

BAHAN KECEMERLANGAN (BK9)
4541/3 KIMIA
KERTAS 3

Question	Rubric	Score										
1(a)	Able to write all the pH value accurately with one decimal place . <u>Answer:</u> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;"><u>Concentration of HCl</u></th> <th style="text-align: left;"><u>pH value</u></th> </tr> </thead> <tbody> <tr> <td>0.1 mol dm⁻³</td> <td>1.0</td> </tr> <tr> <td>0.01 mol dm⁻³</td> <td>2.0</td> </tr> <tr> <td>0.001 mol dm⁻³</td> <td>3.0</td> </tr> <tr> <td>0.0001 mol dm⁻³</td> <td>4.0</td> </tr> </tbody> </table>	<u>Concentration of HCl</u>	<u>pH value</u>	0.1 mol dm ⁻³	1.0	0.01 mol dm ⁻³	2.0	0.001 mol dm ⁻³	3.0	0.0001 mol dm ⁻³	4.0	3
	<u>Concentration of HCl</u>	<u>pH value</u>										
	0.1 mol dm ⁻³	1.0										
	0.01 mol dm ⁻³	2.0										
0.001 mol dm ⁻³	3.0											
0.0001 mol dm ⁻³	4.0											
Able to write any 3 pH value accurately // All readings correctly but with two decimal places .	2											
Able to write any 2 pH value correctly.	1											
No response or wrong response	0											

Question	Rubric	Score										
1(b)	Able to construct a table to record the data that contain: <ol style="list-style-type: none"> 1. Correct titles 2. Correct value // ecf from 2(a) 3. Correct unit of concentration <table style="margin: 10px auto; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Concentration of hydrochloric acid / mol dm⁻³</th> <th style="text-align: center;">pH value</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0.1</td> <td style="text-align: center;">1.0</td> </tr> <tr> <td style="text-align: center;">0.01</td> <td style="text-align: center;">2.0</td> </tr> <tr> <td style="text-align: center;">0.001</td> <td style="text-align: center;">3.0</td> </tr> <tr> <td style="text-align: center;">0.0001</td> <td style="text-align: center;">4.0</td> </tr> </tbody> </table>	Concentration of hydrochloric acid / mol dm ⁻³	pH value	0.1	1.0	0.01	2.0	0.001	3.0	0.0001	4.0	3
	Concentration of hydrochloric acid / mol dm ⁻³	pH value										
	0.1	1.0										
	0.01	2.0										
0.001	3.0											
0.0001	4.0											
Able to construct a less accurate table that contains: <ol style="list-style-type: none"> 1. Titles 2. pH value 	2											
Able to construct a table with at least one title / reading	1											
No response or wrong response	0											

Question	Rubric	Score
1(c)	Able to calculate the number of moles with correct unit <u>Answer:</u> Number of moles of hydrogen ion = $MV/1000$ $= \frac{0.01 \times 50}{1000}$ $= 0.0005 \text{ mol}$	3
	Able to calculate the number of moles without unit/wrong unit	2
	Able to show the operation without final answer $\frac{0.01 \times 50}{1000}$	1
	No response or wrong response	0

Question	Rubric	Score
1(d)	Able to predict the pH value correctly Sample answer: $2 < \text{pH value} < 7$	3
	Able to predict the pH value less accurately Sample answer: $2 < \text{pH value} \leq 7$	2
	Able to give an idea of pH value Sample answer: Greater than 2.0 // $1 \leq \text{pH value} \leq 2$	1
	No response or wrong response	0

Question	Rubric	Score
1(e)	Able to state all the three observations correctly Sample answer: (i) Gas bubbles are released (ii) pH value increases (iii) Magnesium becomes thinner// The size of magnesium becomes smaller	3
	Able to state any two observation correctly	2
	Able to state any one observation correctly	1
	No response or wrong response	0

Question	Rubric	Score
1(f)	Able to state the relationship between the concentration of H^+ ions and the pH value of hydrochloric acid correctly Sample answer: The higher the concentration of H^+ ions, the lower the pH value of hydrochloric acid// [vice versa]	3
	Able to state the relationship less correctly Sample answer: The higher the concentration of H^+ ions, the lower the pH value// Concentration of H^+ ions is inversely proportional to the pH value of hydrochloric acid	2
	Able to give an idea of relationship Sample answer: Concentration of H^+ ions affects the pH value	1
	No response or wrong response	0

