

MODUL MPSM PULAU PINANG
PERATURAN PEMARKAHAN KIMIA KERTAS 3, 2020

Qn No.		Score												
1(a)	Able to accurately record all readings to two decimal places and with unit	3												
	<u>Answer</u> Set I: 150.70, 150.64; Set II: 150.70, 150.55; Set III: 150.70, 150.47													
	Able to record any four readings correctly													
1(b)	<u>Sample answers</u> 1. Set I: 150.70, 150.63 2. Set I: 150.7011, 150.6392 Set II: 150.70, 150.55 Set II: 150.7011, 150.5523 Set III: 150.70, 150.46 Set III: 150.7011, 150.4689	2												
	Able to record any three readings correctly	1												
	<p style="text-align: center;">Able to construct a table that consists of</p> 1. Manipulated variable with correct unit 2. Mass of conical flask and its content with correct unit before the experiment 3. Mass of conical flask and its content with correct unit after the experiment 4. All data on mass transferred correctly <u>Sample answer:</u> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">Concentration of hydrochloric acid (mol dm⁻³)</td> <td style="text-align: center;">0.1</td> <td style="text-align: center;">0.5</td> <td style="text-align: center;">1.0</td> </tr> <tr> <td style="text-align: center;">Mass before experiment (g)</td> <td style="text-align: center;">150.70</td> <td style="text-align: center;">150.70</td> <td style="text-align: center;">150.70</td> </tr> <tr> <td style="text-align: center;">Mass after experiment (g)</td> <td style="text-align: center;">150.64</td> <td style="text-align: center;">150.55</td> <td style="text-align: center;">150.47</td> </tr> </table>	Concentration of hydrochloric acid (mol dm⁻³)	0.1	0.5	1.0	Mass before experiment (g)	150.70	150.70	150.70	Mass after experiment (g)	150.64	150.55	150.47	3
Concentration of hydrochloric acid (mol dm⁻³)	0.1	0.5	1.0											
Mass before experiment (g)	150.70	150.70	150.70											
Mass after experiment (g)	150.64	150.55	150.47											
1(b)	<p style="text-align: center;">Able to construct a table that consists of</p> 1. Manipulated variable 2. Mass of conical flask and its content before the experiment 3. Mass of conical flask and its content after the experiment 4. Four data on mass transferred correctly <u>Sample answer</u> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">Concentration</td> <td style="text-align: center;">0.1</td> <td style="text-align: center;">0.5</td> <td style="text-align: center;">1.0</td> </tr> <tr> <td style="text-align: center;">Mass before experiment</td> <td style="text-align: center;">150.70</td> <td style="text-align: center;">150.70</td> <td style="text-align: center;">150.70</td> </tr> <tr> <td style="text-align: center;">Mass after experiment</td> <td style="text-align: center;">150.64</td> <td style="text-align: center;">150.47</td> <td style="text-align: center;">150.55</td> </tr> </table>	Concentration	0.1	0.5	1.0	Mass before experiment	150.70	150.70	150.70	Mass after experiment	150.64	150.47	150.55	2
	Concentration	0.1	0.5	1.0										
	Mass before experiment	150.70	150.70	150.70										
Mass after experiment	150.64	150.47	150.55											
<p style="text-align: center;">Able to give an idea of tabulation of data that consists of</p> 1. Manipulated variable 2. Mass of conical flask and its content before / after the experiment 3. Two data on mass transferred correctly <u>Sample answer</u> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">Concentration</td> <td style="text-align: center;">0.1</td> <td style="text-align: center;">0.5</td> </tr> <tr> <td style="text-align: center;">Mass</td> <td style="text-align: center;">150.70</td> <td style="text-align: center;">150.70</td> </tr> </table>	Concentration	0.1	0.5	Mass	150.70	150.70	1							
Concentration	0.1	0.5												
Mass	150.70	150.70												
1(c)	Able to state one observation correctly	3												
	<u>Sample answer:</u> 1. Bubbles produced													
	Able to state one observation less correctly													
1(c)	<u>Sample answers:</u> 1. Air bubbles produced 2. Mass reading decreases	2												
	Able to give an idea of the observation	1												
	<u>Sample answers:</u> 1. Conical flask becomes warm 2. Mass is 150.64 g 3. Mass changes													

