

# Chemistry TRIAL SPM 2009

## PAPER 1 & 2

# JABATAN PELAJARAN PERLIS

## Mark Sheet Paper 1 TRIAL CHEMISTRY SPM 2009

1	A
2	D
3	C
4	C
5	B
6	B
7	C
8	D
9	D
10	D
11	B
12	B
13	A
14	C
15	D
16	A
17	C
18	D
19	A
20	D

21	A
22	D
23	C
24	A
25	B
26	A
27	B
28	C
29	D
30	A
31	D
32	A
33	B
34	B
35	B
36	A
37	C
38	C
39	D
40	B

41	C
42	B
43	B
44	B
45	C
46	C
47	C
48	D
49	C
50	B

A-11

B-14

C-14

D-12

**4541/2 CHEMISTRY**  
**PEPERIKSAAN PERCUBAAN SPM TAHUN 2009**

*Paper 2*

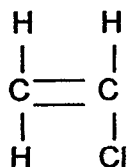
**Section A**

- 1 (a) (i) solid 1  
 (ii) liquid 1  
 (b) Vibrate and rotate in their fixed position 1  
 (c) (i) The temperature at which substance changes from solid to liquid 1  
 (ii) 78 °C 1  
 (iii) 1. Heat energy is absorbed 1  
 2. to overcome the intermolecular forces between particles / van der waals forces 1  
 (d) (i) Molecule 1  
 (ii) 1

Magnesium oxide	
Carbon dioxide	√

**TOTAL 9**

- 2 (a) (i) Long-chain /big molecules made up of many repeating units/monomer 1  
 (ii) 1



- (iii) 1. Burning 1  
 2. produce toxic gas 1  
 (iv) Reduce, reuse and recycle // educate users to the right disposal methods 1  
 (b) (i) Silicon dioxide // silica // silicon (IV) oxide 1  
 (ii) 1. Lead glass // lead crystal glass 1  
 2. Soda-lime glass 1  
 (iii) Can withstand heat // high melting point 1

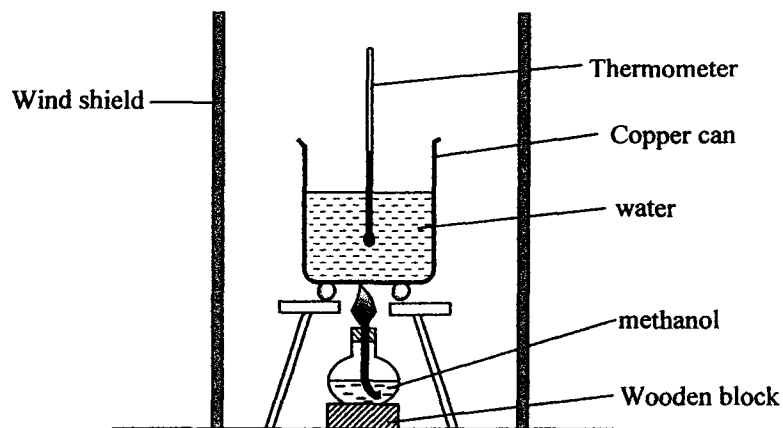
**TOTAL 9**

3	(a) (i)	Substances that are added to food to prevent spoilage / to improve appearance / taste / texture	1
	(ii)	Preservative	1
	(iii)	Thickener	1
	(iv)	Cause cancer / allergy / asthma / hyperactivity ....	1
	(b) (i)	Kill bacteria Reduce tension / anxiety	1
	(ii)	Patient becomes ill again	1
	(iii)	$C_9H_8O_4$ $C_9H_8O_4$	1
	(iv)	180	1
		<b>Total</b>	<b>10</b>
4	(a)	Chemical reaction that involves oxidation and reduction occurring simultaneously / at the same time	1
	(b)	To allow the movement of ions in order to complete the circuit	1
	(c)	Must show in the diagram: electron flows from electrode P to Q	1
	(d)	$2I^- \longrightarrow I_2 + 2e^-$ 1. Correct formulae of reactant and product 2. balance	1 1
	(e)	Brown solution turns dark blue	1
	(f) (i)	6 // +6	1
	(ii)	Reduction	1
	(iii)	1. Oxidation number of Chromium decreases 2. from +6 to +3	1 1
	(ii)	Acidified potassium manganate(VII) solution // Bromine water // chlorine water	1
		<b>TOTAL</b>	<b>10</b>

