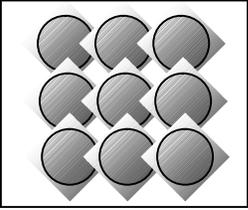
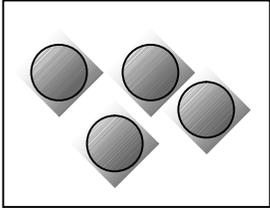


ANSWER SCHEME**CHEMISTRY****PAPER 1****(TRIAL 2015)**

1	B	26	C
2	D	27	A
3	B	28	A
4	B	29	A
5	C	30	D
6	A	31	A
7	A	32	C
8	B	33	D
9	A	34	B
10	B	35	A
11	D	36	B
12	C	37	C
13	A	38	D
14	C	39	C
15	D	40	B
16	A	41	A
17	A	42	D
18	C	43	A
19	B	44	C
20	B	45	B
21	B	46	C
22	C	47	D
23	D	48	D
24	D	49	C
25	C	50	B

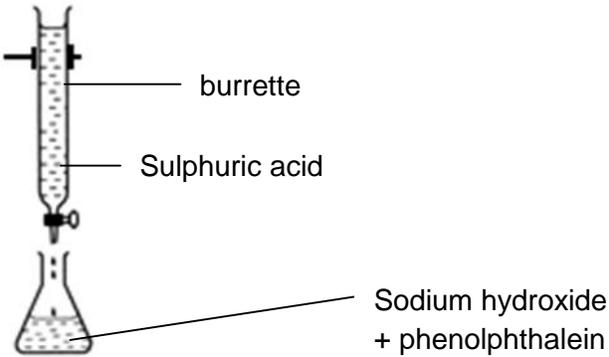
**Marking Scheme
Chemistry Paper 2 (4541/2)
SPM Trial Exam 2015**

Question			Marking Criteria	Sub mark	Mark
1	(a)	(i)	Diffusion a: sublimation	1	1
		(ii)	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>Solid</p> </div> <div style="text-align: center;">  <p>Gas</p> </div> </div>	1 1	2
		(iii)	Molecule	1	1
	(b)	(i)	Formula that shows the simplest ratio of atoms of each elements in a compound	1	1
		(ii)	Any suitable named metal Any suitable named acid Sample answer : - Zinc (r: formula) (r: Copper // Argentum) - Sulphuric acid	1 1	2
		(iii)	Repeat heating, cooling and weighing process untill constant mass is obtained	1	1
		(iv)	Any suitable oxide metal lower than Hydrogen in reactivity series Sample answer : PbO // AgO	1	1
Total					9

Question			Marking Criteria	Sub mark	Mark
2	(a)	(i)	$\text{CaCO}_3 + 2\text{HCl} \rightarrow \text{CaCl}_2 + \text{CO}_2 + \text{H}_2\text{O}$ 1- Correct formula of reactants and products 2- Correct balance	1 1	2
		(ii)	30/24000 mol // 0.00125 mol	1	1
		(iii)	$0.00125 \times 6.02 \times 10^{23}$ // 7.505×10^{20}	1	1
		(iv)	1. correct ratio mol //mol of CaCO_3 2. correct mass with correct unit Sample answer : 1. 1 mol CO_2 : 1 mol CaCO_3 0.00125 mol CO_2 : 0.00125 mol CaCO_3 2. Mass $\text{CaCO}_3 = 0.00125 \times 100 \text{ g}$ // 0.125 g	1 1	2
	(b)	(i)	$\text{C}_5\text{H}_8\text{NO}_4\text{Na}$	1	1
		(ii)	Ionic compound (r : ionic bond)	1	1
		(iii)	169	1	1
				Total	9

Question			Marking Criteria	Sub mark	Mark
3	(a)			1 1 1	3
	(b)		T		1
	(c)		P_2R // H_2O		1
	(d)	(i)	S		1
		(ii)	- Atom S is more reactive than atom Q. - Valence electron in atom S is further away from the nucleus compare to atom Q. - The attraction force between the proton in the nucleus of atom S is weaker than atom Q // Atom S is more easier to released electron than atom Q.	1 1 1	3
		(iii)	- Act as a catalyst	1	1
				Total	10

Question		Marking Criteria	Sub mark	Mark
4	(a)	Positively charged ion // Positive ion		1
	(b)	Cu^{2+} and H^+		1
	(c)	- Copper - Cu^{2+} received 2 electrons (to form copper)	1 1	2
	(d)	(i) Hydrogen (r: formula)		1
		(ii) - Put the burning wooden splinter into the mouth of the test tube containing the gas - the 'pop' sound produced	1 1	2
	(e)	Zinc		1
	(f)	(i) The voltage reading of Cell S increase (when the zinc electrode is replaced with magnesium) // The voltage reading of Cell S is higher when the zinc electrode is replaced with magnesium		1
		(ii) Magnesium is more electropositive than zinc // Magnesium is higher than zinc in the electrochemical series		1
			Total	10

