & \text{H} & & \text{H} \end{array}$ or $\begin{array}{ccccccc} & \text{H} & & \text{H} & & \text{H} & & \text{H} & & \text{H} \\ & & & & & & & & & \\ \text{H} & - \text{C} & = & \text{C} & - & \text{C} & - & \text{C} & - & \text{C} & - \text{H} \\ & & & & & & & & & \\ & & & & & \text{H} & & \text{H} & & \text{H} \end{array}$ or $\begin{array}{ccccccc} & & & \text{H} & & & \\ & & & & & & \\ & \text{H} & - & \text{C} & - & \text{H} \\ & & & & & & \\ \text{H} & - & \text{C} & = & \text{C} & - & \text{C} & - & \text{C} & - & \text{H} \\ & & & & & & & & \\ & & & & & & \text{H} & & \text{H} \end{array}$ or $\begin{array}{ccccccc} & & & \text{H} & & & \\ & & & & & & \\ & \text{H} & - & \text{C} & - & \text{H} \\ & & & & & & \\ \text{H} & - & \text{C} & = & \text{C} & - & \text{C} & - & \text{C} & - & \text{H} \\ & & & & & & & & \\ & & & & & & \text{H} & & \text{H} \end{array}$	Any 1	1
Total			10

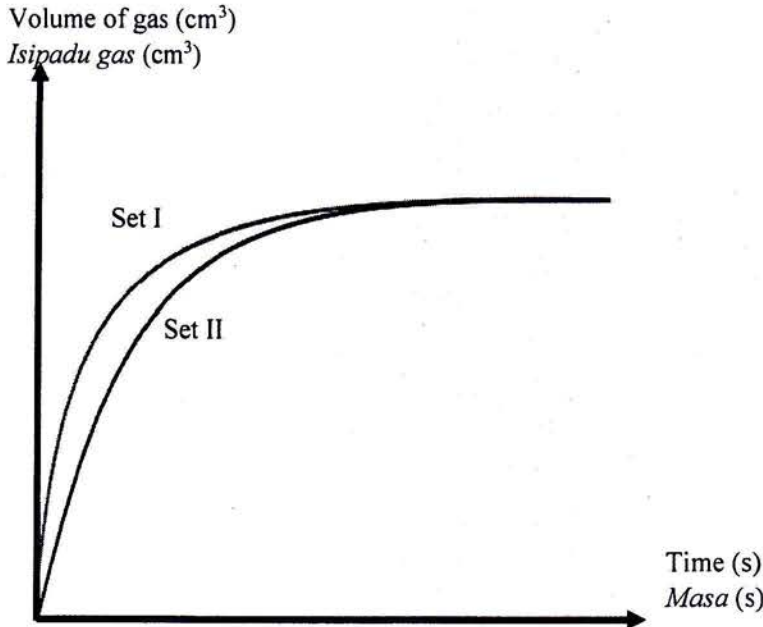
No.	Mark Scheme	Marks	Total marks
5 (a)(i)	<i>Able to state the type of reaction correctly</i> <u>Answer:</u> Precipitation // Double decomposition <i>Pemendakan // Penguraian ganda dua</i>	1	1
(a)(ii)	<i>Able to state the ion X and ion Y correctly</i> <u>Answers:</u> Ion X : Pb^{2+} Ion Y : Na^+ // K^+ // NH_4^+ // Li^+	1 1	2
(a)(iii)	<i>Able to write chemical equation correctly</i> 1. Correct formulae of reactants and products 2. Balanced chemical equation <u>Sample answer:</u> $\text{X}(\text{NO}_3)_2 + 2\text{YI} \rightarrow \text{XI}_2 + 2\text{YNO}_3$	1 1	2
(a)(iv)	<i>Able to describe chemical test to verify the presence of anion in X nitrate solution correctly</i> <u>Sample answers:</u> 1. Add 2 cm³ dilute sulphuric acid followed by 2 cm³ iron (II) sulphate solution into a test tube containing X nitrate solution <i>Tambahkan 2 cm³ asid sulfuric cair ke diikuti dengan larutan ferum(II) sulfat yang mengandungi larutan X nitrat</i> 2. Slowly add concentrated sulphuric acid <i>Perlahan-lahan tambahkan asid sulfurik pekat</i> 3. Brown ring is formed. <i>Cincin perang terbentuk.</i>	1 1 1	3
(b)(i)	<i>Able to give the reason correctly</i> <u>Sample answers:</u> Calcium sulphate is insoluble in water // the plaster is waterproof <i>Kalsium sulfat tidak larut di dalam air // supaya plaster kalis air</i>	1	1
(b)(ii)	<i>Able to calculate the mass of calcium sulphate correctly</i> <u>Answers:</u> 1. $\frac{50 \times 0.1}{1000}$ // 0.005 mol 2. $0.005 \times (40+32+16(4))$ g // 0.68 g	1 1	2
Total			11