Question	Rubric	Score	
2 (a)	Able to state All variables correctly	3	
	<u>Sample answer</u> Manipulated variable : Sodium oxide and sulphur dioxide gas // Type of oxide Responding variable : Properties of solution // Colour change of litmus paper Fixed variable : Water		
	Able to state any two variables correctly		2
	Able to state any one variable correctly		1
	No response or wrong response		0

Question	Rubric	Score	
2 (b)	Able to state the hypothesis correctly.	3	
	<u>Sample answer</u> When sodium oxide dissolves in water, (it shows basic properties)/(red litmus paper turns blue) and when sulphur dioxide dissolves in water, (it shows acidic properties)/(blue litmus paper turns red).		
	Able to state hypothesis less correctly		2
	<u>Sample answer</u> When sodium oxide dissolves in water, (it shows basic properties)/(red litmus paper turns blue)// When sulphur dioxide dissolves in water, (it shows acidic properties)/(blue litmus paper turns red).		
	Able to state an idea of the hypothesis		
<u>Sample answer:</u> Type of oxide affect the colour of litmus paper	1		
No response or wrong response	0		

Question	Rubric	Score	
2 (c)(i)	Able to give the correct inference.	3	
	<u>Sample answer</u> Aluminium oxide soluble in nitric acid and sodium hydroxide solution// Neutral solution produced// Aluminium oxide shows amphoteric properties.		
	Able to give inference less accurately.		2
	<u>Sample answer:</u> Aluminium oxide soluble in (nitric acid)/(sodium hydroxide solution)// Aluminium oxide shows basic/acidic properties		
	Able to give an idea of inference.		
<u>Sample answer:</u> Aluminium oxide dissolved.	1		
No response or wrong response	0		

Question	Rubric	Score
2 (c)(ii)	Able to write the operational definition for amphoteric oxide correctly. Able to describe the following criteria (i) What should be observed (ii) What should be done <u>Sample answer :</u> Oxide that produces a colourless solution and pH value 7.0 when when dissolved in nitric acid and sodium hydroxide solution.	3
	Able to state the operational definition less correctly <u>Sample answer</u> Oxide that produces (a colourless solution)/(pH value 7.0) when when dissolved in nitric acid and sodium hydroxide solution.	2
	Able to give an idea of the operational definition <u>Sample answer</u> (Colourless solution)/(pH value 7) when dissolves in (nitric acid)/(sodium hydroxide solution)	1
	No response given / wrong response	0

Question	Rubric	Score				
2 (d)	Able to classify all the oxides correctly. <u>Sample Answer :</u> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%; text-align: center;">Acidic oxide</th> <th style="width: 50%; text-align: center;">Basic oxide</th> </tr> </thead> <tbody> <tr> <td>Silicon dioxide Phosphorous(V) oxide</td> <td>Magnesium oxide Copper(II) oxide, CuO</td> </tr> </tbody> </table>	Acidic oxide	Basic oxide	Silicon dioxide Phosphorous(V) oxide	Magnesium oxide Copper(II) oxide, CuO	3
	Acidic oxide	Basic oxide				
	Silicon dioxide Phosphorous(V) oxide	Magnesium oxide Copper(II) oxide, CuO				
	Able to classify three oxides correctly	2				
Able to classify any two oxides correctly or give opposite answers. <u>Sample Answer :</u> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%; text-align: center;">Basic oxide</th> <th style="width: 50%; text-align: center;">Acidic oxide</th> </tr> </thead> <tbody> <tr> <td>Silicon dioxide Phosphorous(V) oxide</td> <td>Magnesium oxide Copper(II) oxide, CuO</td> </tr> </tbody> </table>	Basic oxide	Acidic oxide	Silicon dioxide Phosphorous(V) oxide	Magnesium oxide Copper(II) oxide, CuO	1	
Basic oxide	Acidic oxide					
Silicon dioxide Phosphorous(V) oxide	Magnesium oxide Copper(II) oxide, CuO					
No response given / wrong response	0					

