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PEPERIKSAAN PERCUBAAN SPM  
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CHEMISTRY

UNTUK KEGUNAAN PEMERIKSA SAHAJA

SKEMA  
PEMARIKAHAN

MARKING SCHEME  
PAPER 1

| QUESTION NO | ANSWER | QUESTION NO | ANSWER |
|-------------|--------|-------------|--------|
| 1           | A      | 26          | A      |
| 2           | B      | 27          | C      |
| 3           | C      | 28          | B      |
| 4           | D      | 29          | B      |
| 5           | C      | 30          | C      |
| 6           | D      | 31          | C      |
| 7           | A      | 32          | C      |
| 8           | B      | 33          | B      |
| 9           | B      | 34          | C      |
| 10          | D      | 35          | B      |
| 11          | B      | 36          | C      |
| 12          | B      | 37          | B      |
| 13          | B      | 38          | B      |
| 14          | D      | 39          | B      |
| 15          | B      | 40          | B      |
| 16          | B      | 41          | D      |
| 17          | D      | 42          | B      |
| 18          | A      | 43          | B      |
| 19          | B      | 44          | C      |
| 20          | A      | 45          | D      |
| 21          | B      | 46          | B      |
| 22          | D      | 47          | C      |
| 23          | A      | 48          | B      |
| 24          | B      | 49          | C      |
| 25          | B      | 45          | C      |

| QUESTION NO | Marking Criteria | MARK                                                                                                                |             |   |
|-------------|------------------|---------------------------------------------------------------------------------------------------------------------|-------------|---|
|             |                  | SUB                                                                                                                 | TOTAL       |   |
| 1           | (a) (i)          | Nucleon number of an element is the total number of protons and neutrons in its atom                                | 1           | 9 |
|             | (ii)             | $35 - 17 = 18$                                                                                                      | 1           |   |
|             | (iii)            | shows nucleus and three shells occupied with electron<br>Label 12 proton, 12 neutron                                | 1 + 1       |   |
|             | (iv)             | Number of electrons = 20                                                                                            | 1           |   |
| (b)         | (i)              | Uniform scale for X-axis and Y-axis and labelled<br>Transfer of point<br>Smooth curve and correct form of the graph | 1<br>1<br>1 |   |
|             | (ii)             | Dotted line on the graph from the horizontal line to Y-axis at 80°C.                                                | 1           |   |

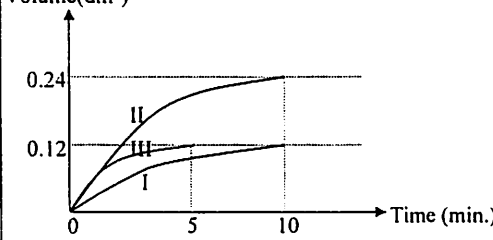
|      |                                          |       |                                                                                                |        |    |
|------|------------------------------------------|-------|------------------------------------------------------------------------------------------------|--------|----|
| 2    | (a)                                      | (i)   | 0.25 mol<br>$0.25 \times 6.02 \times 10^{23}$ // $1.505 \times 10^{23}$ molecules              | 1<br>1 | 10 |
|      |                                          | (ii)  | number of mole of $\text{CO}_2 = \frac{6.0}{24.0}$ // 0.25 mole<br><br>$0.25 \times 44$ // 11g | 1      |    |
|      | (b)                                      | (i)   | Chemical formula that shows simplest mole ratio of each atom of each element in the compound   | 1      |    |
|      |                                          | (ii)  | Mg = 2.4g , O = 1.6g                                                                           | 1 + 1  |    |
|      |                                          | (iii) | 1 : 1                                                                                          | 1      |    |
|      |                                          | (iv)  | MgO                                                                                            | 1      |    |
| (v)  | To allow oxygen enter the crucible       | 1     |                                                                                                |        |    |
| (vi) | Copper is less/almost not reactive metal | 1     |                                                                                                |        |    |

|     |       |                                                                      |        |    |
|-----|-------|----------------------------------------------------------------------|--------|----|
| 3   | (a)   | Chemical cell                                                        | 1      | 10 |
|     | (b)   | $\text{Cu}^{2+}$ , $\text{H}^+$ , $\text{SO}_4^{2-}$ , $\text{OH}^-$ | 1      |    |
| (c) | (i)   | label (-) at zinc                                                    | 1      |    |
|     | (ii)  | From zinc to copper through the external circuit                     | 1      |    |
|     | (iii) | Copper electrode become thicker                                      | 1      |    |
|     | (iv)  | $\text{Cu}^{2+} + 2\text{e}^- \rightarrow \text{Cu}$                 | 1      |    |
| (d) | (i)   | Copper anode become thinner                                          | 1      |    |
|     | (ii)  | Copper atom release electron/copper atom ionize                      | 1      |    |
|     | (iii) | Copper atom dissolve in solution.<br>Copper metal                    | 1<br>1 |    |

