



**MODUL PINTAS  
TINGKATAN 5  
CHEMISTRY  
Kertas 3**

**4541/3**

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

Satu jam tiga puluh minit

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**PERATURAN PEMARKAHAN  
KIMIA K3  
4541/3**

No	Mark Scheme <i>Skema markah</i>	Mark <i>Markah</i>								
1(a)	<p><b>Able to state all the three variables and all the three actions correctly.</b></p> <p><u>Answer</u></p> <table border="1"> <thead> <tr> <th>Name of variable</th> <th>Action to be taken</th> </tr> </thead> <tbody> <tr> <td>(i) <b>Manipulated variable:</b> Concentration of acid</td> <td>(i) <b>Method to manipulate variable:</b> Use different concentration of acid / dilute the acid</td> </tr> <tr> <td>(ii) <b>Responding variable:</b> pH value</td> <td>(ii) <b>What to observe in the responding variable:</b> pH meter reading</td> </tr> <tr> <td>(iii) <b>Controlled variable:</b> Type of acid / hydrochloric acid</td> <td>(iii) <b>Method to maintain constant variable:</b> Use same type of acid</td> </tr> </tbody> </table>	Name of variable	Action to be taken	(i) <b>Manipulated variable:</b> Concentration of acid	(i) <b>Method to manipulate variable:</b> Use different concentration of acid / dilute the acid	(ii) <b>Responding variable:</b> pH value	(ii) <b>What to observe in the responding variable:</b> pH meter reading	(iii) <b>Controlled variable:</b> Type of acid / hydrochloric acid	(iii) <b>Method to maintain constant variable:</b> Use same type of acid	3+3
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(i) <b>Manipulated variable:</b> Concentration of acid	(i) <b>Method to manipulate variable:</b> Use different concentration of acid / dilute the acid									
(ii) <b>Responding variable:</b> pH value	(ii) <b>What to observe in the responding variable:</b> pH meter reading									
(iii) <b>Controlled variable:</b> Type of acid / hydrochloric acid	(iii) <b>Method to maintain constant variable:</b> Use same type of acid									
	<b>Able to state any two variables and any two actions correctly.</b>	2+2								
	<b>Able to state any one variable and any one action correctly.</b>	1+1								
	<b>No response or wrong response</b>	0								

No	Mark Scheme <i>Skema markah</i>	Mark <i>Markah</i>
1(b)	<p><b>Able to state the relationship correctly between the manipulated variable and the responding variable with direction.</b></p> <p><u>Sample answer:</u> The higher the concentration of hydrochloric acid, the lower the pH value.</p>	3
	<p><b>Able to state the relationship between the manipulated variable and the responding variable without direction.</b></p> <p><u>Sample answer:</u> Concentration of acid affect the pH value.</p>	2
	<p><b>Able to state the idea of hypothesis</b></p> <p><u>Sample answer:</u> Acid have pH value</p>	1
	<b>No response or wrong response</b>	0

No	Mark Scheme <i>Skema markah</i>	Mark <i>Markah</i>
1(c)	<b>Able to predict the concentration correctly with unit.</b>  <u>Sample answer:</u> 0.000001 mol dm <sup>-3</sup> / 1.0 X 10 <sup>-6</sup> mol dm <sup>-3</sup>	3
	<b>Able to predict the concentration correctly without unit.</b>  <u>Sample answer:</u> 0.000001 / 1.0 X 10 <sup>-6</sup>	2
	<b>Able to predict the concentration in range form.</b>  <u>Sample answer:</u> Lower than 0.000001	1
	<b>No response or wrong response</b>	0

No	Mark Scheme <i>Skema markah</i>	Mark <i>Markah</i>
1(d)	<b>Able to show how to calculate the volume correctly and answer with unit.</b>  <u>Sample answer:</u> $M_1V_1 = M_2V_2$ (1.0) $V_1 = (0.01) (250)$ $V_1 = 2.5 / 1.0$ $= 2.5 \text{ cm}^3$	3
	<b>Able to give the volume correctly with unit.</b>  <u>Sample answer:</u> 2.5 cm <sup>3</sup>	2
	<b>Able to give the volume correctly without unit.</b>  <i>Sample answer:</i> 2.5	1
	<b>No response or wrong response</b>	0

