



**PENTAKSIRAN DIAGNOSTIK AKADEMIK  
SEKOLAH BERASRAMA PENUH 2017**

**PEPERIKSAAN PERCUBAAN SIJIL PELAJARAN  
MALAYSIA  
CHEMISTRY  
Kertas 1, 2, 3  
Ogos 2017**

**4541/1,2, 3**

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**MARKING SCHEME  
PAPER 1, 2 & 3**

**MARKING SCHEME CHEMISTRY PAPER 1**

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

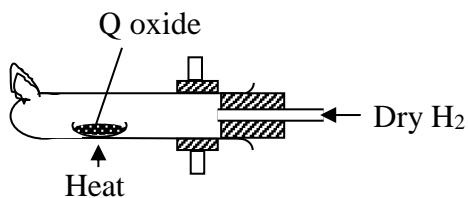
**MARKING SCHEME FOR CHEMISTRY PAPER 2**

**SECTION A**

No			Rubric	Mark	Total marks
1	(a)	(i)	[Able to state the type of particle in copper(II) sulphate correctly] Answer : Ion	1	5
		(ii)	[Able to state the observation in the experiment correctly]  Sample answer : Blue colour spread upward to the agar after one day <i>Warna biru merebak ke seluruh agar-agar selepas beberapa hari</i>	1	
	(iii)	[Able to explain the observation using kinetic theory correctly]  Sample answer: 1. Copper(II) sulphate consist of tiny and discrete ion <i>Kuprum(II) sulfat terdiri daripada ion yang kecil dan diskrit</i> 2. which are in motion <i>yang sentiasa bergerak</i> 3. Ions move in the spaces between the particles of agar <i>// ions move from higher concentration region to lower concentration region</i> <i>Ion bergerak ke dalam ruangan antara zarah agar // ion bergerak daripada kawasan berkepekatan tinggi ke kawasan berkepekatan rendah</i>	1 1 1		
(b)	(i)	[Able to state the number of proton correctly] Answer: 6	1	4	
	(ii)	[Able to state the term used correctly] Answer : Isotopes	1		
	(iii)	[Able to represent atom carbon-13 in form of ${}^A_ZX$ Answer: ${}^{13}_6C$	1		
	(iv)	[Able to state the carbon isotope used to estimate the age of fossil correctly]  Answer : Carbon-14 <i>Karbon-14</i>	1		
<b>TOTAL</b>					<b>9</b>

No		Rubric	Mark	Total marks
2	(a)	<p>[Able to state the type of substance to make chair P and Q correctly]</p> <p>Sample answer:            P : polymer // polypropene            P : <i>polimer // polipropena</i>            Q : alloy // stainless steel            Q : <i>aloi // keluli nirkatrat / keluli tahan karat</i></p>	1 1	2
	(b)	(i) <p>[Able to draw structural formula of monomer of polypropene correctly]</p> <p>Answer :</p> $  \begin{array}{c}  \text{H} \quad \text{CH}_3 \\    \quad   \\  \text{C} = \text{C} \\    \quad   \\  \text{H} \quad \text{H}  \end{array}  $	1	1
		(ii) <p>[Able to give two reasons correctly]</p> <p>Sample answer :            P1 : Does not rust  <i>Tidak berkarat</i>            P2 : Stronger  <i>Lebih kuat</i></p>	1 1	2
	(b)	(i) <p>[Able to state the medicine that can replace medicine P and give a suitable suggestion correctly]</p> <p>Sample answer :            P1 : Medicine P is acidic// can cause internal bleeding  <i>Ubat P berasid// boleh menyebabkan pendarahan dalaman</i>            P2 : Can replace with paracetamol  <i>Boleh digantikan dengan parasetamol</i></p>	1 1	2
		(ii) <p>[Able to give correct action and a reason correctly]</p> <p>Sample answer :            P1 : Must take full course  <i>Perlu diambil sepenuhnya</i>            P2 : To make sure all bacteria are killed  <i>Untuk memastikan semua bakteria dihapuskan</i></p>	1 1	2
<b>TOTAL</b>				<b>9</b>

No	Rubric		Mark	Total marks
3	(a)	[Able to state the meaning of empirical formula correctly] Answer : Empirical formula is the <b>formula</b> that shows the simplest whole number ratio of <b>atoms</b> for each element in a compound. <i>Formula empirik adalah formula yang menunjukkan nisbah teringkas bilangan atom setiap unsur bagi suatu sebatian.</i>	1	1
	(b)	(i) [Able to state one example of metal which is higher than hydrogen in the reactivity series correctly]  Sample answer : Magnesium/Mg//Zinc/Zn//Aluminium/Al <i>Magnesium/ Mg// Zink/ Zn// Aluminium/ Al</i>	1	
		(ii) [Able to explain why the metal is chosen correctly] Sample answer : Magnesium/Zinc/Aluminium is a reactive metal / <i>Magnesium/ zink/ aluminium adalah logam reaktif</i>	1	
		(iii) [Able to explain how to determine that the reaction is completed correctly] Answer : Repeat heating, cooling and weighing until a constant mass is obtained <i>Ulang pemanasan, penyejukan dan penimbangan sehingga jisim tetap diperolehi.</i>	1	3
	(c)	(i) [Able to draw a functional diagram and label the apparatus set-up correctly]  Answer : 1. Functional diagram <i>Gambarajah berfungsi</i> 2. Label – dry hydrogen gas, Q oxide, heat <i>Label – gas hidrogen kering, oksida Q, panaskan</i>	1  1	2



No		Rubric	Marks	Total Marks															
	(ii)	[Able to determine the empirical formula of Q oxide correctly] Sample answer : <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Element <i>Unsur</i></td> <td style="width: 25%; text-align: center;">Q</td> <td style="width: 25%; text-align: center;">O</td> </tr> <tr> <td>Mass (g) <i>Jisim (g)</i></td> <td style="text-align: center;">1.28</td> <td style="text-align: center;">0.32</td> </tr> <tr> <td>No of moles of atoms <i>Bil. mol atom</i></td> <td style="text-align: center;">1.28/64 //</td> <td style="text-align: center;">0.32/16 //</td> </tr> <tr> <td>Simplest mole ratio <i>Nisbah mol teringkas</i></td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> </tr> <tr> <td>Empirical formula <i>Formula empirik</i></td> <td colspan="2" style="text-align: center;">QO</td> </tr> </table>	Element <i>Unsur</i>	Q	O	Mass (g) <i>Jisim (g)</i>	1.28	0.32	No of moles of atoms <i>Bil. mol atom</i>	1.28/64 //	0.32/16 //	Simplest mole ratio <i>Nisbah mol teringkas</i>	1	1	Empirical formula <i>Formula empirik</i>	QO		1	3
Element <i>Unsur</i>	Q	O																	
Mass (g) <i>Jisim (g)</i>	1.28	0.32																	
No of moles of atoms <i>Bil. mol atom</i>	1.28/64 //	0.32/16 //																	
Simplest mole ratio <i>Nisbah mol teringkas</i>	1	1																	
Empirical formula <i>Formula empirik</i>	QO																		
	(iii)	[Able to write a balanced chemical equation correctly] Answer : $QO + H_2 \rightarrow Q + H_2O$	1	1															
<b>TOTAL</b>				10															