No.	Rubric	Mark	Total mark
6(a)	<i>Able to state the meaning of electrolysis correctly</i> <u>Sample answer:</u> Process of dissociation of an ionic substance in aqueous or molten state / an electrolyte into its constituent elements using electric current <i>Proses penguraian sebatian ion dalam keadaan akueus atau leburan / elektrolit kepada unsur juzuknya menggunakan arus elektrik</i>	1	1
(b)	<i>Able to state the formulae of all the ions in the electrolyte</i> <u>Answers:</u> Cu^{2+}, NO_3^-, H^+, OH^-	1	1
(c)	<i>Able to draw the arrow to show the direction of electron flow correctly</i> <u>Sample answer:</u> <u>Note:</u> At least one correct arrow and on the wire 	1	1
(d)(i)	<i>Able to write the half-equation for the reaction that occurred at copper electrode correctly</i> <u>Answers:</u> Copper electrode : $\text{Cu} \rightarrow \text{Cu}^{2+} + 2\text{e}^-$ <i>Elektrod kuprum</i>	1	1
(d)(ii)	<i>Able to state the process that occurs at copper electrode correctly</i> <u>Answer:</u> Oxidation <i>Pengoksidaan</i>	1	1
(d)(iii)	<i>Able to explain based on the change in oxidation number correctly</i> <u>Sample answer:</u> The oxidation number of copper increases from 0 to +2 <i>Nombor pengoksidaan kuprum bertambah daripada 0 kepada +2</i>	1	1

No.	Rubric	Mark	Total mark
(e)	<i>Able to draw and label what can be observed at each electrodes in the boxes correctly</i> 1. Correct drawing at cathode 2. Correct drawing at anode <u>Sample answers:</u> 	1 1	2
(g)	<i>Able to draw and label the apparatus set-up for the electroplating process correctly</i> 1. Functional diagram 2. Correct electrolyte 3. Correct electrodes <u>Sample answers:</u> 	1 1 1	3
		Total	11

3. Empirical formula = CH ₂	1	
n(CH ₂) = 70		
4. n(14) = 70	1	
5. n = 5	1	
6. Molecular formula = C ₅ H ₁₀	1	
7. Structural formula of an isomer		
$ \begin{array}{ccccccc} & \text{H} & \text{H} & & \text{H} & \text{H} & \text{H} \\ & & & & & & \\ \text{H} & - \text{C} & - \text{C} & = & \text{C} & - \text{C} & - \text{C} - \text{H} \\ & & & & & & \\ & \text{H} & & & & \text{H} & \text{H} \end{array} $	1	
8. Pent-2-ene	1	
9. Structural formula of another isomer		
$ \begin{array}{ccccccc} & & \text{H} & & & & \\ & & & & & & \\ & \text{H} & - \text{C} & - \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} $	1	
10. 2-methylbut-1-ene	1	10
Total		20