No	Mark Scheme <i>Skema markah</i>	Mark <i>Markah</i>																								
1(e)	<p><b>Able to record <i>all readings accurately to two decimal point with unit.</i></b></p> <p><u>Sample answer:</u></p> <table border="1"> <thead> <tr> <th></th> <th>Initial burette readings</th> <th>Final burette readings</th> </tr> </thead> <tbody> <tr> <td>First titration</td> <td>1.20 cm<sup>3</sup></td> <td>25.30 cm<sup>3</sup></td> </tr> <tr> <td>Second titration</td> <td>2.90 cm<sup>3</sup></td> <td>27.20 cm<sup>3</sup></td> </tr> <tr> <td>Third titration</td> <td>0.55 cm<sup>3</sup></td> <td>24.60 cm<sup>3</sup></td> </tr> </tbody> </table>		Initial burette readings	Final burette readings	First titration	1.20 cm <sup>3</sup>	25.30 cm <sup>3</sup>	Second titration	2.90 cm <sup>3</sup>	27.20 cm <sup>3</sup>	Third titration	0.55 cm <sup>3</sup>	24.60 cm <sup>3</sup>	3												
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	<b>No response or wrong response</b>	0																								

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1(f)	<p><b>Able to construct a table that contains:</b></p> <ol style="list-style-type: none"> <li>1. <i>Correct titles</i></li> <li>2. <i>Readings and unit</i></li> </ol> <p><u>Sample answer:</u></p> <table border="1"> <tr> <td>Titration number</td> <td>1</td> <td>2</td> <td>3</td> </tr> <tr> <td>Final burette reading / cm<sup>3</sup></td> <td>25.30</td> <td>27.20</td> <td>24.60</td> </tr> <tr> <td>Initial burette reading / cm<sup>3</sup></td> <td>1.20</td> <td>2.90</td> <td>0.55</td> </tr> <tr> <td>Volume of hydrochloric acid / cm<sup>3</sup></td> <td>24.10</td> <td>24.30</td> <td>24.05</td> </tr> </table>	Titration number	1	2	3	Final burette reading / cm <sup>3</sup>	25.30	27.20	24.60	Initial burette reading / cm <sup>3</sup>	1.20	2.90	0.55	Volume of hydrochloric acid / cm <sup>3</sup>	24.10	24.30	24.05	3
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	<p><b>Able to construct a less accurate table that contains the following:</b></p> <ol style="list-style-type: none"> <li>1. <i>Titles</i></li> <li>2. <i>Readings</i></li> </ol> <p><u>Sample answer:</u></p> <table border="1"> <tr> <td>Titration number</td> <td>1</td> <td>2</td> <td>3</td> </tr> <tr> <td>Final burette reading</td> <td>25.30</td> <td>27.20</td> <td>24.60</td> </tr> <tr> <td>Initial burette reading</td> <td>1.20</td> <td>2.90</td> <td>0.55/0.60</td> </tr> <tr> <td>Volume of hydrochloric acid</td> <td>24.10</td> <td>24.30</td> <td>24.05</td> </tr> </table>	Titration number	1	2	3	Final burette reading	25.30	27.20	24.60	Initial burette reading	1.20	2.90	0.55/0.60	Volume of hydrochloric acid	24.10	24.30	24.05	2
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	<p><b>Able to construct a table with at least one title / reading.</b></p> <p><u>Sample answer:</u></p> <table border="1"> <tr> <td>Final burette readings</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Initial burette readings</td> <td></td> <td></td> <td></td> </tr> </table>	Final burette readings				Initial burette readings				1								
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	<b>No response or wrong response</b>	0																

No	Mark Scheme <i>Skema markah</i>	Mark <i>Markah</i>
1(g)	<b>Able to state the colour change accurately.</b>  <u>Sample answer:</u> The colour of phenolphthalein change from pink to colourless.	3
	<b>Able to state the the colour change inaccurately.</b>  <u>Sample answer:</u> Change to colourless.	2
	<b>Able to state an idea about the observation.</b>  <u>Sample answer:</u> The colour changes // pink	1
	<b>No response or wrong response</b>	0

No	Mark Scheme <i>Skema markah</i>	Mark <i>Markah</i>
1(h)	<p><b>Able to give the operational definition accurately by stating the following two information.</b></p> <p>1. <b>What should be done</b> : <i>Added to neutralize sodium hydroxide solution</i>  2. <b>What should be observed</b>: <i>Phenolphthalein change from pink to colourless</i></p> <p><u>Sample answer:</u>  Acid is the substance when added to neutralize sodium hydroxide solution, the phenolphthalein change from pink to colourless</p>	3
	<p><b>Able to give the operational definition <i>correctly</i> by stating any <i>one</i> of the information above.</b></p> <p><u>Sample answer:</u>  Acid is a substance that is added to neutralize sodium hydroxide solution</p> <p style="text-align: center;">Or</p> <p>Acid is a substance that changes the colour of phenolphthalein from pink to colourless.</p>	2
	<p><b>Able to give the operational definition <i>correctly</i> by giving an idea of the information above.</b></p> <p><u>Sample answer:</u>  Acid neutralizes the alkali</p> <p style="text-align: center;">Or</p> <p>phenolphthalein change from pink to colourless.</p>	1
	<b>No response or wrong response</b>	0