Question			Marking Criteria	Sub mark	Mark
5	(a)	(i)	$\text{H}_2\text{SO}_4 + 2\text{NaOH} \rightarrow \text{Na}_2\text{SO}_4 + 2\text{H}_2\text{O}$ - Correct formula of reactants and products - Balanced equation	1 1	2
		(ii)	1. Correct no of mol of NaOH 2. Correct ratio mol 3. Correct molarity with correct unit Sample answer : 1. mol NaOH : $0.1 \times 25 / 1000 // 0.0025$ 2. $0.0025 \text{ mol NaOH} : 0.00125 \text{ mol H}_2\text{SO}_4$ 3. Molarity $\text{H}_2\text{SO}_4 = 0.1 \text{ mol dm}^{-3}$	1 1 1	3
		(iv)	 <p>- Functional diagram - Labelled diagram</p>	1 1	2
		(v)	- 25 cm^3 - Concentration of H^+ in the hydrochloric acid is half of sulphuric acid // Concentration of H^+ in the sulphuric acid is double of hydrochloric acid	1 1	2
	(b)		- Bee sting is acidic, toothpaste is basic//alkaline - Toothpaste neutralises the bee sting	1 1	2
Total					11

Question		Marking Criteria	Sub Mark	Total Mark
6	(a)	Hydroxyl group // -OH group	1	1
	(b)	$ \begin{array}{c} \text{H} \quad \text{H} \quad \text{H} \\ \quad \quad \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{H} \\ \quad \quad \\ \text{O} \quad \text{H} \quad \text{H} \\ \\ \text{H} \end{array} \qquad \begin{array}{c} \text{H} \quad \text{H} \quad \text{H} \\ \quad \quad \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{H} \\ \quad \quad \\ \text{H} \quad \text{O} \quad \text{H} \\ \\ \text{H} \end{array} $	1+1	2
	(c)	(i) Dehydration	1	1
		(ii) $\text{C}_3\text{H}_7\text{OH} \quad \text{C}_3\text{H}_6 + \text{H}_2\text{O}$ 1. Correct reactants and products	1	1
	(d)	1. Propene change purple colour of Potassium manganate (VII) to colourless while propane purple colour remain unchanged 2. propene can undergoes addition reaction because it is unsaturated hydrocarbon // consist double bond between carbon atoms 3. propane cannot undergoes addition reaction because it is saturated hydrocarbon // consist single bond between carbon atoms	1 1 1	3
	(e)	(i) ester	1	1
		(ii) 1. pour [5-10 cm ³] ethanol into a boiling tube of [5-10 cm ³] pentanoic acid 2. put a few drops of concentrated sulphuric acid into the boiling tube and heat gently	1 1	2
TOTAL				11

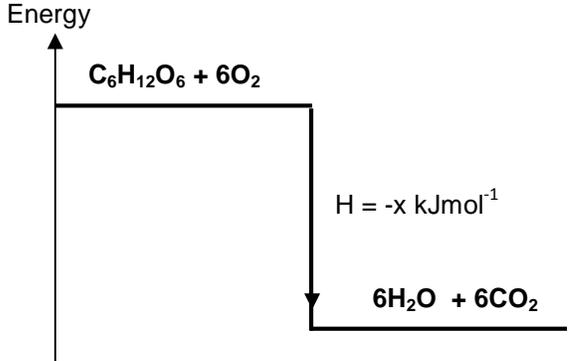
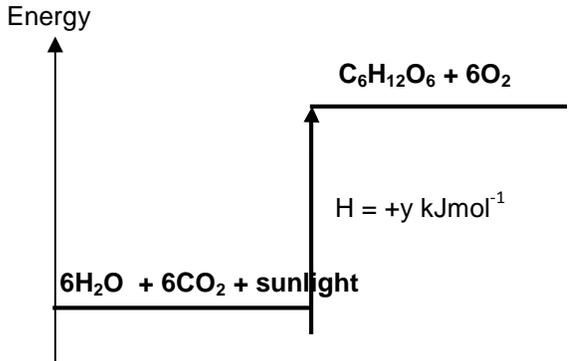
Question			Marking Criteria	Sub Mark	Total Mark
7	(a)	(i)	1. correct name of the process 2. correct formula of reactants and product of step X 3. balance chemical equation of step X 4. correct formula of reactants and product of step X 5. balance chemical equation of step X Answer : Contact Process Step X : $2\text{SO}_2 + \text{O}_2 \rightarrow 2\text{SO}_3$ Step Y : $\text{SO}_3 + \text{H}_2\text{SO}_4 \rightarrow \text{H}_2\text{S}_2\text{O}_7$	1 1+1 1+1	5
			1. Dissolve in rain water to produce acid rain 2. Increase the acidity of water in the river // disturbs the ecosystem // aquatic organisms may die	1 1	2
	(b)	(i)	NH_4SO_4	1	1
		(ii)	1. Urea 2. % of N in urea = $28 / 60 \times 100 = 46.67\%$ 3. % of N in fertilizers X = $28 / 132 \times 100 = 21.21\%$ 4. Percentage of N atoms by mass in urea is higher than ammonium sulphate	1 1 1 1	4
	(c)		P : Fibre glass Q : Bronze R : Duralumin S : Ceramics T : Lead crystal glass	1 1 1 1 1	5
	(d)		Properties: Durable / light / inert to chemical / insulator (any 2 answers) Uses : Plastic plate / toys / shopping bag (any 1 answer)	1+1 1	3
TOTAL					20