No.	Mark scheme	Mark	
		Sub	Total
8(a)	Able to label curves for Set I and Set III as in Diagram 8 correctly Able to show and label the activation energy for Set I as E_a and Set III as E_a' correctly <u>Answer:</u> 1. Label curve for Set I 2. Label curve for Set III 3. Show and label activation energy for Set I // 4. Show and label activation energy for Set III // 	1 1 1 1 4	
(b)	Able to write a balanced chemical equation for the reaction correctly 1. Correct chemical formulae for both reactants and products <u>Answer:</u> $\text{Zn} + \text{H}_2\text{SO}_4 \rightarrow \text{ZnSO}_4 + \text{H}_2$ Able to calculate the average rate of reaction for Set I and Set II correctly <u>Answer:</u> 2. Set I Rate of reaction = $\frac{40}{33} \text{ cm}^3 \text{ s}^{-1}$ // $1.21 \text{ cm}^3 \text{ s}^{-1}$ 3. Set II Rate of reaction = $\frac{40}{45} \text{ cm}^3 \text{ s}^{-1}$ // $0.89 \text{ cm}^3 \text{ s}^{-1}$	1 1 1	

No.	Mark scheme	Mark	
		Sub	Total
	<i>Able to sketch graph for Set I and Set II correctly</i> 4. Label of both axes 5. Curve on graph 6. Label Set I and Set II <u>Answer:</u> 	1 1 1	6
(c)	<i>Able to compare the rate of reaction and explain by using the collision theory correctly</i> <u>Sample answers:</u> <u>Set I and Set II</u> - Rate of reaction for Set I is higher <i>Kadar tindak balas bagi Set I lebih tinggi</i> - Size of zinc used in Set I is smaller <i>Saiz zink yang digunakan dalam Set I lebih kecil</i> - Greater total surface area exposed <i>Jumlah luas permukaan terdedah lebih besar</i> - Frequency of collision between H^+ and Zn atom in Set I is higher <i>Frekuensi perlanggaran antara H^+ dan atom Zn dalam Set I lebih tinggi</i> - Frequency of effective collision between particles in Set I is higher <i>Frekuensi perlanggaran berkesan antara zarah dalam Set I lebih tinggi</i>	1 1 1 1 1	

No.	Mark scheme	Mark	Total Mark
9(a)(i)	Able to suggest alkali A and alkali B correctly - Correct alkali A - Correct alkali B <u>Sample answers:</u> Alkali A: Ammonia solution / aqueous // NH₃ solution / aqueous <i>Larutan/akueus ammonia//Larutan/akueus NH₃</i> Alkali B: Sodium hydroxide solution // potassium hydroxide solution // NaOH solution // KOH solution <i>Larutan natrium hidroksida//kalium hidroksida// NaOH/ KOH</i>	1 1	2
(a)(ii)	Able to explain the difference in pH value of alkali A and alkali B correctly <u>Sample answers:</u> [Based on (a)(i)] - Alkali A is a weak alkali // ionises partially in water. <i>Alkali A ialah alkali lemah // mengion separa dalam air</i> - Alkali B is a strong alkali // ionises completely in water. <i>Alkali B ialah alkali kuat // mengion sepenuhnya dalam air</i> - The concentration of hydroxide ion of Alkali B is higher. <i>Kepekatan ion hidroksida dalam Alkali B lebih tinggi</i> - Thus, the pH value of Alkali B is higher. <i>Maka, nilai pH Alkali B lebih tinggi</i>	1 1 1 1	4
(a)(iii)	Able to write balanced chemical equation for the reaction correctly - Correct formula of reactants and products - Balanced equation <u>Answer:</u> $2\text{NH}_3 + \text{H}_2\text{SO}_4 \rightarrow (\text{NH}_4)_2\text{SO}_4 //$ $2\text{NH}_4\text{OH} + \text{H}_2\text{SO}_4 \rightarrow (\text{NH}_4)_2\text{SO}_4 + 2\text{H}_2\text{O}$ Able to describe a chemical test to verify the cation of the product - Correct reagent used - Correct observation <u>Sample answers:</u> [Based on (a)(i)] - Add Nessler reagent into the test tube containing the cation. <i>Tambah reagen Nessler ke dalam tabung uji yang mengandungi kation tersebut</i> - Brown precipitate is formed. <i>Pembentukan mendakan perang terbentuk</i>	1 1 1 1	4

