

**MODUL PENINGKATAN PRESTASI MURID TINGKATAN 5  
TAHUN 2026**

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**KIMIA  
KERTAS 1**

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**PERATURAN PEMARKAHAN**

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**Modul ini mengandung 2 halaman bercetak termasuk muka hadapan**

|           |          |           |          |
|-----------|----------|-----------|----------|
| <b>1</b>  | <b>D</b> | <b>21</b> | <b>D</b> |
| <b>2</b>  | <b>A</b> | <b>22</b> | <b>B</b> |
| <b>3</b>  | <b>A</b> | <b>23</b> | <b>B</b> |
| <b>4</b>  | <b>B</b> | <b>24</b> | <b>C</b> |
| <b>5</b>  | <b>A</b> | <b>25</b> | <b>D</b> |
| <b>6</b>  | <b>B</b> | <b>26</b> | <b>D</b> |
| <b>7</b>  | <b>B</b> | <b>27</b> | <b>D</b> |
| <b>8</b>  | <b>B</b> | <b>28</b> | <b>C</b> |
| <b>9</b>  | <b>A</b> | <b>29</b> | <b>C</b> |
| <b>10</b> | <b>A</b> | <b>30</b> | <b>B</b> |
| <b>11</b> | <b>D</b> | <b>31</b> | <b>A</b> |
| <b>12</b> | <b>C</b> | <b>32</b> | <b>C</b> |
| <b>13</b> | <b>A</b> | <b>33</b> | <b>C</b> |
| <b>14</b> | <b>C</b> | <b>34</b> | <b>D</b> |
| <b>15</b> | <b>A</b> | <b>35</b> | <b>D</b> |
| <b>16</b> | <b>C</b> | <b>36</b> | <b>B</b> |
| <b>17</b> | <b>A</b> | <b>37</b> | <b>B</b> |
| <b>18</b> | <b>C</b> | <b>38</b> | <b>B</b> |
| <b>19</b> | <b>C</b> | <b>39</b> | <b>D</b> |
| <b>20</b> | <b>D</b> | <b>40</b> | <b>A</b> |

**A=10**

**B =10**

**C=10**

**D=10**

**TAMAT**

**MODUL PENINGKATAN PRESTASI MURID TINGKATAN 5  
TAHUN 2026**

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**KIMIA  
KERTAS 2**

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**PERATURAN PEMARKAHAN**

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Modul ini mengandung 16 halaman bercetak termasuk muka hadapan

| Soalan | Peraturan pemarkahan                                                                                                                         | Sub<br>markah | Jumlah<br>markah |
|--------|----------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------------|
| 1(a)   | Nombor proton // <i>Proton number</i>                                                                                                        | 1             | 1                |
| (b)    | Menganggar usia artifak/ fosil // <i>Estimating the age of artifacts/ fossils</i>                                                            | 1             | 1                |
| (c)    | Pepejal // <i>Solid</i>                                                                                                                      | 1             | 1                |
| (d)    | Mempunyai empat elektron valens / bilangan elektron valens yang sama<br><i>Have four valence electrons / same number of valence electron</i> | 1             | 1                |
| (e)    | 14                                                                                                                                           | 1             | 1                |
|        | JUMLAH                                                                                                                                       |               | 5                |

| Soalan  | Peraturan pemarkahan                                                                                                                                                                      | Sub<br>markah | Jumlah<br>markah |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------------|
| 2(a)    | $\text{FeCl}_3$                                                                                                                                                                           | 1             | 1                |
| (b)     | 1.Jisim zat terlarut // <i>Mass of solute.</i><br>2.Isipadu air suling // <i>Volume of distilled water.</i>                                                                               | 1<br>1        | 2                |
| (c)(i)  | Pencairan// <i>Dilution</i>                                                                                                                                                               | 1             | 1                |
| (c)(ii) | Keamatan warna perang berkurang//warna perang larutan ferum(III) klorida menjadi pudar//<br><i>Intensity of brown colour decreases// brown colour of iron(III) chloride become fades.</i> | 1             | 1                |
|         | JUMLAH                                                                                                                                                                                    |               | 5                |