Question		Marking Criteria	Sub Mark	Total Mark
8	(a)	(i) <ul style="list-style-type: none"> - correct label of axis and unit -correct plot -correct curve 	1 1 1	3
		(ii) <ul style="list-style-type: none"> - volume lead(II) nitrate – 2.5 cm³ -no of mol of Pb²⁺ $\frac{2.5 \times 1}{1000}$ // 0.0025 mol - no of mol of I⁻ $\frac{5 \times 1}{1000}$ // 0.005 mol - correct ratio 0.0025 mol Pb²⁺ react with 0.005 mol I⁻ -correct number of mol of iodide ions react with 1 mol lead(II) ions 1 mol Pb²⁺ react with 2 mol I⁻ -correct formula of reactants and products -correct balance $Pb^{2+} + 2 I^{-} \rightarrow PbI_2$ 	1 1 1 1 1 1	7
	(b)	(i) <ul style="list-style-type: none"> Oxide T : CuO // copper(II) oxide Salt W : CuSO₄ // copper(II) sulphate Salt X : Cu(NO₃)₂ // copper(II) nitrate Solid Y : BaSO₄ // barium sulphate 	1 1 1 1	4
		(ii) <ul style="list-style-type: none"> -White precipitate formed -double decomposition reaction 	1 1	2

Question			Marking Criteria	Sub Mark	Total Mark
		(iii)	-correct chemical equation $\text{CuSO}_4 + \text{Ba}(\text{NO}_3)_2 \rightarrow \text{Cu}(\text{NO}_3)_2 + \text{BaSO}_4$ -No of mol of barium nitrate $\frac{50 \times 1}{1000} // 0.05$ - ratio 1 mol $\text{Ba}(\text{NO}_3)_2$: 1 mol BaSO_4 0.05 mol $\text{Ba}(\text{NO}_3)_2$: 0.05 mol BaSO_4 - correct mass & unit of BaSO_4 0.05 x 233 g // 11.65 g	1 1 1 1	4
TOTAL					20

Question			Marking Criteria	Sub Mark	Total Mark
9	(a)	(i)	Acid X : hydrochloric acid Acid Y : sulphuric acid Gas Z : hydrogen gas <i>Reject : formula</i> -correct method and reagent to identify gas Z -correct observation Answer : Put a burning wooden splinter to the mouth of test tube 'pop' sound produce	1 1 1 1 1	5
		(ii)	-No of mol of acid Y $\frac{50 \times 0.5}{1000} // 0.025$ - ratio 1 mol H_2SO_4 : 1 mol H_2 0.025 mol H_2SO_4 : 0.025 mol H_2 - correct volume of gas Z 0.025 x 24 dm ³ // 0.6 dm ³	1 1 1	3

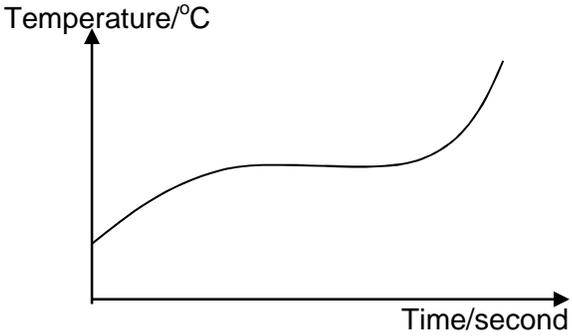
Question		Marking Criteria	Sub Mark	Total Mark
	(iii)	<p>Volume of gas / cm³</p> <p style="text-align: right;">time / s</p> <ul style="list-style-type: none"> - Both axis labeled & unit - Correct curve I & labeled - Correct curve II & labeled - Correct curve III & labeled 	1 1 1 1	4
	(iv)	<ol style="list-style-type: none"> 1. Rate of reaction in Experiment III is higher than in Experiment II 2. In Experiment III presence of copper(II) sulphate as a catalyst. 3. Activation energy in experiment III is <u>lower than</u> experiment II. 4. more colliding particles can overcome the activation energy in exp. III. 5. The frequency of effective collisions in exp III is higher. 	1 1 1 1 1	5
	(b)	<ul style="list-style-type: none"> -Temperature -at warm place, kinetic energy of particles increases/higher -Rate of rising of the dough increases/higher 	1 1 1	3
TOTAL				20

