

JAWAPAN KIMIA KERTAS 3

Question	Marks Scheme	Marks
1(a)	<p><i>Able to state all the voltmeter readings accurately with correct decimal place and unit</i></p> <p><u>Sample answer:</u> W and Cu : 2.8 V X and Cu : 0.8 V Y and Cu : 1.4 V Z and Cu : 0.4 V</p>	3
	<p><i>Able to state at least three voltmeter readings accurately without unit or with unit but wrong decimal place</i></p> <p><u>Sample answer:</u> W and Cu : 2.8 // 2.80 V X and Cu : 0.8 // 0.80 V Y and Cu : 1.4 // 1.40 V Z and Cu : 0.4 // 0.40 V</p>	2
	<i>Able to state at least two readings correctly without unit</i>	1
	<i>No response or wrong response</i>	0

Question	Marks Scheme	Marks
1(b)	<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 bigger is the voltage value.</p>	3
	<p><i>Able to state the relationship between the manipulated variable and responding variable.</i></p> <p><u>Sample answer:</u> Different pair of metals have different voltage value</p>	2
	<p><i>Able to state the idea of hypothesis</i></p> <p><u>Sample answer:</u> Pair of different metals shows voltmeter reading</p>	1
	<i>No response or wrong response</i>	0

Question	Marks Scheme	Marks										
1(c)	<p><i>Able to construct a table to record the voltmeter reading for each pair of metals that contain:</i></p> <p>1. Correct titles with unit 2. Correct readings</p> <p><u>Sample answer</u></p> <table border="1"> <thead> <tr> <th>Pairs of metals</th> <th>Voltage / V</th> </tr> </thead> <tbody> <tr> <td>W and Cu</td> <td>2.8</td> </tr> <tr> <td>X and Cu</td> <td>0.8</td> </tr> <tr> <td>Y and Cu</td> <td>1.4</td> </tr> <tr> <td>Z and Cu</td> <td>0.4</td> </tr> </tbody> </table>	Pairs of metals	Voltage / V	W and Cu	2.8	X and Cu	0.8	Y and Cu	1.4	Z and Cu	0.4	3
Pairs of metals	Voltage / V											
W and Cu	2.8											
X and Cu	0.8											
Y and Cu	1.4											
Z and Cu	0.4											
	<p><i>Able to construct a less accurate table that contains:</i></p> <p>1. Titles without unit 2. At least two correct readings</p>	2										
	<i>Able to construct a table with at least one title and one reading</i>	1										
	<i>No response or wrong response</i>	0										

Question	Marks Scheme	Marks
1(d)	<p><i>Able to state all the three variables correctly</i></p> <p><u>Sample answer:</u> Manipulated variable: Pairs of metals // negative terminal Responding variable: Voltmeter reading // Voltage Constant variable: Copper electrode, copper(II) sulphate solution</p>	3
	<i>Able to state any two variables correctly</i>	2
	<i>Able to state any one variable correctly</i>	1
	<i>No response or wrong response</i>	0

Question	Marks Scheme	Marks
1(e)	<p><i>Able to state the correct operational definition for the position of metals in the electrochemical series.</i></p> <p><u>Sample answer:</u> When the voltmeter reading of two metals dipped in an electrolyte is bigger, the position between the two metals in the electrochemical series is further apart.</p>	3
	<p><i>Able to state the position of metals in the electrochemical series</i></p> <p><u>Sample answer:</u> The further the distance between two metals in the electrochemical series, the voltmeter reading is bigger</p>	2

	<i>Able to state an idea of position of metals</i>	1
	<u>Sample answer:</u> Position of metals is influenced by voltage // Different metals shows different voltmeter reading	
	No response or wrong response	0