No			Rubric	Mark	Total marks
4	(a)	(i)	[Able to state the substance X correctly] Answer : Ammonia / NH <sub>3</sub>	1	1
		(ii)	[Able to state one physical properties of ammonia correctly] Answer : Low melting and boiling points // soluble in water // can conduct electricity in aqueous solution <i>Takat lebur dan takat didih rendah// larut dalam air// boleh mengkonduksi elektrik dalam larutan akueus</i>	1	1
	(b)		[Able to give a reason why ammonium chloride is suitable as fertiliser correctly]  Answer : Soluble in water // high percentage of nitrogen <i>Larut dalam air// peratus nitrogen tinggi</i>	1	1
	(c)	(i)	[Able to name two substances that can be used to produce ammonium chloride correctly] Answer : P1 : Ammonia solution/ ammonium hydroxide <i>Larutan ammonia / ammonium hidroksida</i> P2 : Hydrochloric acid <i>Asid hidroklorik</i>	1	2
		(ii)	[Able to name the reaction occur correctly] Answer : Neutralisation <i>Peneutralan</i>	1	

	(d)	(i)	[Able to write the both formula of anion and cation present in ammonium chloride correctly]  Answer : NH <sub>4</sub> <sup>+</sup> and Cl <sup>-</sup>	1+1	2
		(ii)	[Able to describe the chemical test to identify ammonium ion correctly] Sample answer : P1 : Add Nessler reagent into the test tube containing ammonium chloride solution. <i>Tambahkan reagen Nessler ke dalam tabung uji yang mengandung larutan ammonium klorida</i> P2 : Brown precipitate is formed <i>Mendakan perang terbentuk</i>	1  1	
<b>TOTAL</b>					<b>10</b>

No			Rubric	Mark	Total marks
5	(a)	(i)	[Able to state the colour change of iron(II) sulphate solution correctly] Answer : Green to brown <i>Hijau kepada perang</i>	1	1
		(ii)	[Able to state the type of reaction correctly] Answer : Oxidation <i>Pengoksidaan</i>	1	1
	(b)		[Able to show the steps to calculate the oxidation number of chromium correctly] Answer : P1 : 2(x) + 7(-2) = -2 P2 : +6	1 1	2
	(c)	(i)	[Able to state the reducing agent in the reaction correctly] Sample answer : Iron(II) sulphate // FeSO <sub>4</sub> // Fe <sup>2+</sup> ion <i>Ferum(II) sulfat// FeSO<sub>4</sub>// ion Fe<sup>2+</sup></i>	1	1
		(ii)	[Able to explain the answer based on transferring of electrons correctly]  Sample answer :  P1 : iron(II) ion loses/releases electron to form iron(III) ion <i>Ion ferum(II) kehilangan/ membebaskan electron membentuk ion ferum(III)</i> P2 : Iron(II) ion is oxidized <i>Ion ferum(II) dioksidakan</i>	1  1	2

	(d) (i)	<p>[Able to draw a labelled diagram to show the apparatus set-up to investigate the transfer of electrons at a distance correctly]</p> <p>Sample answer:</p> <ol style="list-style-type: none"> <li>1. Functional diagram <i>Gambarajah berfungsi</i></li> <li>2. Correct label <i>Label dengan betul</i></li> </ol>	1 1	2
		<p>(ii) [Able to explain why there is no deflection of galvanometer needle correctly]</p> <p>Sample answer:</p> <p>P1 : Insoluble salt/ Iron(II) carbonate is formed <i>Garam tak terlarutkan/ Ferum(II) karbonat terbentuk</i></p> <p>P2 : ions cannot move between the two solutions // incomplete circuit <i>ion tidak dapat melalui antara dua larutan // litar tidak lengkap</i></p>	1 1	2
<b>TOTAL</b>				11

No		Rubric	Mark	Total marks
6	(a)	<p>[Able to explain why polystyrene cup is used in the experiment correctly]</p> <p>Sample answer :</p> <p>Polystyrene cup reduce heat loss to surroundings// polystyrene cup is a good insulator <i>Cawan polistirena dapat mengurangkan haba terbebas ke persekitaran// cawan polistirena ialah penebat haba yang baik</i></p>	1	1



	(b)	<p>[Able to state one observation besides the temperature change correctly]</p> <p>Sample answer :</p> <ol style="list-style-type: none"> <li>Zinc powder dissolves <i>Serbuk zink larut</i></li> <li>Intensity of blue colour of copper(II) sulphate decreases <i>Keamatan warna biru kuprum(II) sulfat berkurang</i></li> <li>Brown solid formed <i>Pepejal perang terbentuk</i></li> </ol> <p>[any <b>one</b> answer]</p>	1	1
	(c)	<p>[Able to show the steps to obtained the heat of displacement of copper by zinc correctly]</p> <ol style="list-style-type: none"> <li>No of moles of CuSO<sub>4</sub></li> <li>Heat change</li> <li>Heat of displacement with negative sign and correct unit</li> </ol> <p>Sample answer :</p> <ol style="list-style-type: none"> <li>No of moles of CuSO<sub>4</sub> <i>Bil. mol CuSO<sub>4</sub></i> = 100(0.1)/1000 = 0.01 mol</li> <li>Heat released = 100(4.2)(5) <i>Haba dibebaskan</i> = 2100 J / 2.1 kJ</li> <li>Heat of displacement, ΔH = 2.1 kJ/0.01 <i>Haba penyerasan, ΔH</i> = - 210 kJ mol<sup>-1</sup> // - 210 000 J mol<sup>-1</sup></li> </ol>	1 1 1	3
	(d)	<p>[Able to compare the total energy absorbed to break the bonds in the reactants and the total energy released during formation of bonds in the products during reaction correctly]</p> <p>Answer :</p> <p>The total energy absorbed to break the bonds in the reactants is lower than the total energy released during formation of bonds in the products</p> <p><i>Jumlah tenaga diserap untuk memutuskan ikatan dalam bahan tindak balas lebih rendah daripada jumlah dibebaskan semasa pembentukan ikatan dalam hasil tindak balas</i></p>	1	1