|       |                                                                                                              |            |                                                                                                                                              |          |    |
|-------|--------------------------------------------------------------------------------------------------------------|------------|----------------------------------------------------------------------------------------------------------------------------------------------|----------|----|
| 4     | (a)                                                                                                          | (i)        | Yellow solution turns orange//Container/solution feels hot                                                                                   | 1        | 10 |
|       |                                                                                                              | (ii)       | Potassium chloride                                                                                                                           | 1        |    |
|       | (b)                                                                                                          |            | $20\text{cm}^3$                                                                                                                              | 1        |    |
|       |                                                                                                              | (i)        | Precipitation reaction//Double decomposition reaction                                                                                        | 1        |    |
|       |                                                                                                              | (ii)       | $\text{Pb}(\text{NO}_3)_2 + \text{Na}_2\text{SO}_4 \rightarrow \text{PbSO}_4 + 2\text{NaNO}_3$<br>Correct formula of substances<br>Balancing | 1 +<br>1 |    |
| (iii) | Lead(II) sulphate                                                                                            | 1          |                                                                                                                                              |          |    |
| (iv)  | Number of mole of $\text{Na}_2\text{SO}_4 = 10 \times 0.5/1000$ // 0.005 mol                                 | 1          |                                                                                                                                              |          |    |
| (v)   | Number of moles of $\text{PbSO}_4 = 0.005$<br><br>Mass of $\text{PbSO}_4 = 0.005 \times 303 = 1.515\text{g}$ | 1<br><br>1 |                                                                                                                                              |          |    |

|     |                                                                                                       |                                                                                                           |       |    |
|-----|-------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|-------|----|
| 5   | (a)                                                                                                   | Alkene                                                                                                    | 1     | 10 |
|     | (b)                                                                                                   | $\text{CH}_3-\text{CH}(\text{OH})-\text{CH}_3$ // $\text{H}-\text{CH}(\text{OH})-\text{CH}_2-\text{CH}_3$ | 1     |    |
| (c) | (i)                                                                                                   | $2\text{C}_2\text{H}_6 + 9\text{O}_2 \rightarrow 6\text{CO}_2 + 6\text{H}_2\text{O}$                      | 1     |    |
|     | (ii)                                                                                                  | Gas is bubbled through lime water.<br>Lime water turns cloudy                                             | 1 + 1 |    |
| (d) | correct set up apparatus<br>Label                                                                     | 1                                                                                                         |       |    |
| (e) | Acidified potassium dichromate(VI) solution                                                           | 1                                                                                                         |       |    |
| (f) | (i) $\text{C}_2\text{H}_5\text{COOC}_3\text{H}_7$ Label $\text{C}_2\text{H}_5\text{COOC}_3\text{H}_7$ | 1 + 1                                                                                                     |       |    |

|   |      |                                                                                                                                       |             |    |
|---|------|---------------------------------------------------------------------------------------------------------------------------------------|-------------|----|
|   | (ii) | Float on the water.                                                                                                                   | 1           |    |
| 6 | (a)  | Redox reaction is a reaction in which oxidation and reduction occur at the same time.                                                 | 1           | 11 |
|   | (b)  | Oxygen and water                                                                                                                      | 1           |    |
|   | (c)  | $\text{Fe (s)} \rightarrow \text{Fe}^{2+} \text{(aq)} + 2\text{e}^-$                                                                  | 1           |    |
|   | (d)  | Label of water droplet, oxygen and iron<br>Label of negative pole and positive pole<br>Draw arrow from negative to positive pole iron | 1<br>1<br>1 |    |
|   | (e)  | Electron transfer from negative pole to positive pole through iron<br>Electron gains by oxygen in water<br>Hydroxide ion is form      | 1<br>1<br>1 |    |
|   | (f)  | Using sacrificial metal<br>By alloying the ion<br>By tin plating<br>By galvanizing * any two                                          | 1<br>1      |    |