5	(a)	Blue	1
	(b)	Sulphuric acid r: formula	1
	(c)	$\text{CuO} + \text{H}_2\text{SO}_4 \longrightarrow \text{CuSO}_4 + \text{H}_2\text{O}$	1+ 1
	(d)	Acid completely reacts with copper(II) oxide // acid is completely neutralized by copper(II) oxide	1
		$0.1 = \frac{\text{mass}}{(64 + 32 + 64)}$ $= 0.1 \times 160 \text{ g}$ $= 16 \text{ g}$	Calculate RMM-1 1
	(e)	1.NaOH/ NH <sub>3</sub> solution is added drop by drop until in excess 2.blue precipitate is insoluble / blue precipitate is soluble in excess NaOH / NH <sub>3</sub> solution	1 1
	(f) (i)	Carbon dioxide r: formula	1
	(ii)	CuCO <sub>3</sub>	1
<b>TOTAL</b>			<b>11</b>

- 6 (a) Heat released when methanol burns completely in air to produce carbon dioxide and water // Exothermic reaction // Energy content in the reactant is higher than the product // 728 kJ heat is released

(b)



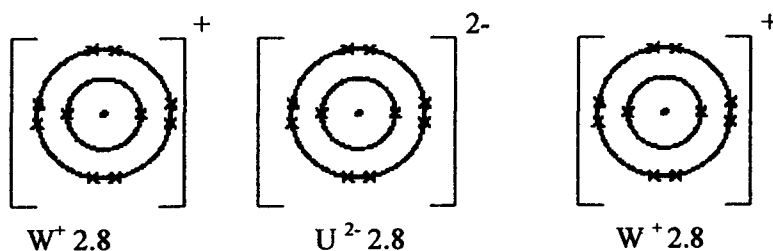
[Functional diagram + Labels]-

1 + 1

c (i)	$728 = \frac{\text{Heat change}}{1.6 // 0.05}$ $\underline{\hspace{2cm}}$ $32$	1
	Heat = 728 X 0.05 // 36.4 kJ	1
(ii)	$36400 = 200 \times 4.2 \times \theta$ $\theta = \frac{36400}{200 \times 4.2}$ $// 43.3 \text{ } ^\circ\text{C}$	1 1
(d)	Use wind shield // never use wire gauze // use thin copper can // water is stirred with the thermometer // weigh the spirit lamp immediately before and after burning	1
(e)	<ol style="list-style-type: none"> <li>1. Number of carbon atom per molecule in propanol is higher</li> <li>2. More CO<sub>2</sub> and H<sub>2</sub>O are produced</li> <li>3. More heat is released</li> </ol>	1 1 1
	<b>TOTAL</b>	<b>11</b>

**Section B**

- 7 (a) (i) Metal : V//W 1  
 Non-metal : U 1  
 .....(2)
- (ii) Group 1 1  
 Period 3 1  
 .....(2)
- (iii) High melting and boiling points // 1  
 Soluble in water//  
 Can conduct electricity in molten and aqueous state



1 + 1

.....(3)

- (b)(i)  $2V + 2H_2O \longrightarrow 2VOH + H_2$
- Formulae for reactants and products correct 1 + 1  
 Balanced 1  
 .....(3)

- (ii) 1.W is more reactive 1  
 2.atomic size of W is bigger 1  
 3.force of attraction between nucleus and the valence electron becomes weaker 1  
 4.W is easier to lose valence electron 1  
 .....(4)

- (c)(i) P : ionic 1  
 Q : covalent 1  
 .....(2)