	(e)	(i)	[Able to choose the correct polystyrene cup]  Answer : Polystyrene cup P <i>Cawan polistirena P</i>	1	1
		(ii)	[Able to explain why the polystyrene cup is chosen]  Sample answer : 1. The surface area of the solution exposed is smaller <i>Luas permukaan larutan terdedah lebih kecil</i> 2. Less heat energy lost/ released to surrounding <i>Sedikit tenaga haba hilang/ terbebas ke persekitaran</i>	1  1	2
	(f)		[Able to state one metal that is higher than zinc in ECS and able to explain why the metal is chosen correctly]  Sample answer : 1. Aluminium/ Al // Magnesium/ Mg 2. Distance between aluminium and copper/ magnesium and copper is further than zinc and copper in electrochemical series // Aluminium/ Magnesium is higher than zinc in electrochemical series// <i>Aluminium/ Magnesium is more electropositive than zinc</i> <i>Jarak antara magnesium dan kuprum/ aluminium dan kuprum lebih jauh daripada zink dan kuprum dalam siri elektrokimia//</i> <i>Aluminium/ magnesium lebih tinggi daripada zink dalam siri Elektrokimia</i> <i>Aluminium/ magnesium lebih elektropositif daripada zink</i>	1  1	2
<b>TOTAL</b>					<b>11</b>

## SECTION B

No			Rubric	Mark	Total marks
7	(a)	(i)	[Able to state the basic used by Henry Moseley to develop the Periodic Table of Elements correctly] Answer: Elements are arranged based on increasing in proton number. <i>Unsur-unsur disusun berdasarkan pertambahan nombor proton</i>	1	1
		(ii)	[Able to arrange the elements correctly] Answer: P, Q, R, S	1	1
		(iii)	[Able to determine and explain the position of element R correctly]  Sample answer: P1: Electron arrangement of atom R is 2.8.5 <i>Susunan elektron atom R adalah 2.8.5</i> P2: Atom R has three shells occupied with electrons <i>Atom R mempunyai tiga petala berisi elektron</i> P3: R is located in Period 3 <i>R terletak dalam Kala 3</i> P4: Atom R has five valence electrons <i>Atom R mempunyai lima elektron valens</i> P5: R is located in Group 15 <i>R terletak dalam Kumpulan 15</i>	1 1 1 1 1	5
	(b)	(i)	[Able to suggest substance P correctly]  Sample answer: P1: Substance P is soda lime/ calcium oxide <i>Bahan P ialah soda kapur/ kalsium oksida</i>	1	1
		(ii)	[Able to write the balance chemical equation correctly]  1. Correct chemical formula for reactant and product. <i>Formula kimia yang betul bagi bahan dan hasil tindak balas.</i> 2. Balanced chemical equation. <i>Persamaan kimia seimbang.</i>  Sample answer: $2 \text{ Fe} + 3 \text{ Y}_2 \longrightarrow 2 \text{ FeY}_3$	1 1	2

	(iii)	<p>[Able to compare and explain the reactivity of <math>Y_2</math> and <math>Z_2</math> with hot iron wool correctly]</p> <p>Sample answer:</p> <p>P1: <math>Y_2</math> is more reactive than <math>Z_2</math> <i><math>Y_2</math> lebih reaktif dari <math>Z_2</math></i></p> <p>P2: Atomic size of Y is smaller than Z <i>Saiz atom Y lebih kecil daripada Z</i></p> <p>P3: Distance between nucleus and valence electron of atom Y is nearer <i>Jarak antara nukleus dan elektron valens bagi atom Y lebih dekat</i></p> <p>P4: Force of attraction between nucleus and electron of atom Y is stronger <i>Daya tarikan antara nukleus dan elektron bagi atom Y lebih kuat</i></p> <p>P5: Easier for atom Y to attract/ receive electron <i>Lebih mudah bagi atom Y untuk menarik/menerima elektron</i></p>	1	
			1	
			1	
			1	
			1	5
	(iv)	<p>[Able to to explain the the differences of melting and boiling points of compound A and B correctly]</p> <p>Sample answer:</p> <p>P1: Melting and boiling points of compound A is higher <i>Takat lebur dan takat didih sebatian A lebih tinggi</i></p> <p>P2: There are strong electrostatic force between ions in compound A. <i>Terdapat daya tarikan elektrostatik yang kuat antara ion dalam sebatian A</i></p> <p>P3: More heat needed to overcome the strong force of attraction. <i>Lebih banyak haba diperlukan untuk mengatasi daya tarikan yang kuat</i></p> <p>P4: There are weak Van der Waals force between molecules in compound B // There are weak intermolecular force of attraction in compound B. <i>Terdapat daya tarikan Van der Waals yang lemah antara molekul dalam sebatian B // terdapat daya tarikan antara molekul yang lemah dalam sebatian B</i></p> <p>P5: Less/ little heat needed to overcome the weak force of attraction. <i>Kurang/ sedikit haba diperlukan untuk mengatasi daya tarikan yang lemah</i></p>	1	
			1	
			1	
			1	
			1	5
<b>TOTAL</b>			<b>20</b>	<b>20</b>