| Soalan  | Peraturan pemarkahan                                                                                                                                                                                                                                                                 | Sub<br>markah | Jumlah<br>markah |
|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------------|
| 3(a)(i) | Berkarat // <i>Rust</i>                                                                                                                                                                                                                                                              | 1             | 1                |
| (ii)    | Keluli nirkarat // <i>Stainless steel</i>                                                                                                                                                                                                                                            | 1             | 1                |
| (iii)   | <p>1: Lukisan betul (2 saiz atom yang berbeza )<br/> <i>Correct drawing (2 different atomic sizes)</i></p> <p>2: Label betul // <i>Correct label</i></p> <div style="text-align: center;">  </div> | 1<br><br>1    | 2                |
| (b)(i)  | <p>Batu- bata // Mangkuk // Pinggan // [mana-mana objek yang sesuai]<br/> <i>Bricks // Bowl // Plate // [any suitable object]</i></p> <p>Reject: peralatan dapur</p>                                                                                                                 | 1             | 1                |
| (ii)    | <p>Cakera pemotong // Implan gigi // komponen enjin dalam kapal terbang jet // [mana-mana objek yang sesuai]<br/> <i>Cutting disc // Dental implant // Engine component in a jet airplane // [any suitable object]</i></p>                                                           | 1             | 1                |
|         | JUMLAH                                                                                                                                                                                                                                                                               |               | 6                |

| Soalan  | Peraturan pemarkahan                                                                                                                                                                                                              | Sub<br>markah | Jumlah<br>markah |
|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------------|
| 4(a)    | Hidroksil // <i>Hydroxyl</i>                                                                                                                                                                                                      | 1             | 1                |
| (b)     | Alkohol Q: C <sub>3</sub> H <sub>8</sub> O                                                                                                                                                                                        | 1             | 2                |
|         | Asid karboksilik A: CH <sub>2</sub> O                                                                                                                                                                                             | 1             |                  |
| (c)(i)  | 1. Formula bahan dan hasil tindak balas betul<br><i>Correct formula of reactants and products of the reaction</i>                                                                                                                 | 1             | 2                |
|         | 2. Persamaan seimbang // <i>Balanced equation</i><br><br>$\text{C}_3\text{H}_7\text{OH} + \frac{9}{2} \text{O}_2 \rightarrow 3\text{CO}_2 + 4\text{H}_2\text{O}$                                                                  | 1             |                  |
| (c)(ii) | 1. Bilangan mol // <i>Number or mole</i>                                                                                                                                                                                          | 1             | 2                |
|         | 2. Nisbah mol // <i>Mole ratio</i><br><br>Bil mol alkohol Q: 4.0/60 // 0.0667mol<br>Nisbah mol: 1 mol C <sub>3</sub> H <sub>7</sub> OH: 3 mol CO <sub>2</sub><br>0.0667 mol : 0.2 mol<br>Bilangan mol // Number of mole = 0.2 mol | 1             |                  |
|         | JUMLAH                                                                                                                                                                                                                            |               | 7                |

| Soalan  | Peraturan pemarkahan                                                                                                                                                                                                                                                                                                                                                                                        | Sub<br>markah | Jumlah<br>markah |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------------|
| 5(a)(i) | R                                                                                                                                                                                                                                                                                                                                                                                                           | 1             | 1                |
| (ii)    | Bertindak sebagai mangkin// Membentuk ion atau sebatian berwarna// Membentuk ion kompleks// Mempunyai lebih daripada satu nombor pengoksidaan<br><i>Act as a catalyst// Form coloured ions or compounds// Form complex ions// Have more than one oxidation number</i>                                                                                                                                       | 1             | 1                |
| (b)(i)  | 1. Formula bahan dan hasil tindak balas betul<br><i>Correct formula of reactants and products of the reaction</i><br>2. Persamaan seimbang // <i>Balanced equation</i><br><br>$4R + 3O_2 \rightarrow 2R_2O_3$                                                                                                                                                                                               | 1<br><br>1    | 2                |
| (b)(ii) | $2X + (-2 \times 3) = 0$<br>$X = +3$                                                                                                                                                                                                                                                                                                                                                                        | 1<br>1        | 2                |
| (c)     | 1. Saiz atom S lebih besar berbanding atom Q // Daya tarikan antara nukleus terhadap elektron valens dalam atom S lebih lemah berbanding atom Q. // <i>The atomic size of S is larger than Q atom.// The attraction force between the nucleus and the valence electrons in S atom is weaker than in Q atom.</i><br>2. Atom Q lebih mudah menerima elektron. // <i>Q atom is easier to receive electron.</i> | 1<br><br>1    | 2                |
|         | JUMLAH                                                                                                                                                                                                                                                                                                                                                                                                      |               | 8                |