- (ii) 1.In solution P, ions can move freely 1  
 2.Ions carry the charge and the bulb is lighted up 1  
 3.In solution Q, Q exist as molecule//no free moving ions 1  
 4.molecule does not carry the charge and the bulb does not light up 1  
 .....(4)

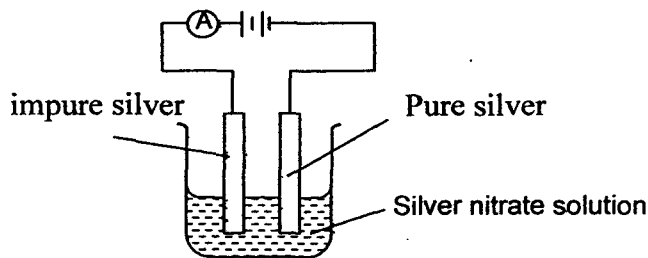
**TOTAL 20**

8	(a)	Smaller pieces of charcoal have bigger total surface area	1
		More area is exposed to oxygen	1
		Big pieces of charcoal have smaller total surface area	1
		Less area is exposed to oxygen	1..... 4
(b) (i)	Rate of reaction of Exp I : $1/18 = 0.056 \text{ s}^{-1}$	1	
	Rate of reaction of Exp II: $1/10 = 0.100 \text{ s}^{-1}$	1..... 2	
(ii)	Mol of sulphuric acid: $\frac{10 \times 0.1}{1000} // 0.001$	1	
	Mol of Sodium thiosulphate : $\frac{50 \times 0.1}{1000} // 0.005$	1	
	1 mol of sulphuric acid produce 1 mol of S 0.001 of sulphuric acid produce 0.001 mol of S	1	
	Mass of sulphur: $0.001 \times 32 \text{ g} // 3.2 \text{ g}$	1.....4	
	<u>Exp I and II</u>		
	Rate of reaction of Exp II is higher	1	
	Exp II has higher temperature,	1	
	the kinetic energy of the particles higher	1	
	The frequency of collision between hydrogen ions and thiosulphate ions increases	1	
	Frequency of effective collision increases	1.....5	
	<u>Exp I and III</u>		
	Rate of reaction of Exp I is higher	1	
	The concentration of Exp I is higher	1	
	The number particles per unit volume in the solution increases	1	
	The frequency of collision between hydrogen ions and thiosulphate ions increases	1	
	The frequency of effective collision increases	1.....5	
	TOTAL	20	



Section C

9 (a)

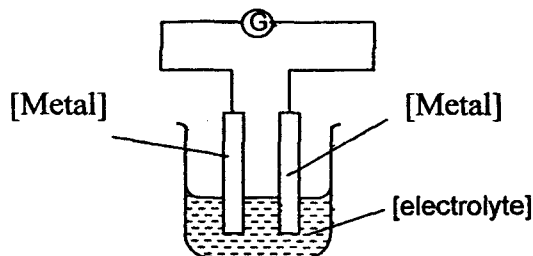


Functional 1  
 Label: 1 battery and ammeter 1  
 2 pure silver and impure silver 1  
 3 silver nitrate solution 1.....4

(b) (i)  
 and (ii)

I	II	
Anode becomes thinner	Gas bubbles are released	2
Copper (II) ion	Oxygen	2
$\text{Cu} \rightarrow \text{Cu}^{2+} + 2\text{e}$	$4\text{OH}^- \rightarrow \text{O}_2 + 2\text{H}_2\text{O} + 4\text{e}$	2.....6

(c)



1+1

Procedure:

1. Clean both metals with sandpaper. 1
2. Pour [electrolyte] into a beaker. 1
3. Dip both metals into the [electrolyte] 1
4. Connect both metals to a voltmeter / galvanometer / bulb 1

Observation:

1. Needle of voltmeter / galvanometer deflects // bulb lights up. [**compulsory**] 1
2. Negative terminal becomes thinner // positive terminal becomes thicker / bubbles are released 1

Half equation:

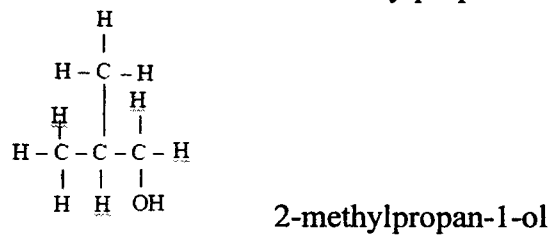
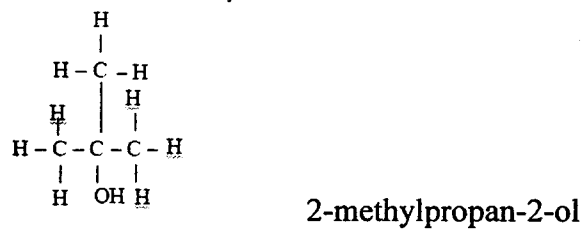
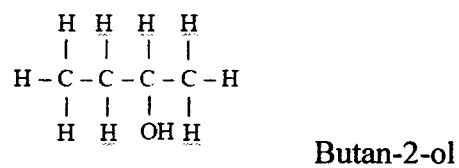
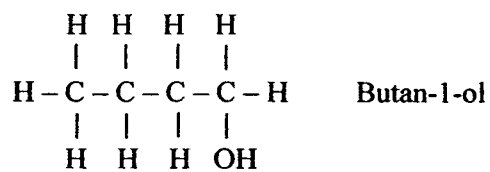
Negative terminal:  $\text{M} \rightarrow \text{M}^{n+} + \text{ne}$  1

Positive terminal:  $\text{M}^{n+} + \text{ne} \rightarrow \text{M} // 2\text{H}^+ + 2\text{e} \rightarrow \text{H}_2$  1

TOTAL

20

10 (a)



Choose any two structural formula and correct name

4

(b)

P	Q
hydrocarbon	Non-hydrocarbon
alkene	Carboxylic acid
Contains carbon atoms and hydrogen atoms only	Contains carbon atoms, hydrogen atoms and oxygen atom
Insoluble in water	Soluble in water
Carbon-carbon double bond	Carboxyl group
Decolourises brown bromine water	Does not change the brown colour of bromine water
Decolourises purple colour of potassium manganate(VII) solution	Does not change the purple colour of potassium manganate(VII) solution
$C_nH_{2n}$ , $n=2,3,\dots$	$C_nH_{2n+1}COOH$ , $n=0,1,\dots$

1  
1  
1  
1  
1  
1  
1  
1  
1

Max:6

(c)

Apparatus: test tubes, dropper

Materials: bromine water // acidified potassium manganate(VII) solution, hexane, hexene

1

Procedure:

1.  $2\text{ cm}^3$  of liquid in bottle X is poured into two separate test tubes.
2. 2 to 3 drops of bromine water are added to two test tubes.
3. The mixture is shaken.
4. Any observation is recorded.
5. Steps 1 to 3 are repeated using liquid in bottle Y to replace liquid in bottle X.

1  
1  
1  
1  
1

Observation:

Liquid in bottle X	Liquid in bottle Y
Brown bromine water decolourises // purple acidified potassium manganate (VII) solution decolourises	No visible change

1+1

Liquid in bottle X/Y is hexene

Liquid in bottle Y/X is hexane

1

1.....10

TOTAL

20

# Chemistry TRIAL SPM 2009

## PAPER 3

KK0510 – Memberi definisi secara operasi

Question number	Rubric	Score
1(a)	<i>Able to give the operational definition accurately</i>  Sample answer: Metal that burns brightly when reacts with oxygen is the most reactive metal // Metal that glows faintly when reacts with oxygen is the least reactive metal	3
	<i>Able to give the operational definition correctly</i>  Sample answer: Metal that reacts with oxygen is a reactive metal	2
	<i>Able to give the idea about the operational definition</i>  Sample answer: Magnesium is the most reactive metal	1
	No response or wrong response	0