No		Rubric		Mark	Total marks
8	(a)	(i)	[Able to write the molecular formula of the gas correctly]  Answer: P1: C <sub>2</sub> H <sub>4</sub>	1	
		(ii)	[Able to state the colour change on bromine water and explain the answer correctly]  Sample answer: P2 : Brown to colourless <i>Perang kepada tidak berwarna</i> P3 : The gas produced is an <b>unsaturated hydrocarbon</b> // consists of <b>carbon-carbon double bond</b> . <i>Gas yang terhasil adalah hidrokarbon tak tepu// mengandungi ikatan ganda dua antara atom-atom karbon.</i> P4 : It can <b>react</b> with bromine water/ undergoes <b>addition reaction</b> with bromine water <i>Ia boleh bertindak balas dengan air bromin/ menjalankan tindak balas penambahan dengan air bromin.</i>	1  1  1	4
	(b)	(i)	[Able to write the chemical equation for the complete combustion of propane correctly]  1. Correct formula of reactants and products <i>Formula bahan dan hasil tindak balas yang betul</i> 2. Balanced equation <i>Persamaan seimbang</i>  Answer : C <sub>3</sub> H <sub>8</sub> + 5O <sub>2</sub> → 3CO <sub>2</sub> + 4H <sub>2</sub> O	1  1	2
		(ii)	[Able to show the steps to calculate the volume of carbon dioxide gas correctly] 1. Number of moles 2. Ratio of moles 3. Volume of gas with unit  Sample answer : P1 : Number of moles of propane = 2.2 ÷ 44 = 0.05 mol <i>Bilangan mol propana</i> P2 : 1 mol of C <sub>3</sub> H <sub>8</sub> / propane : 3 mol of CO <sub>2</sub> /carbon dioxide 0.05 mol of C <sub>3</sub> H <sub>8</sub> / propane : 0.15 mol of CO <sub>2</sub> /carbon dioxide P3 : Volume of CO <sub>2</sub> = 0.15 × 24 dm <sup>3</sup> = 3.6 dm <sup>3</sup> <i>Isi padu CO<sub>2</sub></i>	1 1 1	3

	(c) (i)	<p>[Able to state the homologues series and the functional group for compounds P, Q and R correctly] Sample answer:</p> <table border="1" data-bbox="421 331 1238 770"> <thead> <tr> <th data-bbox="421 331 611 405">Compound <i>Sebatian</i></th> <th data-bbox="611 331 895 405">Homologous series <i>Siri homolog</i></th> <th data-bbox="895 331 1238 405">Functional group <i>Kumpulan berfungsi</i></th> </tr> </thead> <tbody> <tr> <td data-bbox="421 405 611 591">P</td> <td data-bbox="611 405 895 591">P1: Alkena <i>Alkena</i></td> <td data-bbox="895 405 1238 591">Carbon-carbon double bond <i>Ikatan ganda dua antara atom-atom karbon // C=C</i></td> </tr> <tr> <td data-bbox="421 591 611 665">Q</td> <td data-bbox="611 591 895 665">P2 : Alcohol <i>Alkohol</i></td> <td data-bbox="895 591 1238 665">Hydroxyl group <i>Hidroksil // -OH</i></td> </tr> <tr> <td data-bbox="421 665 611 770">R</td> <td data-bbox="611 665 895 770">P3 : Ester <i>Ester</i></td> <td data-bbox="895 665 1238 770">Carboxylate <i>karboksilat // -COO-</i></td> </tr> </tbody> </table>	Compound <i>Sebatian</i>	Homologous series <i>Siri homolog</i>	Functional group <i>Kumpulan berfungsi</i>	P	P1: Alkena <i>Alkena</i>	Carbon-carbon double bond <i>Ikatan ganda dua antara atom-atom karbon // C=C</i>	Q	P2 : Alcohol <i>Alkohol</i>	Hydroxyl group <i>Hidroksil // -OH</i>	R	P3 : Ester <i>Ester</i>	Carboxylate <i>karboksilat // -COO-</i>	1+1 1+1 1+1	6
Compound <i>Sebatian</i>	Homologous series <i>Siri homolog</i>	Functional group <i>Kumpulan berfungsi</i>														
P	P1: Alkena <i>Alkena</i>	Carbon-carbon double bond <i>Ikatan ganda dua antara atom-atom karbon // C=C</i>														
Q	P2 : Alcohol <i>Alkohol</i>	Hydroxyl group <i>Hidroksil // -OH</i>														
R	P3 : Ester <i>Ester</i>	Carboxylate <i>karboksilat // -COO-</i>														
	(ii)	<p>[Able to draw two isomers of compound Q correctly] Sample answer :</p> <pre data-bbox="421 920 1050 1532">       H H H H           H H H H                                 H - C - C - C - C - H   H - C - C - C - C - H                                       O H H H           H O H H                                   H                   H                H                           H - C - H                           H       H                     H - C - C - C - H               O   H   H                H                           H - C - H                           H       H                     H - C - C - C - H               H   O   H               H </pre> <p>Any <b>two</b> correct structural formulae</p>	1+1	2												

	(iii)	<p>[Able to write the chemical equation for the conversion of compound Q to compound R and name the ester formed correctly]</p> <p>1. Correct formula of reactants and products <i>Formula bahan dan hasil tindak balas yang betul</i></p> <p>2. Balanced equation <i>Persamaan seimbang</i></p> <p>3. Name compound R <i>Nama sebatian R</i></p> <p>Answer :  <math>\text{CH}_3\text{COOH} + \text{C}_4\text{H}_9\text{OH} \rightarrow \text{CH}_3\text{COOC}_4\text{H}_9 + \text{H}_2\text{O}</math>            Butyl ethanoate  <i>Butil etanoat</i></p>	1	1	1	3
<b>TOTAL</b>						<b>20</b>

### BAHAGIAN C

No.	Rubric		Mark	Total mark
9.	(a)	<p>[Able to suggest acid X and acid Y correctly]</p> <p>Sample answer:            Acid X : Hydrochloric acid/HCl// nitric acid/HNO<sub>3</sub>  <i>Asid hidroklorik/HCl // acid nitric/HNO<sub>3</sub></i>            Acid Y : Sulphuric acid/H<sub>2</sub>SO<sub>4</sub>  <i>Asid sulfurik/H<sub>2</sub>SO<sub>4</sub></i></p> <p>[Able to write a balanced chemical equation for the reaction between acid X and excess zinc correctly]</p> <p>P1:Correct chemical formula for reactants and products            P2:Balance chemical equation</p> <p>Sample answer:  <math>2\text{HCl} + \text{Zn} \rightarrow \text{ZnCl}_2 + \text{H}_2</math>  <math>2\text{HNO}_3 + \text{Zn} \rightarrow \text{Zn}(\text{NO}_3)_2 + \text{H}_2</math></p>	1  1  1 1	4
	(b)	<p>(i) [Able to compare the rate of reaction between Experiment I and Experiment II correctly]</p> <p>P1:Rate of reaction in Experiment II is higher  <i>Kadar tindak balas Eksperimen II lebih tinggi</i></p> <p>(ii) P2:Rate of reaction in Experiment III is higher  <i>Kadar tindak balas Eksperimen III lebih tinggi</i></p> <p>[Able to explain the differences of rate based on collision theory correctly]</p> <p>Sample answer:  <u>Experiment I and Experiment II</u>            P3: Concentration of hydrogen ions/ H<sup>+</sup> in Experiment II is double  <i>Kepekatan ion hidrogen/ H<sup>+</sup> dalam Eksperimen II dua kali ganda</i></p> <p>P4:Number of hydrogen ion/H<sup>+</sup> per unit volume is higher  <i>Bilangan ion hidrogen/ H<sup>+</sup> per unit isipadu lebih tinggi</i></p> <p>P5:Frequency of collision between zinc atom and hydrogen ions /H<sup>+</sup> is higher  <i>Frekuensi perlanggaran antara atom zink dan ion hidrogen/ H<sup>+</sup> lebih tinggi</i></p> <p>P6:Frequency of effective collision is higher  <i>Frekuensi perlanggaran berkesan lebih tinggi.</i></p>	1  1  1 1 1 1	6