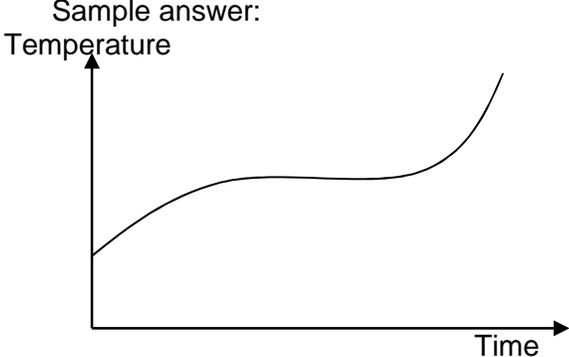
Question		Marking Criteria	Sub Mark	Total Mark
10	(a)	Type of chemical reaction 1. Diagram 10.1 : exothermic reaction. 2. Diagram 10.2 : endothermic reaction.	1 1	
		Energy content of reactants and products : 3. Diagram 10.1 : The energy content in the reactants is higher than the energy content in the products 4. Diagram 10.2 : the energy content in the reactants less than the energy content in the products .	1 1	
		5-label energy and correct level diagram 10.1 6-correct equation & H Energy level diagram 10.1  7-label energy and correct level diagram 10.2 8-correct equation & H Energy level diagram 10.2 	1 + 1 1 + 1	8
	(b)	1. Number of moles of $\text{CuSO}_4 = \frac{(0.1)(50)}{1000}$ // 0.005 mol	1	
		2. Heat change, $mc = 210 \times 0.005$ J // 1.05 kJ // 1050 J	1	
		3. Metal X : Zn // Mg	1	
		4. $= \frac{1050}{(50)(4.2)}$.°C // 5.0°C	1	4

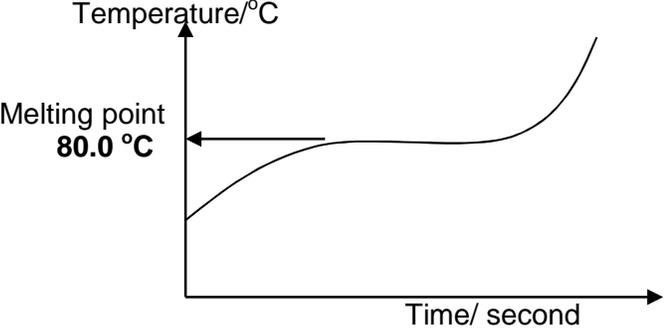
Question		Marking Criteria	Sub Mark	Total Mark										
(c)		<p><u>Material and apparatus</u></p> <ol style="list-style-type: none"> Lead(II) nitrate solution // barium nitrate solution // Calcium nitrate solution copper(II) sulphate solution // magnesium sulphate // zinc sulphate (any suitable soluble sulphate of +2 cation) <p><u>Procedure:</u></p> <ol style="list-style-type: none"> Measure 50 cm³ of copper (II) sulphate solution 0.5 mol dm⁻³ using measuring cylinder and pour into polystyrene cup Measure initial temperature of the solution. Measure 50 cm³ of lead(II) nitrate solution 0.5 mol dm⁻³ using measuring cylinder and pour into another polystyrene cup Measure initial temperature of the solution. Mix the solution, stir by using thermometer and measure the maximum temperature of the mixture. <p><u>Table:</u></p> <table border="1"> <tbody> <tr> <td>Initial temperature of Lead(II) nitrate /°C</td> <td>1</td> </tr> <tr> <td>Initial temperature Copper(II) sulphate /°C</td> <td>2</td> </tr> <tr> <td>Average Initial temperature of the mixture /°C</td> <td>3</td> </tr> <tr> <td>Maximum Temperature/°C</td> <td>4</td> </tr> <tr> <td>Temperature change /°C</td> <td>4 - 3</td> </tr> </tbody> </table>	Initial temperature of Lead(II) nitrate /°C	1	Initial temperature Copper(II) sulphate /°C	2	Average Initial temperature of the mixture /°C	3	Maximum Temperature/°C	4	Temperature change /°C	4 - 3	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>8</p>
Initial temperature of Lead(II) nitrate /°C	1													
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Temperature change /°C	4 - 3													
TOTAL				20										