Question	Marks Scheme	Marks												
1(f)	<i>Able to state all the correct observations and inferences</i> <u>Sample answers:</u> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>After 20 minutes</th> <th>Observations</th> <th>Inferences</th> </tr> </thead> <tbody> <tr> <td>At the negative terminal</td> <td>Electrode dissolves / becomes thinner</td> <td>The metal atoms release electrons to form ions</td> </tr> <tr> <td>At the positive terminal</td> <td>Electrode becomes thicker</td> <td>The copper(II) ions accept electrons to form copper atoms</td> </tr> <tr> <td>Copper(II) sulphate solution</td> <td>Intensity of blue solution decreases // Blue solution turns pale blue</td> <td>Concentration of Cu^{2+} ions decreases // Cu^{2+} ions are discharged to form copper atoms</td> </tr> </tbody> </table>	After 20 minutes	Observations	Inferences	At the negative terminal	Electrode dissolves / becomes thinner	The metal atoms release electrons to form ions	At the positive terminal	Electrode becomes thicker	The copper(II) ions accept electrons to form copper atoms	Copper(II) sulphate solution	Intensity of blue solution decreases // Blue solution turns pale blue	Concentration of Cu^{2+} ions decreases // Cu^{2+} ions are discharged to form copper atoms	6
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	<i>Able to state any five correct observations and its inferences</i>	5												
	<i>Able to state any four correct observations and its inferences</i>	4												
	<i>Able to state any three correct observations and its inferences</i>	3												
	<i>Able to state any two correct observations and its inferences</i>	2												
	<i>Able to state any one correct observation and its inference</i>	1												
	No response or wrong response	0												

Question	Marks Scheme	Marks
1(g)	<i>Able to arrange in ascending order of all the metals</i> <u>Sample answer:</u> Cu, Z, X, Y, W	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</i>	1
	No response or wrong response	0

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Question	Marks Scheme	Marks												
1(h)	<p><i>Able to predict the three positive terminals and three voltage values for all pairs of metals correctly</i></p> <p><u>Sample answer:</u></p> <table border="1"> <thead> <tr> <th>Pair of Metals <i>Pasangan logam</i></th> <th>Positive Terminal <i>Terminal Positif</i></th> <th>Voltage / V <i>Voltan / V</i></th> </tr> </thead> <tbody> <tr> <td>W and X</td> <td>X</td> <td>2.0</td> </tr> <tr> <td>X and Y</td> <td>X</td> <td>0.6</td> </tr> <tr> <td>W and Z</td> <td>Z</td> <td>2.4</td> </tr> </tbody> </table>	Pair of Metals <i>Pasangan logam</i>	Positive Terminal <i>Terminal Positif</i>	Voltage / V <i>Voltan / V</i>	W and X	X	2.0	X and Y	X	0.6	W and Z	Z	2.4	6
Pair of Metals <i>Pasangan logam</i>	Positive Terminal <i>Terminal Positif</i>	Voltage / V <i>Voltan / V</i>												
W and X	X	2.0												
X and Y	X	0.6												
W and Z	Z	2.4												
	Able to state any five correct positive terminals and voltage	5												
	Able to state any four correct positive terminals and voltage	4												
	Able to state any three correct positive terminals and voltage	3												
	Able to state any two correct positive terminals and voltage	2												
	Able to state any one correct positive terminal and voltage	1												
	No response or wrong response	0												

Question	Marks Scheme	Marks						
1(i)	<p><i>Able to classify all the four substances correctly</i></p> <p><u>Sample answer:</u></p> <table border="1"> <thead> <tr> <th>Can be made as electrolyte</th> <th>Cannot be made as electrolyte</th> </tr> </thead> <tbody> <tr> <td>Sodium chloride solution</td> <td>Glucose solution</td> </tr> <tr> <td>Dilute sulphuric acid</td> <td>Glacial ethanoic acid</td> </tr> </tbody> </table>	Can be made as electrolyte	Cannot be made as electrolyte	Sodium chloride solution	Glucose solution	Dilute sulphuric acid	Glacial ethanoic acid	3
Can be made as electrolyte	Cannot be made as electrolyte							
Sodium chloride solution	Glucose solution							
Dilute sulphuric acid	Glacial ethanoic acid							
	Able to classify any three substances correctly	2						
	Able to classify any two substances correctly	1						
	No response or wrong response	0						