1(d)	Able to state a corresponding inference correctly	3
	<u>Sample answer:</u> 1. Carbon dioxide is released	
	Able to state a corresponding inference less correctly	2
1(e)	<u>Sample answers:</u> 1. Acid and calcium carbonate reacts 2. Gas is released	
	Able to state an idea of a corresponding inference	1
	<u>Sample answers</u> 1. Gas is formed 2. Heat is released	
1(f)	Able to state all the variables correctly	3
	<u>Sample answers</u> Manipulated variable: Concentration of hydrochloric acid Responding variable : Rate of reaction // Change in mass of CaCO ₃ Fixed variable : Hydrochloric acid // Mass of CaCO ₃ // Temperature // Size of CaCO ₃	
	Able to state any two variables correctly or one correct variable and idea of two other variables	2
1(g)	Able to state any one variable correctly or idea of all the variables	1
	Able to state the relationship with direction between the manipulated variable and the responding variable	3
	<u>Sample answers:</u> 1. The higher the concentration of hydrochloric acid, the higher the rate of reaction 2. The higher the concentration of hydrochloric acid, the larger the change in mass of CaCO ₃	
1(h)	Able to state the relationship between the manipulated variable and the responding variable	2
	<u>Sample answers:</u> 1. The higher the concentration of hydrochloric acid, the faster the reaction 2. Change in concentration of hydrochloric affect the change in mass of CaCO ₃	
	Able to state an idea of hypothesis	1
1(i)	<u>Sample answer:</u> 1. Concentration affects mass	
	Able to correctly predict the electronic balance reading	3
	<u>Answer:</u> [150.4720 – 150.5550 g]	
1(j)	Able to predict less correctly the electronic balance reading	2
	<u>Sample answers:</u> 1. More than 150.4689 and less than 150.5523 2. [150.4689 – 150.4719] 3. [150.5524 – 150.5549]	
	Able to give an idea of predicting the ammeter reading	1
1(k)	<u>Sample answer:</u> 1. More than 150.4689	
	Able to state the operational definition for rate of reaction with the following criteria:	3
	(i) What should be done (ii) What should be observed <u>Sample answer</u> 1. Change in mass of when time is taken at 8 minutes.	
1(l)	Able to state the operational definition for rate of reaction with the following criteria:	2
	(i) What should be done or (ii) What should be observed <u>Sample answers:</u> 1. Change in mass when time is taken 2. Mass when time is taken at 8 minutes	

	<p align="center">Able to give an idea for the operational definition for the rate of reaction</p> <p><u>Sample answers:</u></p> <ol style="list-style-type: none"> Time is taken Change in mass after some time 	1									
1(i)	<p align="center">Able to state correctly the relationship between the change in mass with time</p> <p><u>Sample answer:</u></p> <ol style="list-style-type: none"> When time increases, the change in mass increases until a constant 	3									
	<p align="center">Able to state less correctly the relationship between the change in mass with time</p> <p><u>Sample answer:</u></p> <ol style="list-style-type: none"> When time increases, the change in mass increases. 	2									
	<p align="center">Able to give an idea of the relationship between the change in mass with time</p> <p><u>Sample answer:</u></p> <ol style="list-style-type: none"> Mass increases with time 	1									
1(j)	<p align="center">Able to write a balanced chemical equation with the following criteria</p> <ol style="list-style-type: none"> Correct chemical formulae for all reactants and products Correct balanced equation <p><u>Sample answer:</u></p> <ol style="list-style-type: none"> $2\text{HCl} + \text{CaCO}_3 \rightarrow \text{CaCl}_2 + \text{H}_2\text{O} + \text{CO}_2$ 	3									
	<p align="center">Able to write a chemical equation with all correct formulae</p> <p><u>Sample answer:</u></p> <ol style="list-style-type: none"> $\text{HCl} + \text{CaCO}_3 \rightarrow \text{CaCl}_2 + \text{H}_2\text{O} + \text{CO}_2$ 	2									
	<p align="center">Able to give an idea of chemical equation</p> <p><u>Sample answer:</u></p> <ol style="list-style-type: none"> $\text{HCl} + \text{CaCO}_3 \rightarrow \text{CaCl}_2 + \text{H}_2\text{CO}_3$ 	1									
1(k)	<p align="center">Able to classify all the substances correctly</p> <table border="1"> <tr> <td><u>Answer</u></td> <td align="center">Substance with pH more than 7</td> <td align="center">Substance with pH less than 7</td> </tr> <tr> <td></td> <td align="center">Soap</td> <td align="center">Carbonated drink</td> </tr> <tr> <td></td> <td align="center">Baking powder</td> <td align="center">Vinegar</td> </tr> </table>	<u>Answer</u>	Substance with pH more than 7	Substance with pH less than 7		Soap	Carbonated drink		Baking powder	Vinegar	3
	<u>Answer</u>	Substance with pH more than 7	Substance with pH less than 7								
		Soap	Carbonated drink								
	Baking powder	Vinegar									
	Able to classify any three substances correctly	2									
	Able to classify any two substances correctly	1									
2(a)	<p align="center">Able to give the problem statement correctly</p> <p><u>Sample answers</u></p> <ol style="list-style-type: none"> How does the type of electrolyte affect electroplating? How does zinc sulphate and copper (II) sulphate solutions affect electroplating? 	3									
	<p align="center">Able to give the problem statement less correctly</p> <p><u>Sample answer</u></p> <ol style="list-style-type: none"> How does the type of electrolyte affect the experiment 	2									
	<p align="center">Able to to give an idea of problem statement</p> <p><u>Sample answer:</u></p> <ol style="list-style-type: none"> How is electroplating done. 	1									
2(b)	<p align="center">Able to state all variables correctly</p> <p><u>Sample answers:</u></p> <p>Manipulated variable: Type of electrolyte // Zinc sulphate and copper (II) sulphate solutions</p> <p>Responding variable : Brown deposit // Electroplating</p> <p>Fixed variable : Copper at the anode</p>	3									
	Able to state any two variables correctly or Able to state any one correct variable and idea of two other	2									