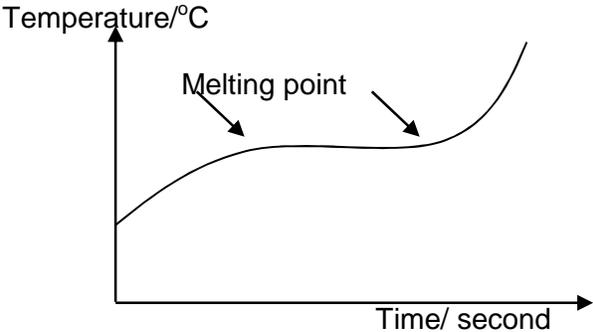
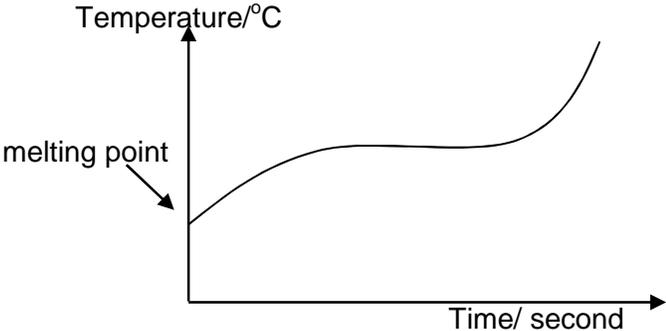
MARKING SCHEME PAPER 3 CHEMISTRY TRIAL SPM PAHANG 2015

Question	Explanation/Rubric	Maximum score
1(a)	<p><i>Able to record all reading accurately to one decimal point and with unit.</i></p> <p>Sample answer: Initial temperature : 60.0°C Temperature at 30s : 68.0 °C Temperature at 60s : 78.0 °C Temperature at 90s : 80.0 °C Temperature at 120s : 80.0 °C Temperature at 150s : 80.0 °C Temperature at 180s : 82.0 °C Temperature at 210s : 85.0 °C Temperature at 240.0s : 95.0°C</p>	3
	<i>Able to record all readings correctly without decimal point // Able to record 6-8 readings correctly</i>	2
	<i>Able to record 3-5 readings correctly</i>	1
	No response or wrong response	0

Question	Explanation/Rubric	Maximum score
1(b)(i)	<p><i>Able to plot a graph that contains the following information.</i></p> <ul style="list-style-type: none"> - Axes labeled with units - All the 8 points transferred correctly - A smooth curve is drawn <p>Sample answer:</p>  <p>Temperature/°C</p> <p>Time/second</p>	3

Question	Explanation/Rubric	Maximum score
	<p><i>Able to plot the graph that contains the following information.</i></p> <ul style="list-style-type: none"> - Axes labeled without units // 6-7 points transferred correctly // a graph is not smooth <p>Sample answer:</p> 	2
	<i>Able to give an idea to plot a graph</i>	1
	No response or wrong response or empty table	0

Question	Explanation/Rubric	Maximum score
1(b)(ii)	<p><i>Able to state the melting point correctly with 1 decimal place and unit and show on the graph</i></p> <p>Sample answer :</p> 	3

Question	Explanation/Rubric	Maximum score
	<p data-bbox="334 296 1235 394"><i>Able to state the melting point correctly with or without decimal place but with correct unit only without showing on the graph // Able to state the melting point on the curve</i></p> <p data-bbox="334 428 545 459">Sample answer;</p> <ul data-bbox="383 495 1073 527" style="list-style-type: none"> - Melting point of naphthalene : 80.0 °C // 80 °C // <div data-bbox="407 562 1000 894">  </div>	2
	<p data-bbox="334 936 1260 999"><i>Able to state the melting point less accurately without unit and without 1 decimal place // Able to show the melting point incorrectly;</i></p> <p data-bbox="334 1035 545 1066">Sample answer:</p> <ul data-bbox="383 1066 894 1098" style="list-style-type: none"> - Melting point of naphthalene : 80 // <div data-bbox="334 1134 1000 1465">  </div>	1
	No response or wrong response	0

Question	Explanation/Rubric	Maximum score
1(c)	<p><i>Able to explain correctly according to 3 information :</i></p> <ul style="list-style-type: none"> - Heat energy absorbed - <i>is used to overcome the forces of attraction between the molecules/particles</i> - <i>So that the solid naphthalene can turn into liquid</i> <p>Sample answer : Heat energy absorbed is used to overcome the forces of attraction between the molecules so that solid naphthalene can turn into liquid.</p>	3
	<p><i>Able to explain less accurately</i></p> <p>Sample answer : The heat energy is used to overcome the forces of attraction between molecules / particles</p>	2
	<p><i>Able to state an idea</i></p> <p>Sample answer : The heat energy is used / absorbed</p>	1
	No response or wrong response	0