Question	Rubric	Score
3(a)	Able to state the problem statement of the experiment correctly <u>Sample answer:</u> What is the effect on the rusting of iron, Fe when it is in contact with other metals?//How does different type of metals in contact with iron affect rusting?	3
	Able to state the problem statement of the experiment incorrectly <u>Sample answer:</u> To investigate the effect of other metals on the rusting of iron.	2
	Able to give an idea of the problem statement of the experiment <u>Sample answer:</u> More electropositive metal inhibit the rusting of iron or vice versa	1
	No response or wrong response	0

Question	Rubric	Score
3(b)	Able to state the three variables correctly <u>Sample answer:</u> Manipulated variable: Metals in contact with iron// Magnesium and copper Responding variable :Rusting of iron//Presence of blue colour Constant variable : Iron nails//temperature// Jelly solution with potassium hexacyanoferrate(III) and phenolphthalein	3
	Able to state any two variables correctly	2
	Able to state any one variable correctly	1
	No response or wrong response	0

Question	Rubric	Score
3(c)	Able to state the relationship between manipulated variable and responding variable correctly <u>Sample answer:</u> When a more/less electropositive metal in contact with iron, the metal inhibits/speeds up rusting.	3
	Able to state the relationship between manipulated variable and responding variable but in the opposite direction. <u>Sample answer:</u> The rusting of iron is inhibits/speeds up when a more/less electropositive metal in contact with iron.	2
	Able to state an idea of the hypothesis <u>Sample answer:</u> The electropositivity of metals affect the rusting of iron	1
	No response or wrong response	0

Question	Rubric	Score
3(d)	Able to give complete list of substances and apparatus	3
	<u>Sample answer:</u>	
	<u>Substances</u> 1. Jelly solution with potassium hexacyanoferrate(III) and phenolphthalein 2. magnesium ribbon 3. copper strip 4. iron nail	
	<u>Apparatus</u> 1. Test tube 2. test tube rack 3. sand paper	
3(d)	Able to give incomplete list of substances and apparatus	2
	<u>Substances</u> 1. Jelly solution with potassium hexacyanoferrate(III) and phenolphthalein 2. magnesium ribbon 3. copper strip 4. iron nail	
	<u>Apparatus</u> 1. Test tube 2. test tube rack	
	Able to give at least one substance and at least one apparatus	
	No response or wrong response	0

Question	Rubric	Score
3(e)	Able to list all the steps correctly	3
	<u>Sample answer:</u>	
	1. Clean the iron nails and metal strips with sand paper. 2. Wind/ Coil iron nails with magnesium ribbon and copper strip. 3. Put the iron nails into different test tube. 4. Pour the jelly solution containing potassium hexacyanoferrate(III) and phenolphthalein into the test tube. 5. Leave the test tube aside for one day. 6. Record the observation.	
	Able to list down steps 2, 4, 6	
	Able to list down steps 2, 4	
	No response or wrong response	0

Question	Rubric	Score								
3(f)	<p>Able to tabulate the data with the following aspects</p> <ol style="list-style-type: none"> 1. Correct titles 2. Complete list of metals/ test tube <p><u>Sample answer:</u></p> <table border="1"> <thead> <tr> <th>Test tube // Metal</th> <th>Observation</th> </tr> </thead> <tbody> <tr> <td>I // Iron + Magnesium</td> <td></td> </tr> <tr> <td>II // Iron + Copper</td> <td></td> </tr> <tr> <td>III // Iron</td> <td></td> </tr> </tbody> </table>	Test tube // Metal	Observation	I // Iron + Magnesium		II // Iron + Copper		III // Iron		2
	Test tube // Metal	Observation								
I // Iron + Magnesium										
II // Iron + Copper										
III // Iron										
<p>Able to tabulate the data with but incomplete</p> <p><u>Sample answer</u></p> <table border="1"> <thead> <tr> <th>Test tube</th> <th>Observation</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> </tr> </tbody> </table>	Test tube	Observation			1					
Test tube	Observation									
	No response or wrong response	0								

END OF MARKING SCHEME