No.	Mark scheme	Mark	Total Mark
(b)	<i>Able to describe the preparation of solution with calculation correctly</i> <u>Sample answers:</u> - Number of moles of solid X needed $n = \frac{1.0 (250)}{1000} // 0.25 \text{ mol}$ - Mass of solid KOH needed $0.25 \times 160 \text{ g} // 40 \text{ g}$ - Weigh 40 g of solid X in a beaker. <i>Timbang 40 g pepejal X di dalam bikar.</i> - Add distilled water into the beaker. <i>Tambah air suling ke dalam bikar.</i> - Stir with glass rod. <i>Kacau dengan rod kaca.</i> - Pour the solution into a 250 cm³ volumetric flask. <i>Tuang larutan ke dalam kelalang volumetrik</i> - Rinse the apparatus a few times and pour into the volumetric flask. <i>Bilas radas beberapa kali dan tuang ke dalam kelalang volumetrik.</i> - Add distilled water until it reaches the calibration mark. <i>Tambah air suling sehingga mencapai aras penentu ukur.</i> - Close the flask. <i>Tutup kelalang.</i> - Shake the flask. <i>Goncang kelalang.</i>	1 1 1 1 1 1 1 1 1 1	10
		Total	20

No.	Mark Scheme	Mark	Total mark
10(a)(i)	Able to state example of asid X and Y correctly - Correct acid X - Correct acid Y <u>Sample answers:</u> - Hydrochloric acid/ nitric acid /HCl/HNO₃ <i>Asid hidroklorik / asid nitrik /HCl/HNO₃</i> - Ethanoic acid <i>Asid etanoik</i>	1 1	2
(a)(ii)	Able to explain the difference in heat of neutralization in experiment I and II correctly <u>Sample answers:</u> - Heat of neutralization in reaction I is higher than reaction II. <i>Haba peneutralan di tindak balas I lebih tinggi daripada tindak balas II.</i> - Acid X is strong acid while acid Y is weak acid// Acid X ionises completely in water while acid Y ionises partially in water. <i>Asid X adalah asid kuat manakala asid Y adalah asid lemah.</i> <i>Asid X mengion lengkap dalam air manakala asid Y mengion separa dalam air.</i> - Acid X produces higher concentration of hydrogen ions <i>Asid X menghasilkan kepekatan ion hidrogen yang lebih tinggi</i> - Some of heat released is absorbed to complete the ionization of acid Y <i>Sebahagian haba yang dibebaskan diserap bagi melengkapkan pengionan asid Y.</i>	1 1 1 1	4
(a)(iii)	Able to predict the heat released during the reaction and explain the answer correctly <u>Sample answers:</u> - Heat released from reaction with sulphuric acid is double <i>Haba yang dibebaskan daripada tindak balas dengan asid sulfurik adalah dua kali ganda</i> - Acid X is monoprotic acid while sulphuric acid is diprotic acid <i>Asid X adalah asid monobes manakala asid sulfurik adalah asid dwibes</i>	1 1	

No.	Mark Scheme	Mark	Total mark
	3. Sulphuric acid produces double concentration of hydrogen ions <i>Asid sulfurik menghasilkan kepekatan ion hidrogen sebanyak dua kali ganda</i> 4. Sulphuric acid produces double mol of water <i>Asid sulfurik menghasilkan dua mol air</i>	1 1	4
(b)	Able to name metal Z correctly 1. Correct name for metal Z. <u>Sample answers:</u> 1. Magnesium / zinc / aluminium <i>Magnesium / zink / aluminium</i> Able to describe one experiment to determine the heat of reaction correctly 2. Apparatus : polystyrene cup, spatula, thermometer <i>Radas : cawan polistirena, spatula, thermometer</i> Materials: [metal Z], copper(II) sulphate solution <i>Bahan: [logam Z], larutan kuprum(II) sulfat</i> Procedure: 3. Measure 50 cm³ of 1.0 mol dm⁻³ copper(II) sulphate solution <i>Ukur 50 cm³ larutan kuprum(II) sulfat 1.0 mol dm⁻³</i> 4. Pour into polystyrene cup. <i>Tuangkan ke dalam cawan polistirena.</i> 5. Measure and record initial temperature of the solution. <i>Ukur dan catatkan suhu awal larutan.</i> 6. Add quickly one spatula of magnesium powder. <i>Tambahkan dengan cepat satu spatula serbuk magnesium.</i> 7. Stir the mixture with thermometer. <i>Kacau campuran dengan termometer.</i> 8. Record highest temperature of mixture. <i>Catat suhu tertinggi campuran.</i>	1 1 1 1 1 1 1 1	