| QUESTION NO | Marking Criteria | MARK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |   |
|-------------|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---|
|             |                  | SUB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | TOTAL                 |   |
| 8           | (a)              | <ul style="list-style-type: none"> <li>- Industries emit (acidic gases)/(sulphur dioxide).</li> <li>- These gases dissolve in rainwater forming acid rain.</li> <li>- The rain water has a higher concentration of acid.</li> <li>- more collisions between (reacting particles)/(metal and acid) to occur.</li> </ul>                                                                                                                                                                                                        | 1<br>1<br>1<br>1      | 4 |
|             | (b) (i)          | $\text{Zn} + 2\text{HCl} \rightarrow \text{ZnCl}_2 + \text{H}_2$<br>$\text{HCl} : \text{H}_2 = 2 : 1$<br>Mole of $\text{H}_2 = \frac{1}{2} \times 0.4 \times 50/1000 // 0.01$<br>Volume of $\text{H}_2 = 0.01 \times 24 // 0.24 \text{ dm}^3$                                                                                                                                                                                                                                                                                 | 1<br>1<br>1<br>1      | 4 |
|             | (ii)             | Volume( $\text{dm}^3$ )<br> <ul style="list-style-type: none"> <li>- Axes are labels with units</li> <li>- Curves I, II and curve III are leveling started at 10 and 5 minutes respectively.</li> <li>- The gradient of curves II and III are more steep than curve I</li> <li>- Volume of graph level off in Exp. II is 0.24 <math>\text{dm}^3</math> and 0.12 <math>\text{dm}^3</math> in Exp. I and III.</li> </ul>                     | 1<br>1<br>1<br>1      |   |
|             | (iii)            | I: rate = $0.12 \times 1000/10 \times 60 // 0.2$<br>II: rate = $0.24 \times 1000/10 \times 60 // 0.4$<br>III: rate = $0.12 \times 1000/5 \times 60 // 0.4$                                                                                                                                                                                                                                                                                                                                                                    | 1<br>1<br>1           | 3 |
|             | (iv)             | Experiment I and Experiment II:<br><ul style="list-style-type: none"> <li>- The initial rate of reaction in experiment II is higher.</li> <li>- The concentration of hydrochloric acid in experiment II is higher.</li> <li>- The frequency of collision between zinc atoms and hydrogen ions is higher.</li> <li>- The frequency of effective collision also increases.</li> </ul> Experiment I and Experiment III:<br><ul style="list-style-type: none"> <li>- The initial rate of reaction in experiment III is</li> </ul> | 1<br>1<br>1<br>1<br>1 |   |



PAPER 3

| Question | Explanation                                                                                                                | Maximum score |
|----------|----------------------------------------------------------------------------------------------------------------------------|---------------|
| 1(a)(i)  | <i>[Able to state the observations correctly]</i><br>Sample answer :<br>Thermometer reading rises // Temperature increases | 3             |
|          | <i>[Able to state observation]</i><br>Sample answer:<br>Temperature rises                                                  | 2             |
|          | <i>[Able to give an idea of observation]</i><br>Sample answer:<br>Thermometer reading change // Temperature change         | 1             |
|          | <i>[No response given or wrong response]</i>                                                                               | 0             |

| Question  | Explanation                                                                                                       | Maximum score |
|-----------|-------------------------------------------------------------------------------------------------------------------|---------------|
| 1 (a)(ii) | <i>[Able to state the inference correctly ]</i><br>Sample answer:<br>Water absorbed heat energy // Mercury expand | 3             |
|           | <i>[Able to state the inference ]</i><br>Sample answer:<br>Exothermic reaction                                    | 2             |
|           | <i>[Able to state an idea of inference]</i><br>Sample answer:<br>Water temperature increases                      | 1             |
|           | <i>[No response given or wrong response]</i>                                                                      | 0             |

| Question | Explanation                                                                                                                                                                                          | Maximum score |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| 1 (b)    | <i>[Able to state all variables correctly]</i><br>Sample answer:<br>Manipulated variable: Types of alcohols<br>Responding variable: Heat of combustion of alcohol<br>Fixed variable: Volume of water | 3             |
|          | <i>[Able to state any 2 variables correctly]</i>                                                                                                                                                     | 2             |
|          | <i>[Able to state any 1 variable correctly]</i>                                                                                                                                                      | 1             |
|          | <i>[No response given or wrong response]</i>                                                                                                                                                         | 0             |