No	Mark Scheme <i>Skema markah</i>	Mark <i>Markah</i>
1(i)	<b>Able to give all two explanations correctly.</b>  <u>Sample answers:</u> 1. Sulphuric acid is diprotic acid, hydrochloric acid is monoprotic acid, 2. The volume of sulphuric acid is half the volume of hydrochloric acid to produce the same concentration of hydrogen ions.	3
	<b>Able to give any one correct explanation.</b>	2
	<b>Able to give incomplete explanation.</b>  <u>Sample answer:</u> Sulphuric acid is diprotic acid / hydrochloric acid is monoprotic acid	1
	<b>No response or wrong response</b>	0

No	Mark Scheme <i>Skema markah</i>	Mark <i>Markah</i>								
1(j)	<b>Able to classify <i>all the four acids correctly.</i></b>  <u>Sample answer:</u> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Monoprotic acid</th> <th>Diprotic acid</th> </tr> </thead> <tbody> <tr> <td>Nitric acid</td> <td>Sulphuric acid</td> </tr> <tr> <td>Hydrochloric acid</td> <td></td> </tr> <tr> <td>Acetic Acid</td> <td></td> </tr> </tbody> </table>	Monoprotic acid	Diprotic acid	Nitric acid	Sulphuric acid	Hydrochloric acid		Acetic Acid		3
	Monoprotic acid	Diprotic acid								
	Nitric acid	Sulphuric acid								
	Hydrochloric acid									
Acetic Acid										
<b>Able to classify any <i>three acids correctly.</i></b>  <u>Sample answer:</u> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Monoprotic acid</th> <th>Diprotic acid</th> </tr> </thead> <tbody> <tr> <td>Nitric acid</td> <td>Sulphuric acid</td> </tr> <tr> <td>Acetic acid</td> <td>Hydrochloric acid</td> </tr> </tbody> </table>	Monoprotic acid	Diprotic acid	Nitric acid	Sulphuric acid	Acetic acid	Hydrochloric acid	2			
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<b>Able to classify any <i>one acid correctly.</i></b>  <u>Sample answer:</u> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Monoprotic acid</th> <th>Diprotic acid</th> </tr> </thead> <tbody> <tr> <td>Hydrochloric acid</td> <td>Nitric acid</td> </tr> <tr> <td>Sulphuric acid</td> <td>Acetic acid</td> </tr> </tbody> </table>	Monoprotic acid	Diprotic acid	Hydrochloric acid	Nitric acid	Sulphuric acid	Acetic acid	1			
Monoprotic acid	Diprotic acid									
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Sulphuric acid	Acetic acid									
<b>No response or wrong response</b>		0								



No	Mark Scheme <i>Skema markah</i>	Mark <i>Markah</i>
2(a)	<b>Able to give the statement of the problem accurately.</b>  Sample answer: Which of the Plastic will melt when put into hot water? Plastic A or Plastic B will melt when put into hot water? Which of the Plastics is heat resistant when put into hot water?	3
	<b>Able to give the statement of the problem correctly.</b>  Will Plastic A melt in hot water?  Will Plastic B melt in hot water?  Does Plastic A is able to resist heat? Does Plastic B is able to resist heat?  To compare the heat resistant of plastics in hot water.	2
	<b>Able to give an idea of statement of the problem correctly.</b>  Are they any differences in heat resistant of plastics	1
	<b>No response or wrong response.</b>	0

No	Mark Scheme <i>Skema markah</i>	Mark <i>Markah</i>
2(b)	<b>Able to state the three variables correctly.</b>  Manipulated variable: Type of plastic // Plastic A and Plastic B  Responding variable: Observation after put into hot water// condition of plastic after put into hot water  Constant variable : Size//initial length of plastic// temperature of hot water	3
	<b>Able to state any one of the following variables correctly.</b>	2
	<b>Able to state any two of the following variables correctly.</b>	1
	<b>No response or wrong response</b>	0