No.	Mark Scheme	Mark	Total mark
	9. Results: Keputusan: Initial temperature of solution = T_1 °C Suhu awal larutan Highest mixture of mixture = T_2 °C Suhu tertinggi campuran Increase in temperature = $(T_2 - T_1)$ °C = T_3 °C Kenaikan suhu Calculation: Pengiraan: 10. $H = mc\theta$ $= 50 \times 4.2 \times (T_3)$ $= X \text{ kJ}$ 11. Number mole = $(50 \times 1) / 1000 = 0.05 \text{ mol}$ 12. $\Delta H = H/\text{mol} = -(X/0.05) \text{ kJ mol}^{-1}$	1 1 1 1	Max 10
		Total	20

CHEMISTRY KERTAS 3

Question	Rubric	Score						
1(a)	<i>Able to record all the readings of the thermometer correctly</i> Criteria : <i>1. one decimal point</i> <i>2. unit.</i> <u>Answers:</u> <table><tr><td>I</td><td>30.0 °C</td></tr><tr><td>II</td><td>35.0 °C</td></tr><tr><td>III</td><td>40.0 °C</td></tr></table>	I	30.0 °C	II	35.0 °C	III	40.0 °C	3
	I	30.0 °C						
	II	35.0 °C						
	III	40.0 °C						
	<i>Able to record all the readings of the thermometer</i> Criteria : <i>1. one decimal point and one of the readings without unit</i> <i>or</i> <i>2. unit and one of the readings without one decimal point</i>	2						
<i>Able to record all the readings of the thermometer</i> Criteria : without one decimal point and units	1							
No response or wrong response	0							

Question	Rubric	Score								
1(b)	<i>Able to construct a table correctly</i> <i>1. Headings with units</i> <i>2. Correct values and consistent</i> <u>Sample answers:</u> <table><tr><th>Temperature(⁰C) <i>Suhu</i></th><th>Time(s) <i>Masa</i></th></tr><tr><td>30.0</td><td>45.0</td></tr><tr><td>35.0</td><td>30.0</td></tr><tr><td>40.0</td><td>17.0</td></tr></table>	Temperature(⁰ C) <i>Suhu</i>	Time(s) <i>Masa</i>	30.0	45.0	35.0	30.0	40.0	17.0	3
	Temperature(⁰ C) <i>Suhu</i>	Time(s) <i>Masa</i>								
	30.0	45.0								
	35.0	30.0								
	40.0	17.0								
<i>Able to construct a table</i> <i>1.Headings without units</i> <i>2.Correct values and consistent</i> <i>or</i> <i>1.Headings with units</i> <i>2.Correct values and not consistent</i>	2									
<i>Able to construct a table</i> <i>1.Headings without units</i> <i>2.Values not consistent</i>	1									
<i>No response or wrong response</i>	0									

Question	Rubric	Score
1(c)	<i>Able to state the relationship correctly</i> <u>Sample answer:</u> Temperature of gas/water bath increases, the rate of diffusion increases // Temperature of gas/water bath increases, time taken for gas diffused increases <i>Suhu gas / kukus air meningkat, kadar resapan meningkat // Suhu gas / kukus air meningkat, masa diambil untuk gas meresap meningkat</i>	3
	<i>Able to state the relationship</i> <u>Sample answer:</u> Temperature increases, the rate of diffusion increases <i>Suhu meningkat, kadar resapan meningkat</i>	2
	<i>Able to give an idea</i> <u>Sample answer:</u> Temperature affect time <i>Suhu mempengaruhi masa</i>	1
	<i>No response or wrong response</i>	0

Question	Rubric	Score
1(d)	<i>Able to state all the variables correctly</i> <u>Sample answers:</u> ~ MV: Temperature of gas / water bath. <i>Suhu gas /kukus air</i> RV: Rate of diffusion.// Time taken for gas diffused <i>Kadar resapan // Masa diambil untuk gas meresap</i> FV: Type of gas.// Size of gas jar <i>Jenis gas.// Saiz balang gas</i>	3
	<i>Able to state any two variables correctly</i>	2
	<i>Able to state <u>any one</u> variable correctly or Have idea to state all variables</i>	1
	<i>No response or wrong response</i>	0