			<p>P8: Conclusion: The presence of MnO<sub>2</sub> increases the rate of reaction <i>Kesimpulan: Kehadiran MnO<sub>2</sub> meningkatkan kadar tindak balas.</i></p> <p>P9: Correct chemical formula of reactants and products <i>Formula kimia bahan dan hasil tindak balas yang betul</i></p> <p>P10: Balanced equation <i>Persamaan seimbang</i></p> <p>Chemical equation/ <i>persamaan kimia:</i> <math>2\text{H}_2\text{O}_2 \rightarrow 2\text{H}_2\text{O} + \text{O}_2</math></p>	1	
				1	
				1	10
<b>TOTAL</b>					<b>20</b>

No		Rubric	Mark	Total marks	
10	(a)	<p>[Able to write half equation at electrode X and Y correctly]</p> <p>1. Correct chemical formula for reactant and product. <i>Formula kimia yang betul bagi bahan dan hasil tindak balas.</i></p> <p>2. Balanced chemical equation. <i>Persamaan kimia seimbang.</i></p> <p>Answer: P1: Electrode X: <math>2\text{H}^+ + 2\text{e} \rightarrow \text{H}_2</math> P2: Electrode Y: <math>2\text{Cl}^- \rightarrow \text{Cl}_2 + 2\text{e}</math></p> <p>[Able to explain the difference in observation at both electrode X and Y correctly]</p> <p>Sample answer: P3: Hydrogen gas is produced at electrode X but chlorine gas is produced at electrode Y <i>Gas hidrogen dihasilkan di elektrod X tetapi gas klorin dihasilkan di elektrod Y</i></p> <p>P4: Hydrogen ion /H<sup>+</sup> is selectively discharged at electrode X but chloride ion/Cl<sup>-</sup> is selectively discharged at electrode Y// <i>Ion hidrogen/H<sup>+</sup> terpilih untuk dinyahcas di elektrod X tetapi ion klorida/Cl<sup>-</sup> terpilih untuk dinyahcas di elektrod Y//</i></p> <p>Hydrogen gas is neutral but chlorine gas is acidic /bleaching agent // <i>gas hidrogen adalah neutral tetapi gas klorin berasid/ agen peluntur</i></p>	1+1 1+1		
			1	6	
	(b)	(i)	<p>[Able to state the product at the anode and cathode correctly]</p> <p>Answer : P1: Anode : oxygen // <i>oksigen</i> P2: Cathode : aluminium</p>	1 1	2

	(ii)	<p>[Able to state the name of substance X and give the function of substance X correctly]</p> <p>Sample answer:  P1: Cryolite // <i>kriolit</i>  P2: Lower the melting point of aluminium oxide // <i>merendahkan takat lebur aluminium oksida</i></p>	1 1	2
	(iii)	<p>[Able to name metal S and describe laboratory experiment to electroplate metal S on iron spoon correctly]</p> <p>Sample answer:  P1: Metal S is silver / copper / aurum  <i>Logam S adalah argentum/ kuprum /emas</i>  P2: Clean iron spoon with sand paper  <i>Bersihkan sudu besi dengan kertas pasir</i>  P3: Fill half of a beaker with silver nitrate solution  <i>Isikan separuh bikar dengan larutan argentum nitrat</i>  P4: Dip iron spoon and silver plate into the silver nitrate solution  <i>Celupkan sudu besi dan kepingan argentum ke dalam larutan argentum nitrat</i>  P5: Connect iron spoon to the negative terminal and silver plate to the positive terminal of battery.  <i>Sambungkan sudu besi kepada terminal negative dan kepingan argentum kepada terminal positif bateri</i>  P6: Turn on the switch // complete the circuit  <i>Hidupkan suis // lengkapkan litar</i>  P7. Half equation at Anode : <math>Ag \rightarrow Ag^+ + e</math>  <i>Setengah persamaan di anod : <math>Ag \rightarrow Ag^+ + e</math></i>  P8. Half equation at cathode: <math>Ag^+ + e \rightarrow Ag</math>  <i>Setengah persamaan di katod : <math>Ag^+ + e \rightarrow Ag</math></i>  P9. Observation at anode: silver becomes thinner  <i>Pemerhatian di anod : argentum semakin menipis</i>  P10. Observation at cathode : grey solid is deposited  <i>Pemerhatian di katod: pepejal kelabu terenalap</i></p>	1 1 1 1 1 1 1 1 1 1	10
<b>TOTAL</b>				<b>20</b>