No	Mark Scheme <i>Skema markah</i>	Mark <i>Markah</i>
2(c)	<p><b>Able to state the relationship <i>correctly</i> between the manipulated variable and the responding variable with direction.</b></p> <p><u>Sample answer:</u> Plastic A does not melt when put into hot water while Plastic B melts when put into hot water</p> <p>**vice versa</p>	3
	<p><b>Able to state the relationship between the manipulated variable and the responding variable without direction.</b></p> <p><u>Sample answer:</u> Heat affects the condition of plastics// Plastic A/B melts</p> <p>**vice versa</p>	2
	<p><b>Able to state the idea of hypothesis</b></p> <p>Plastic melts</p>	1
	<p><b>No response or wrong response</b></p>	0

No	Mark Scheme <i>Skema markah</i>	Mark <i>Markah</i>
2(d)	<p><b>Able to give complete list of substances and apparatus</b></p> <p><u>Answer:</u>  <b>Substance</b>            -Plastic A            -Plastic B            - Water</p> <p><b>Apparatus</b></p> <ul style="list-style-type: none"> <li>- Scissors</li> <li>- 250 cm<sup>3</sup> beaker</li> <li>- Bunsen burner</li> <li>- Wire gauze</li> <li>- Tripod stand</li> <li>- Tweezer/ tongs</li> </ul>	3
	<p><b>Able to give a list of substances and apparatus but less complete</b></p> <p><u>Answer:</u>  <b>Substance</b>            -Plastic A            -Plastic B            - Water</p> <p><b>Apparatus</b></p> <ul style="list-style-type: none"> <li>- Scissors</li> <li>- 250 cm<sup>3</sup> beaker</li> <li>- Bunsen burner</li> <li>- Wire gauze</li> <li>- Tripod stand</li> </ul>	
	<p><b>Able to give at least <i>two</i> substance and at least <i>two</i> apparatus</b></p> <p><u>Answer:</u>  <b>Substance</b>            -Plastic            - Water</p> <p><b>Apparatus</b></p> <ul style="list-style-type: none"> <li>- beaker</li> <li>- Bunsen burner</li> </ul>	1
	<b>No response or wrong response</b>	0

No	Mark Scheme <i>Skema markah</i>	Mark <i>Markah</i>
2(e)	<p><b>Able to state the complete procedure.</b></p> <p><u>Answer:</u>            1. <b>Cut</b> a piece of Plastic A into [5cm – 10 cm] //            2. <b>Fill</b> the beaker with water until half full [50-200cm<sup>3</sup>]            3. <b>Heat</b> the water using Bunsen burner until water boils            4. <b>Put</b> Plastic A into the boiling water for 10 minutes [ 10-15 minutes]            5. Using a tweezer/tongs, <b>remove</b> the Plastic from the boiling water and            6. <b>Record</b> the observation</p>	3
	<p><b>Able to state a procedure that can conduct the experiment.</b></p> <p>Step 2,3, 4 and 6.</p>	2
	<p><b>Able to state a minimum procedure.</b></p> <p>Step 3, 4, and 6.</p>	1
	<p><b>No response or wrong response</b></p>	0

No	Mark Scheme <i>Skema markah</i>	Mark <i>Markah</i>											
2(f)	<b>Able to make a labeled tabulation of data with suitable unit.</b> <table border="1"> <thead> <tr> <th>Type of plastic</th> <th>Observation</th> </tr> </thead> <tbody> <tr> <td>Plastic A</td> <td></td> </tr> <tr> <td>Plastic B</td> <td></td> </tr> </tbody> </table>	Type of plastic	Observation	Plastic A		Plastic B		2					
	Type of plastic	Observation											
	Plastic A												
	Plastic B												
<b>Able to construct table with at least one title incomplete title or list</b> <table border="1"> <thead> <tr> <th>Type of plastic</th> <th></th> </tr> </thead> <tbody> <tr> <td>Plastic A</td> <td></td> </tr> <tr> <td>Plastic B</td> <td></td> </tr> </tbody> </table> <p>Or</p> <table border="1"> <thead> <tr> <th></th> <th>Observation</th> </tr> </thead> <tbody> <tr> <td>Plastic A</td> <td></td> </tr> <tr> <td>Plastic B</td> <td></td> </tr> </tbody> </table>	Type of plastic		Plastic A		Plastic B			Observation	Plastic A		Plastic B		1
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**END OF ANSWER SCHEME**  
***SKEMA JAWAPAN TAMAT***