Question	Rubric	Score
1(e)	<i>Able to state the hypothesis correctly</i> <i>Criteria : 1. MV followed by RV</i> <i>2. Direction</i> <u>Sample answer:</u> Temperature of gas/water bath increases, rate of diffusion increases. <i>Suhu gas / kukus air meningkat, kadar resapan meningkat</i>	3
	<i>Able to state the hypothesis</i> <u>Sample answer:</u> Temperature increases , rate of diffusion increases.// <i>Suhu meningkat, kadar resapan meningkat</i>	2
	<i>Able to state the idea of hypothesis</i> <u>Sample answer:</u> Temperature affect time.// <i>Suhu mempengaruhi masa</i>	1
	<i>No response or wrong response</i>	0

Question	Rubric	Score
1(f)(i)	<i>Able to state the observations correctly</i> <u>Sample answer:</u> Brown gas diffuses/moves/spreads/fills in gas jar faster at higher temperature <i>Gas meresap/bergerak/merebak/mengisi dalam balang gas lebih cepat pada suhu lebih tinggi</i>	3
	<i>Able to state the observations</i> <u>Sample answer:</u> Gas diffuses fast <i>Gas meresap cepat</i>	2
	<i>Able to state the idea of observations</i> <u>Sample answer:</u> Gas diffuses <i>Gas meresap</i>	1
	<i>No response or wrong response</i>	0

Question	Rubric	Score
1(f)(ii)	<i>Able to state the inference correctly</i> <u>Sample answers:</u> Gas molecules absorb more energy/heat//Kinetic energy of gas molecules increases <i>Molekul gas menyerap lebih tenaga/haba//Tenaga kinetik molekul gas meningkat.</i>	3
	<i>Able to state the inference</i> <u>Sample answers:</u> Gas absorb energy.// <i>Gas menyerap tenaga.</i>	2
	<i>Have idea to state inference</i> <u>Sample answers:</u> High temperature <i>Suhu tinggi</i>	1
	<i>No response or wrong response</i>	0

Question	Rubric	Score
1(g)	<i>Able to state the prediction of the rate of diffusion and give a reason correctly</i> <u>Sample answers:</u> Rate of diffusion lower. Kinetic energy of gas molecules/particles lower.// <i>Kadar resapan lebih rendah. Tenaga kinetik molekul/zarah gas lebih rendah.</i>	3
	<i>Able to state the prediction of the rate of diffusion</i> <u>Sample answers:</u> Rate of diffusion lower <i>Kadar resapan lebih rendah.</i>	2
	<i>Have idea to predict the rate of diffusion</i> <u>Sample answers:</u> Rate of diffusion differ <i>Kadar resapan berlainan.</i>	1
	<i>No response or wrong response</i>	0

Question	Rubric	Score
1(h)	<i>Able to state the operational definition of the rate of diffusion correctly</i> <u>Sample answers:</u> More heat supplied to water bath, the brown gas move faster <i>Lebih banyak haba dibekalkan kepada kukus air, gas perang bergerak lebih cepat.</i>	3
	<i>Able to state the operational definition of the rate of diffusion</i> <u>Sample answers:</u> More heat supplied to water bath //Brown gas moves faster <i>Lebih haba dibekalkan kepada kukus air//Gas perang bergerak lebih cepat</i>	2
	<i>Have idea to state the operational definition</i> <u>Sample answers:</u> Temperature of gas is high//Gas move fast <i>Suhu gas tinggi//gas bergerak cepat.</i>	1
	<i>No response or wrong response</i>	0

Question	Rubric	Score
1(i)	<i>Able to compare the rate of diffusion and state a reason correctly</i> <u>Sample answers:</u> Situation X. Particles in water move slower//Diffusion in liquid is slower <i>Situasi X. Zarah-zarah dalam air bergerak lebih perlahan.//Resapan dalam cecair lebih perlahan</i>	3
	<i>Able to compare the rate of diffusion correctly</i> <u>Sample answers:</u> Situation X. Diffusion in liquid is slow <i>Situasi X. Resapan dalam cecair perlahan.</i>	2
	<i>Have idea to state rate of diffusion</i> <u>Sample answer</u> Situation X <i>Situasi X</i>	1
	<i>No response or wrong response</i>	0