### MARKING SCHEME FOR CHEMISTRY PAPER 3

Question	Rubric	Score										
1(a)	<p><i>Able to state all the observations and inferences correctly</i></p> <p><u>Sample answers:</u></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Observations <i>Pemerhatian</i></th> <th style="text-align: center;">Inferences <i>inferens</i></th> </tr> </thead> <tbody> <tr> <td style="vertical-align: top;">1. Magnesium electrode become thinner <i>Elektrod magnesium semakin tebal</i></td> <td style="vertical-align: top;">Magnesium atom ionised to magnesium ions // Magnesium atom oxidised/corrode <i>Atom magnesium mengion kepada ion magnesium // Atom magnesium mengalami pengoksidaan/terkakis</i></td> </tr> <tr> <td style="vertical-align: top;">2. Copper electrode become thicker <i>Elektrod kuprum semakin tebal</i></td> <td style="vertical-align: top;">Copper atom is formed// Copper(II) ion reduced <i>Atom kuprum terhasil// Ion kuprum(II) mengalami penurunan</i></td> </tr> <tr> <td style="vertical-align: top;">3. Dark blue solution become light blue // The intensity of blue solution decrease <i>Larutan biru tua menjadi biru muda // Keamatan warna biru larutan berkurangan</i></td> <td style="vertical-align: top;">Copper(II) ions is discharged to copper atom // Concentration of copper(II) ion decreases <i>Ion kuprum(II) dinyahcas menjadi atom kuprum // Kepekatan ion kuprum(II) berkurangan</i></td> </tr> <tr> <td colspan="2" style="text-align: center;"># Marks for inference given when observation is correct</td> </tr> </tbody> </table>	Observations <i>Pemerhatian</i>	Inferences <i>inferens</i>	1. Magnesium electrode become thinner <i>Elektrod magnesium semakin tebal</i>	Magnesium atom ionised to magnesium ions // Magnesium atom oxidised/corrode <i>Atom magnesium mengion kepada ion magnesium // Atom magnesium mengalami pengoksidaan/terkakis</i>	2. Copper electrode become thicker <i>Elektrod kuprum semakin tebal</i>	Copper atom is formed// Copper(II) ion reduced <i>Atom kuprum terhasil// Ion kuprum(II) mengalami penurunan</i>	3. Dark blue solution become light blue // The intensity of blue solution decrease <i>Larutan biru tua menjadi biru muda // Keamatan warna biru larutan berkurangan</i>	Copper(II) ions is discharged to copper atom // Concentration of copper(II) ion decreases <i>Ion kuprum(II) dinyahcas menjadi atom kuprum // Kepekatan ion kuprum(II) berkurangan</i>	# Marks for inference given when observation is correct		6
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# Marks for inference given when observation is correct												
	<i>Able to state all 3 observations + 2 corresponding inferences correctly</i>	5										
	<i>Able to state 2 observations + 2 corresponding inferences correctly // Able to state 3 observations + 1 corresponding inferences correctly</i>	4										
	<i>Able to state 2 observations + 1 corresponding inferences correctly // Able to state 3 observations correctly</i>	3										
	<i>Able to state 1 observation + 1 corresponding inference correctly // Able to state 2 observations correctly</i>	2										
	<i>Able to state 1 observation correctly</i>	1										
	<i>No response or wrong response</i>	0										

Question	Rubric	Score
1(b)	<p><i>Able to state all the voltmeter readings accurately with unit and two decimal places correctly</i></p> <p>Magnesium and copper : 2.70 V  P and copper : 0.80 V  Q and copper : 1.10 V  R and copper : 0.50 V</p>	3
	<p><i>Able to state all the voltmeter readings accurately without unit or correct reading with unit.</i></p> <p>Magnesium and copper : 2.70 / 2.7 V  P and copper : 0.80 / 0.8 V  Q and copper : 1.10 / 1.1 V  R and copper : 0.50 / 0.5 V</p>	2
	<i>Able to state any 2 readings correctly without unit</i>	1
	<i>No response or wrong response</i>	0

Question	Rubric	Score										
1(c)	<p><i>Able to construct a table to record the voltmeter reading for each pair of metals with unit accurately</i></p> <p><u>Sample answer:</u></p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Pairs of metals</th> <th>Voltage / V</th> </tr> </thead> <tbody> <tr> <td>Magnesium and copper</td> <td>2.70</td> </tr> <tr> <td>P and copper</td> <td>0.80</td> </tr> <tr> <td>Q and copper</td> <td>1.10</td> </tr> <tr> <td>R and copper</td> <td>0.50</td> </tr> </tbody> </table>	Pairs of metals	Voltage / V	Magnesium and copper	2.70	P and copper	0.80	Q and copper	1.10	R and copper	0.50	3
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	<p><i>Able to construct a table to record the voltmeter reading without unit for each pair of metals</i></p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Pairs of metals</th> <th>Voltage</th> </tr> </thead> <tbody> <tr> <td>Magnesium and copper</td> <td>2.7</td> </tr> <tr> <td>P and copper</td> <td>0.8</td> </tr> <tr> <td>Q and copper</td> <td>1.1</td> </tr> <tr> <td>R and copper</td> <td>0.4</td> </tr> </tbody> </table>	Pairs of metals	Voltage	Magnesium and copper	2.7	P and copper	0.8	Q and copper	1.1	R and copper	0.4	2
Pairs of metals	Voltage											
Magnesium and copper	2.7											
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R and copper	0.4											
	<i>Able to construct a table to record any 2 voltmeter readings without unit.</i>	1										
	<i>No response or wrong response</i>	0										

Question	Rubric	Score
1(d)	<i>Able to arrange all the metals in ascending order in electrochemical series</i>  Sample answer: Copper, R, P, Q, Magnesium	3
	<i>Able to arrange any four metals in correct ascending order</i>	2
	<i>Able to arrange any three metals in correct ascending order// Able to arrange all the metals in descending order</i>	1
	<i>No response or wrong response</i>	0

Question	Rubric	Score								
1(e)	<i>Able to state all the three variables and corresponding action to be taken correctly</i>  Sample answer: <table border="1" data-bbox="363 972 1329 1641"> <thead> <tr> <th>Variable</th> <th></th> </tr> </thead> <tbody> <tr> <td>Manipulated variable</td> <td>Pair of metals // Metal as negative terminal <i>Pasangan logam //</i> <i>Logam sebagai terminal negatif</i></td> </tr> <tr> <td>Responding variable</td> <td>Voltmeter reading // Potential difference <i>Bacaan voltmeter //</i> <i>Beza keupayaan</i></td> </tr> <tr> <td>Constant variable</td> <td>Copper as positive terminal // Volume and concentration of copper(II) nitrate solution <i>Kuprum sebagai terminal positif //</i> <i>Isipadu dan kepekatan larutan kuprum(II) nitrat</i></td> </tr> </tbody> </table>	Variable		Manipulated variable	Pair of metals // Metal as negative terminal <i>Pasangan logam //</i> <i>Logam sebagai terminal negatif</i>	Responding variable	Voltmeter reading // Potential difference <i>Bacaan voltmeter //</i> <i>Beza keupayaan</i>	Constant variable	Copper as positive terminal // Volume and concentration of copper(II) nitrate solution <i>Kuprum sebagai terminal positif //</i> <i>Isipadu dan kepekatan larutan kuprum(II) nitrat</i>	3
Variable										
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	<i>Able to state 2 variable correctly</i>	2								
	<i>Able to state 1 variable correctly</i>	1								
	<i>No response or wrong response</i>	0								