Question	Explanation/Rubric	Maximum score								
1(d)	<p><i>Able to classify all the compound correctly</i></p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">Ionic compound</td> <td style="width: 50%;">covalent compound</td> </tr> <tr> <td>Potassium bromide</td> <td>Glucose</td> </tr> <tr> <td>Zinc nitrate</td> <td>methanol</td> </tr> <tr> <td>Sodium chloride</td> <td>ethyl ethanoate</td> </tr> </table>	Ionic compound	covalent compound	Potassium bromide	Glucose	Zinc nitrate	methanol	Sodium chloride	ethyl ethanoate	3
Ionic compound	covalent compound									
Potassium bromide	Glucose									
Zinc nitrate	methanol									
Sodium chloride	ethyl ethanoate									
	<i>Able to classify any 5 compound correctly.</i>	2								
	<i>Able to classify at least 2 compound correctly</i>	1								
	No response or wrong response/	0								

Question	Explanation/Rubric	Maximum score												
2 (a)	<p><i>Able to state any 3 observations and their related inferences correctly.</i> Sample answer:</p> <table border="1"> <thead> <tr> <th>Test tube</th> <th>Observations <i>Pemerhatian</i></th> <th>Inferences <i>Inferen</i></th> </tr> </thead> <tbody> <tr> <td>2</td> <td> Low intensity of pink colour/ solutions // No blue spot </td> <td> Iron(II) / Fe²⁺ ions are not formed /produced in the solutions // Zinc/Zn corroded / oxidized slowly // less OH⁻ ions formed // Iron / Fe does not rust/ corrode/oxidised </td> </tr> <tr> <td>3</td> <td> Low intensity of blue colour /solutions // Low intensity of pink colour/ solutions </td> <td> Less Iron(II) / Fe²⁺ ions formed / produced in the solutions // Iron / Fe rusted/ corroded/ oxidized slowly // less OH⁻ ions formed // </td> </tr> <tr> <td>4</td> <td> High intensity of pink colour/ solutions // No blue spot </td> <td> Iron(II) / Fe²⁺ ions are not formed /produced in the solutions // Magnesium/Mg corroded /oxidized faster // more OH⁻ ions formed Iron / Fe does not rust/ corrode/oxidised // </td> </tr> </tbody> </table>	Test tube	Observations <i>Pemerhatian</i>	Inferences <i>Inferen</i>	2	Low intensity of pink colour/ solutions // No blue spot	Iron(II) / Fe ²⁺ ions are not formed /produced in the solutions // Zinc/Zn corroded / oxidized slowly // less OH ⁻ ions formed // Iron / Fe does not rust/ corrode/oxidised	3	Low intensity of blue colour /solutions // Low intensity of pink colour/ solutions	Less Iron(II) / Fe ²⁺ ions formed / produced in the solutions // Iron / Fe rusted/ corroded/ oxidized slowly // less OH ⁻ ions formed //	4	High intensity of pink colour/ solutions // No blue spot	Iron(II) / Fe ²⁺ ions are not formed /produced in the solutions // Magnesium/Mg corroded /oxidized faster // more OH ⁻ ions formed Iron / Fe does not rust/ corrode/oxidised //	6
Test tube	Observations <i>Pemerhatian</i>	Inferences <i>Inferen</i>												
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3	Low intensity of blue colour /solutions // Low intensity of pink colour/ solutions	Less Iron(II) / Fe ²⁺ ions formed / produced in the solutions // Iron / Fe rusted/ corroded/ oxidized slowly // less OH ⁻ ions formed //												
4	High intensity of pink colour/ solutions // No blue spot	Iron(II) / Fe ²⁺ ions are not formed /produced in the solutions // Magnesium/Mg corroded /oxidized faster // more OH ⁻ ions formed Iron / Fe does not rust/ corrode/oxidised //												
	Able to state at least 5 observations and their related inferences correctly // less correctly	5												
	<i>Able to state at least 4 observation af inferens correctly//</i>	4												
	<i>Able to state at least 3 observation af inferens correctly</i>	3												
	<i>Able to state at least 2 observation af inferens correctly</i>	2												
	<i>Able to state at least 1 observation af inferens correctly</i>	1												
	No response or wrong response	0												