Question	Rubric	Score								
1(j)	<i>Able to classify all the atoms and molecules correctly</i> <u>Sample answers:</u> <table><tr><th>Atom <i>Atom</i></th><th>Molecule <i>Molekul</i></th></tr><tr><td>Neon <i>Neon</i></td><td>Bromine <i>Bromin</i></td></tr><tr><td>Iron <i>Besi</i></td><td>Water <i>Air</i></td></tr><tr><td>Mercury <i>Raksa</i></td><td>Alcohol <i>Alkohol</i></td></tr></table>	Atom <i>Atom</i>	Molecule <i>Molekul</i>	Neon <i>Neon</i>	Bromine <i>Bromin</i>	Iron <i>Besi</i>	Water <i>Air</i>	Mercury <i>Raksa</i>	Alcohol <i>Alkohol</i>	3
	Atom <i>Atom</i>	Molecule <i>Molekul</i>								
	Neon <i>Neon</i>	Bromine <i>Bromin</i>								
	Iron <i>Besi</i>	Water <i>Air</i>								
	Mercury <i>Raksa</i>	Alcohol <i>Alkohol</i>								
<i>Able to classify 4 substances into atom and molecule correctly</i>	2									
<i>Able to classify 2 substances into atom and molecule correctly</i>	1									
<i>No response or wrong response</i>	0									

Question	Rubric	Score
2(a)	<i>Able to state the problem statement of the experiment correctly</i> <u>Sample answer:</u> How does the position of carbon in the reactivity series of metals can be determined? <i>Bagaimanakah kedudukan karbon dalam siri kereaktifan logam dapat ditentukan?</i>	3
	<i>Able to state the problem statement of the experiment</i> <u>Sample answer:</u> How does the position of carbon can be determined? <i>Bagaimanakah kedudukan karbon ditentukan?</i>	2
	<i>Able to give an idea of the problem statement</i> <u>Sample answer:</u> Determine position of carbon <i>Menentukan kedudukan karbon</i>	1
	<i>No response or wrong response</i>	0

Question	Rubric	Score
2(b)	<i>Able to state all the variables correctly.</i> <u>Sample answer</u> Manipulated variable : Types of metal oxides <i>Jenis oksida logam</i> [Accept any two suitable metal oxides] Responding variable : Reaction occurs// Physical change in mixture <i>Tindak balas berlaku //Perubahan fizikal pada campuran.</i> Fixed variable : Carbon <i>Karbon</i>	3
	<i>Able to state any two variables correctly</i>	2
	<i>Able to state any one variable correctly or Have idea to state all variables</i>	1
	<i>No response or wrong response</i>	0

Question	Rubric	Score
2(c)	<i>Able to state a relationship between the MV follow by RV with direction correctly</i> <u>Sample answer</u> Iron oxide can react with carbon while aluminium oxide cannot react with carbon <i>Ferum oksida bertindak balas dengan karbon manakala aluminium oksida tidak bertindak balas dengan karbon</i>	3
	<i>Able to state a relationship between the MV and RV</i> <u>Sample answer</u> Iron oxide can react with carbon // Aluminium oxide cannot react with carbon <i>Ferum oksida bertindak balas dengan karbon // Aluminium oksida tidak bertindak balas dengan karbon</i>	2
	<i>Able to give an idea of the hypothesis</i> <u>Sample answer</u> Metal reactive/not reactive <i>Logam reaktif/tidak reaktif</i>	1
	<i>No response or wrong response</i>	0