KK0501 – Membuat pemerhatian

Question number	Rubric	Score
1(b)	<i>Able to state one observation accurately</i>  Sample answer: Brown solid when hot, yellow solid when cold	3
	<i>Able to state the observation correctly</i>  Sample answer: Brown solid when hot // yellow solid when cold	2
	<i>Able to state idea of the observation</i>  Sample answer: Brown / yellow solid is formed	1
	No response or wrong response	0

KK0504 – Membuat inferens

Question number	Rubric	Score
1(c)	<i>Able to state an accurate inference for this experiment:</i>  Sample answer: Magnesium is the most reactive metal	3
	<i>Able to state the inference for this experiment:</i>  Sample answer: Magnesium is a reactive metal	2
	<i>Able to state the general inference for this experiment:</i>  Sample answer: Magnesium oxide is formed // Magnesium reacts with oxygen	1
	No response or wrong response	0

KK0510 – Mengawal pembolehubah

Question	Rubric	Score
1(d)	<i>Able to state three variables and the way to control them correctly:</i> Sample answer: (i) <b>Manipulated variable</b> Type of metals  (ii) <b>Responding variable</b> Reactivity of metals / Brightness of flame or glow  (iii) <b>Controlled variable</b> Mass of metal powder / quantity of potassium manganate(VII)	3
	<i>Able to state any 2 of the above information correctly</i>	2
	<i>Able to state any 1 of the above information correctly</i>	1
	No response or wrong response	0

KK0511 – Membuat hipotesis

Question	Rubric	Score
1(e)	<p><i>Able to state the relationship between the manipulated variable and the responding variable correctly and with direction</i></p> <p>Sample answer: The higher the metal in reactivity series, the brighter the flame / glow produced // The higher the metal in reactivity series, the reactivity of the metal increases.</p>	3
	<p><i>Able to state the relationship between the manipulated variable and the responding variable correctly and without direction</i></p> <p>Sample answer: The brighter the flame / glow produced, the higher the metal in reactivity series</p>	2
	<p><i>Able to state an idea of the hypothesis</i></p> <p>Sample answer: The higher the metal, the brighter the flame / glow produced // The higher the metal, the reactivity of the metal increases.</p>	1
	No response or wrong response	0

KK0508 – Mentafsir data

Question number	Rubric	Score
1(f)	<i>Able to arrange the metals in ascending order of reactivity series of metals towards oxygen accurately</i>	3
	Sample answer: Copper, lead, zinc, magnesium	
	<i>Able to arrange any 3 metals in ascending order of reactivity series of metals towards oxygen correctly</i>	2
	Sample answer: <b>Lead, zinc, magnesium, copper //</b> <b>Magnesium, copper, lead, zinc //</b> Magnesium, zinc, lead, copper	
<i>Able to arrange any 2 metals in ascending order of reactivity series of metals towards oxygen correctly</i>	1	
	No response or wrong response	0

KK0505 – Membuat ramalan

Question number	Rubric	Score
1(g)	<i>Able to predict the position of iron in the reactivity series of metals accurately</i>	3
	Answer: Between zinc and lead	
	<i>Able to predict the position of iron in the reactivity series of metals correctly</i>	2
	Answer: Below zinc // above lead	
<i>Able to predict the position of iron in the reactivity series of metals</i>	1	
Answer: Below magnesium // above copper		
	No response or wrong response	0



KK0507 – Menggunakan perhubungan ruang dan masa

Question	Rubric	Score
1(h)	<p><i>Able to explain the relationship between the time to light up and the reactivity of metal accurately</i></p> <p>Sample answer: Magnesium is more reactive than zinc // Zinc is less reactive than magnesium</p>	3
	<p><i>Able to explain the relationship between the time to light up and the reactivity of metal correctly</i></p> <p>Sample answer: Magnesium is a more reactive metal // Zinc is a less reactive metal</p>	2
	<p><i>Able to state an idea of the relationship between the time to light up and the reactivity of metal</i></p> <p>Sample answer: Magnesium is a reactive metal</p>	1
	No response or wrong response	0