Question	Explanation/Rubric	Maximum score
2 (b)	<p><i>Able to state the relationship between the manipulated variable and the responding variable and state the direction correctly.</i></p> <p><u>Sample answer</u> When a less electropositive metal than iron is in contact with iron nail/ferum/Fe, the metal speeds up rusting/corrosion of iron but when a more electropositive metal is in contact with iron/ferum/Fe, the metal inhibits rusting/corrosion of iron //</p> <p>When the metal in contact with iron is lower than iron/ferum/Fe in electrochemical series, the rusting/corrosion of iron is faster but when the metal in contact with iron is higher than iron/ferum/Fe in electrochemical series, the iron does not rust/ rusting/corrosion of iron slower//</p> <p>The further the distance between less electropositive metals and iron/Fe in electrochemical series that in contact with iron, the higher is the intensity/more of blue spots formed but the further the distance between more electropositive metals and iron/Fe in electrochemical series that in contact with iron, the higher is the intensity/more of pinc colour formed.</p>	3
	<p>Able to state the relationship between the manipulated variable and the responding variable without stating the direction/ less accurately</p> <p><u>Sample answer</u> When different metal in contact with iron, the more blue spot/rust formed</p>	2
	<p><i>Able to give an idea of hypothesis</i></p> <p><u>Sample answer</u> Pair of metal will produce rust</p>	1
	No response or wrong response	0

Question	Explanation/Rubric	Maximum score
2 (c)	<p><i>Able to state all the variables in this experiment correctly.</i></p> <p><u>Sample answer</u></p> <p>(i) Manipulated variables : Type/different metal // position of metal in electrochemical series</p> <p>(ii) Responding variable : Rusting / corrosion // presence of blue/pink colour</p> <p>(iii) Constant variable : Size/mass of iron nail // type of nail // clean iron nails // temperature // medium in which the iron nail are kept</p>	3
	Able to state any two variables correctly	2
	Able to state any one variable correctly	1
	No response or wrong response	0

Question	Explanation/Rubric	Maximum score
2 (d)	<p><i>Able to give one operational definition of the experiment correctly with the following aspects:</i></p> <p><i>i.what you do</i></p> <p><i>ii.what you observe</i></p> <p><u>Sample answer</u></p> <p>Blue spot form when less electropositive metal is in contact with iron nail and dipped/put into jelly solutions that contain potassium hexacyanoferrate (III) and phenolphthalein//</p> <p>Rusting occurs when iron nail is in contact with tin/less electropositive metal and form blue colouration in potassium hexacyanoferrate(III) solution and phenolphthalein</p> <p>//</p> <p>No blue spot form when more electropositive metal is in contact with iron nail and dipped/put into jelly solutions that contain potassium hexacyanoferrate (III) and phenolphthalein //</p> <p>Rusting does not occurs when iron nail is in contact with Mg/Zn/more electropositive metal and form blue colouration in potassium hexacyanoferrate(III) solution and phenolphthalein</p> <p>// (based on test tube 1)</p> <p>Blue spot form when iron nail dipped into jelly solutions that contain potassium hexacyanoferrate (III) and phenolphthalein</p>	3

Question	Explanation/Rubric	Maximum score
	<p><i>Able to give the operational definition for rusting incompletely with any one of the following aspects:</i></p> <p><i>i.what you do</i></p> <p><i>ii.what you observe</i></p> <p>Sample answer</p> <p>Metal is put into jelly blue spot form</p>	2
	<p><i>Able to give an idea of operational definition for rusting</i></p> <p>Sample answer</p> <p>Iron corrodes/rust/oxidised</p>	1
	No response or wrong response	0

Question	Explanation/Rubric	Maximum score
2 (e)	<p>Able to predict the metal Q correctly</p> <p>Sample answer</p> <p>Copper/Cu // Silver/Ag</p>	3
	<p>Able to predict the metal Q less correctly</p> <p>Sample answer</p> <p>Gold/Au</p>	2
	<p><i>Able to give an idea of predicting the metal</i></p> <p>Sample answer</p> <p>Mercury/Hg</p>	1
	No response or wrong response	0

Question	Explanation/Rubric	Maximum score
3 (a)	<p><i>Able to state the problem statement with the named strong acid solution and weak acid solution accurately</i></p> <p>Sample answer : Does the heat of neutralisation between hydrochloric acid and sodium hydroxide solution is higher than the heat of neutralisation between ethanoic acid and sodium hydroxide solution?</p>	3
	<p><i>Able to state the problem statement less accurately</i></p> <p>Sample answer : Does the heat of neutralization between strong acid and weak acid with strong alkali different ? //To study the heat of neutralization between strong and weak acid with strong alkali.</p>	2
	<p><i>Able to state an idea about problem statement</i></p> <p>Sample answer : Heat of neutralisation is affected by the strength of acid.</p>	1
	No response or wrong response	0

Question	Explanation/Rubric	Maximum score
3 (b)	<p><i>Able to state the relationship between the manipulated variable and the responding variable and state the direction correctly.</i></p> <p>Sample answer : The reaction between hydrochloric acid/strong acid and sodium hydroxide will give the higher value of heat of neutralization than the reaction between ethanoic acid/weak acid with sodium hydroxide.</p>	3
	<p>Able to state the relationship between the manipulated variable and the responding variable without stating the direction/ less accurately</p> <p>Sample answer Different strength of acid react with sodium hydroxide, different value of heat of neutralisation</p>	2
	<p><i>Able to give an idea of hypothesis</i></p> <p>Sample answer The strength of acid affect the heat of neutralisation</p>	1
	No response or wrong response	0