| Question | Explanation                                                                                                                                                                                                                                                                 | Maximum score |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| 1 (c)    | <i>[Able to state the relationship between the manipulated variable and the responding variable with direction correctly]</i><br>Sample answer:<br>The higher the number of carbon atoms per alcohol molecule, the higher the heat of combustion.<br>Note : RV → MV score 2 | 3             |
|          | <i>[Able to state the relationship between the manipulated variable and the responding variable]</i><br>Sample answer:<br>The higher the number of carbon atoms, the higher the heat of combustion.                                                                         | 2             |
|          | <i>[Able to state an idea of hypothesis]</i><br>Sample answer:<br>Different alcohols different heat of combustion.                                                                                                                                                          | 1             |
|          | <i>[No response given or wrong response]</i>                                                                                                                                                                                                                                | 0             |

| Question | Explanation                                                                                                                                                                                 | Maximum score |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| 1 (d)    | <i>[Able to state all the mass of alcohols and round off into two decimal places correctly]</i><br>Sample answer:<br>Methanol = 1.54<br>Ethanol = 1.20<br>Propanol = 1.10<br>Butanol = 1.61 | 3             |
|          | <i>[Able to state any three the mass of alcohols and round off into two decimal places correctly]</i>                                                                                       | 2             |
|          | <i>[Able to state any two the mass of alcohols and round off into two decimal places correctly]</i>                                                                                         | 1             |
|          | <i>[No response given or wrong response]</i>                                                                                                                                                | 0             |

| Question | Explanation                                                                                                                                                                                                                                                                                                                                                      | Maximum score |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| 1(e)     | <i>Able to calculate the heat of combustion of methanol by fulfill the following criteria :</i><br>(i) Heat absorbed by water<br>(ii) Number of mole<br>(iii) Heat of combustion<br><br>Sample answer:<br>Heat absorbed by water = 25200 J<br>Number of mole = 0.048125 mol<br>Heat of combustion = 523636.36 J mol <sup>-1</sup> // 523.64 kJ mol <sup>-1</sup> | 3             |
|          | <i>Able to calculate the heat of combustion of methanol by fulfill any two criteria.</i><br>Note : ecf criteria (i) or (ii)                                                                                                                                                                                                                                      | 2             |
|          | <i>Able to calculate the heat of combustion of methanol by fulfill any one criteria.</i><br>Note : ecf criteria (i) and (ii)                                                                                                                                                                                                                                     | 1             |

|  |                                              |   |
|--|----------------------------------------------|---|
|  | <i>[No response given or wrong response]</i> | 0 |
|--|----------------------------------------------|---|

| Question | Explanation                                                                                                                                                                                                                                 | Maximum score |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| 1 (f)    | <i>Able to plot a graph by fulfill the following criteria:</i><br>(i) Axes are labelled with unit correctly<br>(ii) Uniform scale so the size of graph at least 50%<br>(iii) All point transferred correctly<br>(iv) Best fit straight line | 3             |
|          | <i>Able to plot a graph by fulfill the following criteria:</i><br>(i) Axes are labeled/ unit correctly<br>(ii) At least three point are transferred correctly<br>(iii) straight line                                                        | 2             |
|          | <i>Able to plot a graph by fulfill the following criteria:</i><br>(i) At least two point are transferred correctly<br>(ii) straight line                                                                                                    | 1             |
|          | <i>[No response given or wrong response]</i>                                                                                                                                                                                                | 0             |

| Question | Explanation                                                                                                                                                                                    | Maximum score |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| 1(g)     | <i>Able to predict the heat of combustion of pentanol with consist of the following criteria:</i><br><br>1. Horizontal line is drawn towards Y axis from n=5.<br>2. value = 2400               | 3             |
|          | <i>Able to predict the heat of combustion of pentanol.</i><br>Sample answer:<br>$2375 \leq x < 2400$ // $2400 < x \leq 2425$<br><i>Able to give an idea to predict the heat of combustion.</i> | 2             |
|          | Sample answer<br>More than 1860                                                                                                                                                                | 1             |
|          | <i>[No response given or wrong response]</i>                                                                                                                                                   | 0             |

| Question | Explanation                                                                                                                                                                         | Maximum score |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| 1(h)     | <i>Able to state the operational definition for heat of combustion correctly</i><br>Sample answer:<br>The heat energy released/produced when 1 mole of alcohol is burnt completely. | 3             |
|          | <i>Able to state the operational definition for heat of combustion</i><br>Sample answer:<br>Heat released/produced when alcohol is burnt completely.                                | 2             |
|          | <i>Able to state an idea of operational definition for heat of combustion</i><br>Sample answer:<br>Energy change when alcohol burns.                                                | 1             |
|          | <i>[No response given or wrong response]</i>                                                                                                                                        | 0             |