Question	Marks Scheme	Marks
2(a)	<p><i>Able to state the problem statement accurately.</i></p> <p><u>Sample answer</u> What is the effect on rusting when iron is in contact with other metals? // How do different types of metals in contact with iron affect rusting?</p>	3
	<p><i>Able to state the problem statement but less accurately.</i></p> <p><u>Sample answer</u> What is the effect of other metals on rusting? // To investigate the effect of different metals on the rusting of iron.</p>	2

	<i>Able to give an idea of statement of the problem.</i>	1
	Sample answer: How rusting occurs? // To investigate the effect of metals on rusting // To investigate rusting	
	No response or wrong response	0

Question	Marks Scheme	Marks
2(b)	<i>Able to state all variables correctly.</i>	3
	Sample answer: Manipulated variable: Different types of metals in contact with iron Responding variable: Rusting of iron // Iron rusts or does not rust // Formation of blue colouration/spot Fixed variable: Iron nails // Electrolyte/(name) // Agar/Jelly solution // Temperature	
	<i>Able to state any two variables correctly.</i>	2
	<i>Able to state any one variable correctly.</i>	1
	No response or wrong response	0

Question	Marks Scheme	Marks
2(c)	<i>Able to state the relationship between the manipulated variable and the responding variable with direction correctly.</i>	3
	Sample answer: A more electropositive metal will prevent iron from rusting while a less electropositive metal will speed up rusting of iron.	
	<i>Able to state the relationship between the manipulated variable and the responding variable:</i>	2
	Sample answer: [Mg /Al /Zn] speeds up iron nail rusting while [Sn / Pb / Cu] slows down rusting. // A more electropositive metal will prevent iron from rusting. // A less electropositive metal will speed up rusting of iron.	
	<i>Able to state an idea of hypothesis:</i>	1
	Sample answer: [Name suitable metal] affects the rusting of iron.	
	No response or wrong response	0

Question	Marks Scheme	Marks
2(d)	<p>Able to give a complete list of materials and apparatus that involves the following:</p> <ol style="list-style-type: none"> 1. Iron nails 2. 1 metal above iron in electrochemical series 3. 1 metal below iron in electrochemical series 4. A suitable electrolyte, test-tubes, sand paper <p><u>Sample answer:</u> Iron nails, magnesium/zinc/aluminium strip, tin/copper/lead/silver strip, hot jelly containing potassium hexacyanoferrate(III) solution, test tubes/boiling tubes, sand paper</p>	3
	<p>Able to give a list of materials and apparatus that involves the following:</p> <ol style="list-style-type: none"> 1. 1 metal above iron in electrochemical series 2. 1 metal below iron in electrochemical series 3. Any suitable electrolyte, any suitable container 	2
	<p>Able to give a list of materials and apparatus that involves the following:</p> <ol style="list-style-type: none"> 1. 1 metal above/below iron in electrochemical series // any suitable electrolyte. 2. Any container 	1
	No response or wrong response	0

Question	Marks Scheme	Marks
2(e)	<p>Able to state the following 6 steps:</p> <ol style="list-style-type: none"> 1. [Clean iron nails and metal strips with sand paper] 2. [Coil the iron nails with the metals] 3. [Place the iron nails in separate container] 4. [Pour/add/fill the [electrolyte] into the container] 5. [Leave them aside for several days] 6. [Record your observation] <p><u>Sample answer:</u></p> <ol style="list-style-type: none"> 1. Clean iron nails, magnesium ribbon and copper strip with sand paper. 2. Coil two iron nails tightly with magnesium ribbon and copper strip. 3. Place all the iron nails in separate test tubes. 4. Pour the hot jelly containing potassium hexacyanoferrate(III) solution into the test tubes. 5. Keep the test tubes in a test tube rack and leave them aside for several days. 6. Record your observations. 	3
	Steps 2,4,6	2
	Step 2[coil iron nail with Mg/Cu], 4	1
	No response or wrong response	0