	variables	
	Able to state any one variable correctly or Able to state idea of all variables	1
2(c)	<i>Able to state the relationship with direction between the manipulated variable and the responding variable</i> <u>Sample answer</u> 1. Copper (II) sulphate solution produces brown deposit at the iron spoon but Zinc sulphate solution does not produce brown deposit at the iron spoon	3
	<i>Able to state the relationship between the manipulated variable and the responding variable</i> <u>Sample answer:</u> 1. Copper (II) sulphate solution produces brown deposit on iron spoon	2
	<i>Able to give an idea of the hypothesis</i> <u>Sample answer:</u> 1. Copper (II) sulphate solution coats iron spoon	1
2(d)	<i>Able to list the materials and apparatus completely</i> <u>Sample answer:</u> Materials 1. Iron spoon 2. Copper (II) sulphate solution 3. Copper rod 4. Zinc sulphate solution Apparatus 5. Beaker 6. Connecting wires 7. Batteries 8. Switch 9. Sandpaper	
	<i>Able to list the materials and apparatus less completely</i> <u>Sample answer</u> Materials 1. Iron spoon 2. Copper (II) sulphate solution 3. Copper rod Apparatus 4. [Container] 5. Connecting wires 6. Batteries	2
	<i>Able to give an idea of the list of materials and apparatus</i> <u>Sample answer:</u> Materials: 1. Iron spoon 2. [electrolyte] Apparatus 3. [Suitable container] 4. Batteries	1
2(e)	<i>Able to state correctly all the steps in the procedure</i> <u>Sample answer:</u> 1. Rub the iron spoon and copper rod with sandpaper 2. Pour copper (II) sulphate solution into a beaker until two-thirds full 3. Insert the iron spoon and copper rod into the solution. 4. Complete the circuit 5. Observe the iron spoon and record it in a table 6. Repeat the experiment by replacing copper (II) sulphate solution with zinc sulphate solution	3
	Able to state less correctly the steps 2, 3, 5 and 6	2
	Able to state an idea of steps 2 and 3	1

2(f)	<p style="text-align: center;">Able to construct a table that consists of:</p> <ol style="list-style-type: none"> 1. Heading for manipulated variable <i>and</i> 2. Headings for responding variable <p>Sample answer:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">Solution</th> <th style="text-align: center;">Observation</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Copper (II) sulphate</td> <td></td> </tr> <tr> <td style="text-align: center;">Zinc sulphate</td> <td></td> </tr> </tbody> </table>	Solution	Observation	Copper (II) sulphate		Zinc sulphate		2
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