| Question | Explanation                                                                                                                                                        | Maximum score |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| 1(i)     | <i>Able to give three reasons correctly</i><br>Sample answer:<br>1. incomplete combustion<br>2. loss of heat to the surrounding<br>3. container absorbed some heat | 3             |
|          | <i>Able to give any two reasons correctly</i>                                                                                                                      | 2             |
|          | <i>Able to give any one reason correctly</i>                                                                                                                       | 1             |
|          | <i>[No response given or wrong response]</i>                                                                                                                       | 0             |

| Question                                     | Explanation                                                                                                                                                                                       | Maximum score             |             |                 |                   |
|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|-------------|-----------------|-------------------|
| 1(j)                                         | <i>Able to classify all the substances correctly</i><br>Sample answer:                                                                                                                            | 3                         |             |                 |                   |
|                                              | <table border="1"> <thead> <tr> <th>Hydrocarbon</th> <th>Non hydrocarbon</th> </tr> </thead> <tbody> <tr> <td>Propane<br/>Butene</td> <td>Methanoic acid<br/>Ethanol</td> </tr> </tbody> </table> |                           | Hydrocarbon | Non hydrocarbon | Propane<br>Butene |
|                                              | Hydrocarbon                                                                                                                                                                                       | Non hydrocarbon           |             |                 |                   |
|                                              | Propane<br>Butene                                                                                                                                                                                 | Methanoic acid<br>Ethanol |             |                 |                   |
|                                              | <i>[Able to classify any three substances correctly]</i>                                                                                                                                          | 2                         |             |                 |                   |
|                                              | <i>[Able to classify any two substances correctly]</i>                                                                                                                                            | 1                         |             |                 |                   |
| <i>[No response given or wrong response]</i> | 0                                                                                                                                                                                                 |                           |             |                 |                   |

| Question number | Rubric                                                                                                                                                        | Score |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 2 (a)           | Able to give the statement of problem correctly.<br><u>Sample answer:</u><br><br>Does the type of electrode/anode affect the choice of ions to be discharged? | 3     |
|                 | Able to give the statement of problem less correctly.<br><u>Sample answer:</u><br><br>The type of electrode/anode affect the choice of ions to be discharged. | 2     |
|                 | Able to give an idea about the statement of problem/ aim.<br><u>Sample answer:</u><br><br>Electrode affect the product formed.                                | 1     |
|                 | No response or wrong response                                                                                                                                 | 0     |
|                 |                                                                                                                                                               |       |

| Question number | Rubric                                                                                                                                                                                                                                | Score |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 2 (b)           | Able to state all variables correctly.<br><u>Sample answer:</u><br><br><u>Manipulated variable</u><br>Type of electrode/ anode<br><br><u>Responding variable</u><br>Product formed at anode<br><br>Controlled variable<br>Electrolyte | 3     |
|                 | Able to state any two variables above correctly.                                                                                                                                                                                      | 2     |
|                 | Able to state any one variable above correctly.                                                                                                                                                                                       | 1     |
|                 | No response or wrong response                                                                                                                                                                                                         | 0     |

| Question number | Rubric                                                                                                                                                                                                     | Score |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 2(c)            | Able to give the hypothesis accurately<br><u>Sample answer:</u><br><br>Type of electrode/anode will influence the choice of ion to be discharged// type of electrode/anode will produce different product. | 3     |
|                 | Able to give the statement of problem correctly.<br><u>Sample answer:</u><br><br>Different anode will influence the choice of ion to be discharged// Different anode will produce different product.       | 2     |
|                 | Able to give an idea of the hypothesis<br><u>Sample answer:</u><br><br>Different electrode will produce different product                                                                                  | 1     |
|                 | No response or wrong response                                                                                                                                                                              | 0     |
|                 |                                                                                                                                                                                                            |       |

| Question number | Rubric                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Score |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 2(d)            | Able to list completely the materials and apparatus.<br><u>Sample answer:</u><br>Materials:<br>1. copper(II) sulphate solution, (0.5 – 2.0) mol dm <sup>-3</sup><br>//any suitable solution that match with metal plate used.<br>2. carbon rod<br>3. copper plate// any metal plate that match with a solution used.<br>4. wooden splinter// any suitable material used for testing a gas or any product at anode.<br>Apparatus:<br>1. electrolytic cell<br>2. battery<br>3. connecting wire<br>4. test tube | 3     |