Question	Rubric	Score
1(f)	<p><i>Able to state the relationship between the manipulated variable and the responding variable with direction.</i></p> <p><u>Sample answer:</u>  The further the distance between two metals in the electrochemical series the higher/larger the voltage //  The further the distance between pair of metals in the electrochemical series the higher/larger the voltage.  <i>Semakin jauh jarak antara dua logam dalam siri elektrokimia semakin tinggi/besar voltan //</i>  <i>Semakin jauh jarak antara pasangan logam dalam siri elektrokimia semakin tinggi/besar voltan //</i></p>	3
	<p><i>Able to state the relationship between the manipulated variable and responding variable.</i></p> <p><u>Sample answer:</u>  The further the distance between two metals, the higher/larger/bigger the voltage.//  The further the distance between two metals in reactivity series, the higher/larger/bigger the voltage.  <i>Semakin jauh jarak antara dua logam, semakin tinggi/besar voltan //</i>  <i>Semakin jauh jarak antara dua logam dalam siri kereaktifan, semakin tinggi/besar voltan</i></p>	2
	<p><i>Able to state the idea of hypothesis</i></p> <p><u>Sample answer:</u>  Different pair of metals have different voltage.  <i>Pasangan logam yang berbeza mempunyai voltan yang berbeza</i></p>	1
	<i>No response or wrong response</i>	0

Question	Rubric	Score
1(g)	<p><i>Able to state the operational definition for the potential difference accurately</i></p> <p>What should be observed : voltmeter reading  <i>Apa yang diperhatikan : bacaan voltmeter</i></p> <p>What should be done : two different metals connected to voltmeter using wire are dipped in an electrolyte  <i>Apa yang dibuat : dua logam berbeza disambungkan kepada voltmeter dengan wayar dicelupkan ke dalam elektrolit</i></p> <p><u>Sample answer:</u>  The potential difference is the voltmeter reading when two different metals connected to voltmeter using wire are dipped in an electrolyte //  The potential difference is the voltmeter reading when two different metals connected to voltmeter using wire are dipped in the copper(II) nitrate solution.  Beza keupayaan adalah bacaan voltmeter apabila <i>dua logam berbeza disambungkan kepada voltmeter dengan wayar dicelupkan ke dalam elektrolit//</i>  Beza keupayaan adalah bacaan voltmeter apabila <i>dua logam berbeza disambungkan kepada voltmeter dengan wayar dicelupkan ke dalam larutan kuprum(II) nitrat.</i></p>	3
	<p><i>Able to state the operational definition for the potential difference correctly</i></p> <p><u>Sample answer:</u>  The potential difference is the voltmeter reading when two metals are used.  <i>Beza keupayaan adalah bacaan voltmeter apabila dua logam digunakan.</i></p>	2
	<p><i>Able to state an idea for the potential difference</i></p> <p><u>Sample answer:</u>  Different metals shows different voltmeter reading  <i>Logam yang berlainan menunjukkan bacaan voltmeter</i></p>	1
	<i>No response or wrong response</i>	0



Question	Rubric	Score
1(h)	<p><i>Able to state the relationship between the changes of the mass of copper strip with the time in experiment I correctly</i></p> <p>Sample answer:</p> <p>The longer the time taken, the mass of copper strip increases.  <i>Semakin lama masa diambil, jisim kepingan kuprum bertambah</i></p>	3
	<p><i>Able to state the relationship between the changes of the mass of copper strip with the time in experiment I less correctly</i></p> <p><u>Sample answer:</u>  When the time becomes longer, the copper strip becomes thicker.  <i>Apabila masa semakin panjang, kepingan kuprum semakin tebal.</i></p>	2
	<p><i>Able to state an idea for the relationship</i></p> <p><u>Sample answer:</u>  When the time become longer, the mass of copper strip decreases.  <i>Apabila masa semakin panjang, jisim kepingan kuprum berkurang</i></p>	1
	<i>No response or wrong response</i>	0

Question	Rubric	Score
1(i)	<p><i>Able to predict the positive terminal, the voltage value and the observation at copper strip correctly</i></p> <p><u>Sample answer:</u></p> <p>(i) Positive terminal : silver  <i>Terminal positif : argentum</i></p> <p>(ii) Voltage : less than 2.7 V  <i>Nilai voltan : kurang daripada 2.7 V</i></p> <p>(iii) Observation at copper strip : copper strip become thinner //  Mass of copper strip decreases  <i>Pemerhatian di kepingan kuprum : kepingan kuprum menipis //</i>  <i>Jisim kepingan kuprum berkurang</i></p>	3
	<i>Able to predict any two answers correctly</i>	2
	<i>Able to predict any one answer correctly</i>	1
	<i>No response or wrong response</i>	0

Question	Rubric	Score				
1(j)	<p><i>Able to classify the cations and anions in copper(II) nitrate solution correctly</i></p> <p><u>Sample answer:</u></p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>Cations</td> <td>Copper(II) ion, hydrogen ion // <math>\text{Cu}^{2+}</math>, <math>\text{H}^+</math></td> </tr> <tr> <td>Anions</td> <td>Sulphate ion, hydroxide ion // <math>\text{SO}_4^{2-}</math>, <math>\text{OH}^-</math></td> </tr> </table>	Cations	Copper(II) ion, hydrogen ion // $\text{Cu}^{2+}$ , $\text{H}^+$	Anions	Sulphate ion, hydroxide ion // $\text{SO}_4^{2-}$ , $\text{OH}^-$	3
Cations	Copper(II) ion, hydrogen ion // $\text{Cu}^{2+}$ , $\text{H}^+$					
Anions	Sulphate ion, hydroxide ion // $\text{SO}_4^{2-}$ , $\text{OH}^-$					
	<i>Able to classify one cation and one anion correctly</i>	2				
	<i>Able to classify one cation or one anion correctly</i>	1				
	<i>No response or wrong response</i>	0				