Question	Rubric	Score
2(d)	<i>Able to give complete list of substances and apparatus</i> <u>Sample answers:</u> 3 substances : Carbon, aluminium oxide, iron oxide <i>Karbon, aluminium oksida, ferum oksida</i> 5 apparatus : Crucible, tripod stand, Bunsen burner, pipe clay triangle, spatula. <i>Mangkuk pijar, tungku kaki tiga, penunu Bunsen, segi tiga tanah liat, spatula</i> [can refer to labelled diagram or procedure but only 1 substance and 2 apparatus]	3
	<i>Able to give 2 substances & 4 apparatus</i> <u>Sample answers:</u> 2 substances : Carbon, iron oxide <i>Karbon, ferum oksida</i> 4 apparatus : Crucible, tripod stand, Bunsen burner, pipe clay triangle <i>Mangkuk pijar, tungku kaki tiga, penunu Bunsen, segi tiga tanah liat</i> [can refer to labelled diagram or procedure but only 1 substance and 1 apparatus]	2
	<i>Able to give 2 substances & 2 apparatus</i> <u>Sample answers:</u> 2 substances: Carbon, iron oxide. <i>Karbon, ferum oksida,</i> 2 apparatus: [Any suitable container], Bunsen burner <i>[Sebarang bekas yang sesuai], penunu Bunsen</i>	1
	No response or wrong response	0

Question	Rubric	Score
2(e)	<i>Able to list all the steps correctly</i> <u>Sample answers:</u> 1. Mix one spatula of carbon with one spatula of aluminium oxide in a crucible <i>Campurkan satu spatula karbon dan satu spatula aluminium oksida di dalam mangkuk pijar.</i> 2. Heat the mixture strongly. <i>Panaskan campuran dengan kuat.</i> 3. Record the observation <i>Catat pemerhatian.</i> 4. Repeat the steps above using iron oxide to replace aluminium oxide <i>Ulang langkah-langkah atas dengan menggunakan ferum oksida untuk menggantikan aluminium oksida</i>	3
	<i>Able to list steps 1,2,3 or 1,2,4</i>	2
	<i>Able to give steps 1 and 2</i>	1
	No response or wrong response	0

Question	Rubric	Score												
2(f)	Able to construct a table with the following aspects: 1. Correct headings 2. Complete list of manipulated variables <u>Sample answer:</u> <table><tr><th>Mixture <i>Campuran</i></th><th>Observation <i>Pemerhatian</i></th></tr><tr><td>Aluminium oxide + carbon <i>Aluminium oksida + karbon</i></td><td></td></tr><tr><td>Iron oxide + carbon <i>Ferum oksida + karbon</i></td><td></td></tr></table> // <table><tr><th>Metal oxide <i>Oksida logam</i></th><th>Observation <i>Pemerhatian</i></th></tr><tr><td>Aluminium oxide <i>Aluminium oksida</i></td><td></td></tr><tr><td>Iron oxide <i>Ferum oksida</i></td><td></td></tr></table>	Mixture <i>Campuran</i>	Observation <i>Pemerhatian</i>	Aluminium oxide + carbon <i>Aluminium oksida + karbon</i>		Iron oxide + carbon <i>Ferum oksida + karbon</i>		Metal oxide <i>Oksida logam</i>	Observation <i>Pemerhatian</i>	Aluminium oxide <i>Aluminium oksida</i>		Iron oxide <i>Ferum oksida</i>		2
	Mixture <i>Campuran</i>	Observation <i>Pemerhatian</i>												
	Aluminium oxide + carbon <i>Aluminium oksida + karbon</i>													
	Iron oxide + carbon <i>Ferum oksida + karbon</i>													
	Metal oxide <i>Oksida logam</i>	Observation <i>Pemerhatian</i>												
	Aluminium oxide <i>Aluminium oksida</i>													
	Iron oxide <i>Ferum oksida</i>													
	Able to construct a table with the following aspects: 1. one of the suitable headings 2. one name of the compound <u>Sample answer:</u> <table><tr><th>Metal oxide <i>Oksida logam</i></th><td></td></tr><tr><td>Aluminium oxide <i>Aluminium oksida</i></td><td></td></tr></table>	Metal oxide <i>Oksida logam</i>		Aluminium oxide <i>Aluminium oksida</i>		1								
	Metal oxide <i>Oksida logam</i>													
	Aluminium oxide <i>Aluminium oksida</i>													
No response or wrong response or empty table	0													

END OF MARKING SCHEME
<https://cikguadura.wordpress.com/>