Question	Explanation/Rubric	Maximum score
3 (c)	<p><i>Able to state all the variables accurately</i></p> <p>Sample answer : Manipulated variable: Hydrochloric Acid and Ethanoic Acid (<i>any suitable named strong and weak acid</i>) // Strong acid and weak acid</p> <p>Responding variable : Heat of neutralisation</p> <p>Fixed variable : Concentration and volume of NaOH solution//NaOH solution//polystyrene cup // Concentration and volume of acid solution</p>	3
	<i>Able to give any two variables accurately</i>	2
	<i>Able to give any one variable accurately</i>	1
	No response or wrong response	0

Question	Explanation/Rubric	Maximum score
3 (d)	<p><i>Able to list down the materials and apparatus completely</i></p> <p>Sample answer : Materials : [0.5-2.0 mol dm⁻³] sodium hydroxide solution, [0.5-2.0 mol dm⁻³] hydrochloric acid, [0.5-2.0 mol dm⁻³] ethanoic acid (<i>any suitable strong and weak named acid</i>), Apparatus :Polystyrene/plastic cup, thermometer, [50-100cm³] measuring cylinder</p>	3
	<p><i>Able to give the list of the apparatus and materials correctly but not complete</i></p> <p>Sample answer : sodium hydroxide solution, hydrochloric acid / ethanoic acid, Polystyrene/plastic cup, thermometer,</p>	2
	<p><i>Able to give an idea on the list of the apparatus and substances correctly</i></p> <p>Any one materials and one apparatus with thermometer</p>	1
	No response or wrong response reject : no thermometer	0

Question	Explanation/Rubric	Maximum score
3 (e)	<p><i>Able to state all the steps of the experiment accurately</i></p> <p>Example</p> <ol style="list-style-type: none"> 1. [25-100 cm³] of sodium hydroxide solution is poured into a polystyrene cup using a measuring cylinder. 2. The initial temperature of sodium hydroxide solution is recorded. 3. [25-100 cm³] of hydrochloric acid is measured into another polystyrene cup. 4. The initial temperature of hydrochloric acid is recorded. 5. Hydrochloric acid is then poured quickly into a cup containing sodium hydroxide solution. 6. The mixture is stirred using thermometer and the highest temperature is recorded. 7. Repeat steps 1 to 6 using ethanoic acid instead of hydrochloric acid. 	3
	<p><i>Able to state 5 steps of the experiment</i></p> <p>Steps 2, 4, 5, 6, 7</p>	2
	<p><i>Able to state 2 minimum steps correctly</i></p> <p>Steps 5, 6</p>	1
	No response or wrong response	0

Question	Explanation/Rubric	Maximum score																		
3 (f)	<p><i>Able to construt the table that contains the following information</i></p> <ol style="list-style-type: none"> Columns and rows Headings in the table With unit <p>Sample answer:</p> <table border="1" data-bbox="347 459 1266 722"> <thead> <tr> <th rowspan="2">Pair of acid/alkali</th> <th colspan="3">Initial temperature/ °C</th> <th rowspan="2">Highest temperature of the mixture/° C</th> </tr> <tr> <th>Acid</th> <th>Alkali</th> <th>Average</th> </tr> </thead> <tbody> <tr> <td>NaOH/HCl</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>NaOH/CH₃COOH</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Pair of acid/alkali	Initial temperature/ °C			Highest temperature of the mixture/° C	Acid	Alkali	Average	NaOH/HCl					NaOH/CH ₃ COOH					2
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	<p><i>Able to construt the table that contains the following information</i></p> <ol style="list-style-type: none"> Columns and rows Headings in the table Without unit <p><i>// Able to state an idea about the tabulation of data</i></p> <p>Tabulation of data has the following elements :</p> <ol style="list-style-type: none"> minimum 2 columns and 2 rows <p>Sample answer :</p> <table border="1" data-bbox="347 1089 1172 1388"> <thead> <tr> <th rowspan="2">Pair of acid/alkali</th> <th colspan="2">Initial temperature</th> <th rowspan="2">Highest temperature of the mixture</th> </tr> <tr> <th>Acid</th> <th>Alkali</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p><i>//</i></p> <p>Sample answer :</p> <table border="1" data-bbox="336 1537 1092 1650"> <tbody> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> </tbody> </table>	Pair of acid/alkali	Initial temperature		Highest temperature of the mixture	Acid	Alkali													1
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END OF MARKING SCHEME