Question	Rubric	Score
2 (a)	<p><b>Able to state the problem statement correctly</b></p> <p>Sample answer :</p> <p>How does the effectiveness of the cleansing action of soap and detergent in hard water different? //</p> <p>Is the cleansing action of detergent is more effective than soap in hard water?//</p> <p>How does the effectiveness of soap and detergent in hard water different?</p> <p><i>Bagaimanakah keberkesanan tindakan pembersihan sabun dan detergen dalam air liat berbeza?//</i></p> <p><i>Adakah tindakan pencucian detergen lebih berkesan daripada sabun dalam air liat?//</i></p> <p><i>Bagaimanakah keberkesanan sabun dan detergen dalam air liat berbeza?</i></p>	3
	<p><b>Able to state the problem statement</b></p> <p>Sample answer:</p> <p>How does the effectiveness of soap and detergent different?</p> <p><i>Bagaimana keberkesanan sabun dan detergen berbeza?</i></p>	2
	<p><b>Able to give an idea of the problem</b></p> <p>Sample answer:</p> <p>To differentiate soap and detergent</p> <p><i>Untuk membezakan sabun dan detergen</i></p>	1
	<b>Wrong response or no response</b>	0

Question	Rubric	Score
2 (b)	<p><b>Able to state the variables correctly</b></p> <p>Sample answer :</p> <p>Manipulated variable : Soap and detergent //</p> <p>Type of cleaning agent <i>Sabun dan detergen //</i> <i>Jenis agen pencuci</i></p> <p>Responding variable : Effectiveness of cleaning agent // Ability to remove the oily stains on cloth <i>Keberkesanan agen pencucian //</i> <i>Kebolehan menanggalkan kotoran berminyak di atas kain</i></p> <p>Fixed variable : Cloths with oily stain // Concentration of magnesium sulphate solution // Hard water // Number of oily stain drops <i>Kain dengan kotoran berminyak //</i> <i>Kepekatan larutan magnesium sulfat //</i> <i>Air liat//</i> <i>Bilangan titis kotoran berminyak</i></p>	<b>3</b>
	<b>Able to state any two variables correctly</b>	<b>2</b>
	<b>Able to state any one variable correctly</b>	<b>1</b>
	<b>Wrong response or no response</b>	<b>0</b>

Question	Rubric	Score
2 (c)	<p><b>Able to state the hypothesis accurately with direction</b></p> <p>Sample answer :  Detergent is more effective than soap as cleaning agent in hard water.//  Detergent can remove the oily stains on cloth in hard water but soap cannot.  <i>Detergen lebih berkesan daripada sabun sebagai agen pencuci dalam air liat.//  Detergen boleh menanggalkan kotoran berminyak atas kain dalam air liat tetapi sabun tidak boleh.</i></p>	<b>3</b>
	<p><b>Able to state the hypothesis correctly</b></p> <p>Sample answer:  Detergent is more effective than soap as cleaning agent.//  Detergent can remove the oily stains on cloth but soap cannot.  <i>Detergen lebih berkesan daripada sabun sebagai agen pencuci.//  Detergen boleh menanggalkan kotoran berminyak atas kain tetapi sabun tidak boleh.</i></p>	<b>2</b>
	<p><b>Able to give an idea of the hypothesis</b></p> <p>Sample answer:  Detergent is more effective//  <i>Detergen lebih berkesan</i></p>	<b>1</b>
	<b>Wrong response or no response</b>	<b>0</b>

Question	Rubric	Score
2 (d)	<p><b>Able to list all materials and apparatus completely</b></p> <p>Sample answer :</p> <p>Materials : Soap and detergent, 1.0 mol dm<sup>-3</sup> magnesium sulphate solution , 2 pieces of clothes stained with oil</p> <p><i>Bahan : Sabun dan detergen, larutan magnesium sulfat 1.0 mol dm<sup>-3</sup>, 2 keping kain dengan kotoran berminyak</i></p> <p>Apparatus : Beaker, glass rod</p> <p><i>Radas : Bikar, rod kaca</i></p>	<b>3</b>
	<p><b>Able to list materials and apparatus less correctly</b></p> <p>Sample answer:</p> <p>Materials : Soap and detergent, hard water / magnesium sulphate solution, Pieces of clothes stained with oil</p> <p>Apparatus : [Any suitable container] [Sebarang bekas yang sesuai]</p>	<b>2</b>
	<p><b>Able to list the minimum materials and apparatus</b></p> <p>Sample answer:</p> <p>Materials : [Any type of soap], [Any type of detergent], [Any type of hard water]</p> <p><i>Bahan : [sebarang jenis sabun], [sebarang jenis detergen] [sebarang jenis air liat]</i></p> <p>Apparatus : [ any container]</p> <p><i>Radas : [ sebarang bekas]</i></p>	<b>1</b>
	<b>Wrong response or no response</b>	<b>0</b>

Question	Rubric	Score
2 (e)	<b>Able to state procedures of the experiment completely</b>  Sample Answer : 1. Measure and pour [50 - 200] cm <sup>3</sup> of 1.0 mol dm <sup>-3</sup> magnesium sulphate solution into a beaker. <i>Sukat dan tuang [50 – 200] cm<sup>3</sup> larutan magnesium sulfat ke dalam bikar.</i> 2. Add soap into the beaker. <i>Tambah sabun ke dalam bikar dan kacau campuran</i> 3. Immerse a piece of cloth stained with oil in the solution. <i>Rendamkan secebis pakaian dengan kotoran berminyak</i> 4. Stir with glass rod / rub the cloth. <i>Kacau dengan rod kaca / gosokkan pakaian</i> 5. Record the observation. <i>Catatkan pemerhatian.</i> 6. Repeat steps 1 – 5 by using detergent. <i>Ulangi langkah 1 – 5 dengan menggunakan detergen.</i>	<b>3</b>
	<b>Able to state steps 1, 2, 3, 5</b>	<b>2</b>
	<b>Able to state steps 1,2,3</b>	<b>1</b>
	<b>Wrong response or no response</b>	<b>0</b>

Question	Rubric	Score						
2 (f)	<b>Able to tabulate the data completely</b>  Sample Answer : <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Type of cleaning agent</th> <th style="width: 50%;">Observation</th> </tr> </thead> <tbody> <tr> <td>Soap</td> <td></td> </tr> <tr> <td>Detergent</td> <td></td> </tr> </tbody> </table>	Type of cleaning agent	Observation	Soap		Detergent		<b>2</b>
	Type of cleaning agent	Observation						
	Soap							
Detergent								
<b>Able to construct a table with correct heading</b>  Sample answer : <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Type of cleaning agent</th> <th style="width: 50%;">Observation</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> </tr> </tbody> </table>	Type of cleaning agent	Observation			<b>1</b>			
Type of cleaning agent	Observation							
<b>Wrong response or no response</b>	<b>0</b>							

**END OF MARKING SCHEME  
PERATURAN PEMARKAHAN TAMAT**