KK0502 – Mengelas

Question number	Rubric	Score
1(i)	<i>Able to make the classification of more reactive metals and less reactive metals when reacts with oxygen accurately</i>	3
	Sample answer: More reactive metals : Magnesium, zinc Less reactive metals : Lead, copper	
	<i>Able to make the classification of more reactive metals // less reactive metals // one more reactive metal and one less reactive metal</i>	2
	<i>Able to make the classification of more reactive metals // less reactive metals inversely</i>	1
Sample answer: Less reactive metals : Magnesium, zinc More reactive metals : Lead, copper		
	No response or wrong response	0

KK0503 – Mengukur dan menggunakan nombor

Question number	Rubric	Score
1(j)(i)	<i>Able to record the masses accurately in two decimal places with unit</i>	3
	Answer: 14.63g 17.03g 18.63g	
	<i>Able to record the masses in two decimal places without unit</i>	2
	<i>Able to record the masses</i>	1
	No response or wrong response	0

KK0506 – Berkomunikasi

Question number	Rubric	Score								
1(j) (ii)	<p><i>Able to construct a table that contains:</i></p> <ol style="list-style-type: none"> <li>1. <i>Crucible + lid, crucible + lid + magnesium, crucible + lid + magnesium oxide and mass with correct unit.</i></li> <li>2. <i>Transfer <u>all</u> the readings from (j)(i) correctly.</i></li> </ol> <p>Answer:</p> <table border="1" data-bbox="518 491 1180 646"> <thead> <tr> <th>Description</th> <th>Mass (g)</th> </tr> </thead> <tbody> <tr> <td>Crucible + lid</td> <td>14.63</td> </tr> <tr> <td>Crucible + lid + magnesium</td> <td>17.03</td> </tr> <tr> <td>Crucible + lid + magnesium oxide</td> <td>18.63</td> </tr> </tbody> </table>	Description	Mass (g)	Crucible + lid	14.63	Crucible + lid + magnesium	17.03	Crucible + lid + magnesium oxide	18.63	3
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	Crucible + lid	14.63								
	Crucible + lid + magnesium	17.03								
Crucible + lid + magnesium oxide	18.63									
<p><i>Able to construct a table that contains:</i></p> <ol style="list-style-type: none"> <li>1. <i>Crucible + lid, crucible + lid + magnesium, crucible + lid + magnesium oxide and mass without unit.</i></li> <li>2. <i>Transfer <u>all</u> the readings from (j)(i) correctly.</i></li> </ol>	2									
<p><i>Able to construct a table that contains:</i></p> <ol style="list-style-type: none"> <li>1. <i>Suitable headings.</i></li> <li>2. <i>Transfer <u>at least two</u> readings from (j)(i) correctly.</i></li> </ol>	1									
No response or wrong response	0									

KK051201 – Aim of the experiment

Question number	Rubric	Score
2(a)	<i>Able to state the problem statement correctly</i>  Sample answer: Does an acid need water to show its acidic properties?	3
	<i>Able to state the problem statement</i>  Sample answer: To investigate the role of water in showing the properties of acid	2
	<i>Able to state the idea of the problem statement</i>  Sample answer: Acid can show its acidic properties	1
	No response or wrong response	0

KK0510 – Mengawal pembolehubah

Question number	Rubric	Score
2(b)	<i>Able to state three variables correctly</i>  Answer: <b>Manipulated variable</b> Type of solvents // water and named organic solvent  <b>Responding variable</b> Bubbles // Colour change of blue litmus paper  <b>Controlled variable</b> Type of acid / calcium carbonate / magnesium	3
	<i>Able to state any 2 variables correctly</i>	2
	<i>Able to state any 1 variable correctly</i>	1
	No response or wrong response	0