|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |   |
|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|  | <p><b>Able to list incompletely materials and apparatus.</b><br/> <b>Sample answer:</b><br/> <b>Materials:</b></p> <ol style="list-style-type: none"> <li>1. Copper(II) sulphate solution //any suitable solution that match with metal plate used.</li> <li>2. carbon rod</li> <li>3. copper plate// any metal plate that match with a solution used.</li> </ol> <p><b>Apparatus:</b></p> <ol style="list-style-type: none"> <li>1. beaker/any suitable container .</li> <li>2. battery</li> <li>3. connecting wire</li> </ol> | 2 |
|  | <p><b>Able to give an idea of materials and apparatus.</b><br/> <b>Sample answer:</b><br/> <b>Materials:</b></p> <ol style="list-style-type: none"> <li>1. any solution</li> <li>2 carbon rod / any metal plate</li> </ol> <p><b>Apparatus:</b></p> <ol style="list-style-type: none"> <li>1. any container</li> <li>2. battery</li> </ol>                                                                                                                                                                                      | 1 |
|  | No response or wrong respons                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0 |

| Question number | Rubric                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Score |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 2(e)            | <p><b>Able to state all procedures completely and correctly.</b><br/> <b>Sample answer:</b></p> <ol style="list-style-type: none"> <li>1. Fill the electrolytic cell (beaker) with half full of copper(II) sulphate solution (any suitable electrolyte that match with metal plate used).</li> <li>2. A test tube filled with copper(II) solution is inverted on the anode carbon electrode.</li> <li>3. Complete the circuit.</li> <li>4. Electricity is flowed.</li> <li>5. Record observation at anode..</li> <li>6. Step 1-5 is repeated using copper plate</li> </ol> | 3     |

|  |                                                                                                                                                                                                                                                                                                                                                                                                                |   |
|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|  | <p><b>Able to state procedures incompletely.</b><br/> <b>Sample answer:</b></p> <ol style="list-style-type: none"> <li>1. Copper(II) sulphate solution (any suitable electrolyte that match with metal plate used) is poured into a beaker/any suitable container.</li> <li>2. Complete the circuit.</li> <li>3. Record observation at anode .</li> <li>4. Step 1-3 is repeated using copper plate.</li> </ol> | 2 |
|  | <p><b>Able to give an idea of the procedure.</b><br/> <b>Sample answer:</b></p> <ol style="list-style-type: none"> <li>1. Copper(II) sulphate solution is poured into a any container.</li> <li>2. Complete the circuit //</li> </ol>                                                                                                                                                                          | 1 |
|  | No response or wrong respons                                                                                                                                                                                                                                                                                                                                                                                   | 0 |

| Question number   | Rubric                                                                                                                                                                                                                                                                                                                             | Score             |             |        |  |                  |  |   |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-------------|--------|--|------------------|--|---|
| 2(f)              | <p><b>Able to exhibit the tabulation of data correctly.</b><br/> <b>Sample answer:</b></p> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Type of electrode</th> <th>Observation</th> </tr> </thead> <tbody> <tr> <td>Carbon</td> <td></td> </tr> <tr> <td>Copper/any metal</td> <td></td> </tr> </tbody> </table> | Type of electrode | Observation | Carbon |  | Copper/any metal |  | 2 |
| Type of electrode | Observation                                                                                                                                                                                                                                                                                                                        |                   |             |        |  |                  |  |   |
| Carbon            |                                                                                                                                                                                                                                                                                                                                    |                   |             |        |  |                  |  |   |
| Copper/any metal  |                                                                                                                                                                                                                                                                                                                                    |                   |             |        |  |                  |  |   |

|                                                                                                                                                                                                                                                                                                             |                   |             |  |  |   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-------------|--|--|---|
| <p>Able to exhibit the tabulation of data less accurately.<br/> <u>Sample answer:</u></p> <table border="1" data-bbox="1268 212 1324 694"> <tr> <td data-bbox="1268 212 1300 436">Type of electrode</td> <td data-bbox="1268 436 1300 694">Observation</td> </tr> <tr> <td> </td> <td> </td> </tr> </table> | Type of electrode | Observation |  |  | 1 |
| Type of electrode                                                                                                                                                                                                                                                                                           | Observation       |             |  |  |   |
|                                                                                                                                                                                                                                                                                                             |                   |             |  |  |   |
| No response or wrong response                                                                                                                                                                                                                                                                               | 0                 |             |  |  |   |

END OF MARKING SCHEME