KK0512 – Membuat hipotesis

Question number	Rubric	Score
2(c)	<p><i>Able to state the relationship between the manipulated variable and the responding variable correctly and with direction</i></p> <p>Sample answer: The presence of water in acid can show its acidic properties</p>	3
	<p><i>Able to state the relationship between the manipulated variable and the responding variable correctly and without direction</i></p> <p>Sample answer: Acid shows its acidic properties in the presence of water // The presence of water influences / affects the acidic properties // The presence of water can show its acidic properties</p>	2
	<p><i>Able to state an idea of the hypothesis</i></p> <p>Sample answer: Acid can shows its acidic properties // Water influences / affects the acid</p>	1
	No response or wrong response	0

KK051205 – Senarai Bahan dan Radas

Question	Rubric	Score	
2(d)	<i>Able to list the materials and apparatus accurately</i>	3	
	Sample answer: Apparatus : Test tube, test tube rack, droppers Materials : Distilled water, glacial ethanoic acid, any suitable organic solvent, blue litmus paper / any metal carbonate / any suitable reactive metal (Mg / Al / Zn / Fe)		
	<i>Able to list the materials and apparatus correctly</i>		2
	Sample answer: Apparatus : Test tube, test tube rack Materials : distilled water, glacial ethanoic acid, any organic solvent		
<i>Able to list at least one material and one apparatus</i>	1		
Sample answer: Apparatus : Test tube / test tube rack / droppers Materials : distilled water / glacial ethanoic acid / any organic solvent			
	No response or wrong response	0	

KK051204 – Prosedur

Question number	Rubric	Score	
2(e)	<i>Able to state 6 steps:</i>	3	
	Sample answer: 1. Three test tubes are labelled A, B, C and placed in a test tube rack 2. Glacial ethanoic acid is placed into each test tube 3. Distilled water is added to test tube B 4. [Organic solvent] is added to test tube C 5. [metal carbonate] / [Mg / Al / Zn / Fe] / blue litmus paper is placed into each test tube 6. Any observations are recorded		
	<i>Able to state steps 2, 3, 4, 5</i>		2
	<i>Able to state steps 2, 3</i>		1
	No response or wrong response	0	

KK051203 – Penjadualan Data

Question number	Rubric	Score								
2(f)	<p><i>Able to exhibit the tabulation of data that includes the following information:</i></p> <ol style="list-style-type: none"> <li>1. <i>Heading for manipulated - description</i></li> <li>2. <i>Heading for responding</i></li> <li>3. <i>4 x 2 table</i></li> </ol> <p>Sample answer:</p> <table border="1" data-bbox="483 510 1170 772"> <thead> <tr> <th><i>Description</i></th> <th><i>Observation</i></th> </tr> </thead> <tbody> <tr> <td>Glacial ethanoic acid</td> <td></td> </tr> <tr> <td>Glacial ethanoic acid + distilled water</td> <td></td> </tr> <tr> <td>Glacial ethanoic acid + [organic solvent]</td> <td></td> </tr> </tbody> </table>	<i>Description</i>	<i>Observation</i>	Glacial ethanoic acid		Glacial ethanoic acid + distilled water		Glacial ethanoic acid + [organic solvent]		2
<i>Description</i>	<i>Observation</i>									
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Glacial ethanoic acid + distilled water										
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	<p><i>Able to exhibit the tabulation of data that include:</i></p> <ol style="list-style-type: none"> <li>1. <i>heading for manipulate/responding</i></li> <li>2. <i>3 x 2 table</i></li> </ol> <table border="1" data-bbox="483 993 1170 1182"> <thead> <tr> <th><i>Description</i></th> <th><i>Observation</i></th> </tr> </thead> <tbody> <tr> <td>Glacial ethanoic acid + distilled water</td> <td></td> </tr> <tr> <td>Glacial ethanoic acid + [organic solvent]</td> <td></td> </tr> </tbody> </table>	<i>Description</i>	<i>Observation</i>	Glacial ethanoic acid + distilled water		Glacial ethanoic acid + [organic solvent]		1		
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Glacial ethanoic acid + distilled water										
Glacial ethanoic acid + [organic solvent]										
	No response or wrong response	0								