| Soalan | Peraturan pemarkahan                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Sub<br>markah | Jumlah<br>markah |
|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------------|
| 6(a)   | Polietena/ Polipropena/ Polivinil klorida/ Polistirena/<br>[mana-mana polimer sintetik yang sesuai]<br><i>Polyethene/ Polypropene/ Polyvinyl chloride/ Polystrene /</i><br>[ <i>Any suitable synthetic polymer</i> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1             | 1                |
| (b)    | <p>1. Struktur monomer, bilangan karbon dan ikatan ganda dua yang betul.</p> <p>2. Struktur polimer, bilangan karbon dan ikatan tunggal yang betul</p> <p>[Mana-mana jawapan yang sesuai dengan 6(a)]</p> <p>1. <i>Correct monomer structure, number of carbon, and double bond.</i></p> <p>2. <i>Correct polymer structure, number of carbon, and single bond.</i></p> <p><i>Any answer that corresponds to 6(a)</i></p> $  \begin{array}{c}  \text{H} \quad \text{H} \\    \quad   \\  n \text{ C} = \text{C} \longrightarrow \left( \begin{array}{c} \text{H} \quad \text{H} \\   \quad   \\ \text{C} - \text{C} \\   \quad   \\ \text{H} \quad \text{CH}_3 \end{array} \right)_n \\    \quad   \\  \text{H} \quad \text{CH}_3  \end{array}  $ $  \begin{array}{c}  \text{H} \quad \text{H} \\    \quad   \\  n \text{ C} = \text{C} \longrightarrow \left( \begin{array}{c} \text{H} \quad \text{H} \\   \quad   \\ \text{C} - \text{C} \\   \quad   \\ \text{H} \quad \text{H} \end{array} \right)_n \\    \quad   \\  \text{H} \quad \text{H}  \end{array}  $ | 1<br><br>1    | 2                |
| (c)(i) | P:Termoplastik // <i>Thermoplastic</i><br>Q :Termoset // <i>Thermosetting</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1<br>1        | 2                |



|       |                                                                                                                                                                                                                                                                                                                                                                                                                             |                   |          |
|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------|
| (ii)  | <p>1. Polimer Q lebih tahan haba.<br/><i>Polymer Q higher heat resistant</i></p> <p>2. Polimer Q mempunyai rangkai silang dan polimer P tidak mempunyai rangkai silang. //Lebih banyak tenaga haba yang diperlukan untuk memutuskan rangkai silang dalam polimer Q.<br/><i>Polymer Q has cross-links and polymer P does not have cross-links. //More heat energy is required to break the cross-links in polymer Q.</i></p> | <p>1</p> <p>1</p> | <p>2</p> |
| (iii) | <p>1. Kalis air/ kotoran// Ringan // Anti kedut // Pelindung sinar UV<br/><i>Water/dirt resistant// Lightweight // Wrinkle resistant // UV protective</i></p> <p>2. Menghasilkan struktur yang <u>sangat</u> rapat / kecil<br/><i>Produces a <u>very</u> tight/small structure</i></p>                                                                                                                                      | <p>1</p> <p>1</p> | <p>2</p> |
|       | JUMLAH                                                                                                                                                                                                                                                                                                                                                                                                                      |                   | 9        |

| Soalan | Peraturan pemarkahan                                                                                                                                                                                                                                                                                    | Sub<br>markah                            | Jumlah<br>markah |
|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|------------------|
| 7(a)   | $C_nH_{2n+1}OH$                                                                                                                                                                                                                                                                                         | 1                                        | 1                |
| (b)    | $  \begin{array}{cccc}  H & H & H & H \\    &   &   &   \\  H-C & -C & -C & -C-H \\    &   &   &   \\  H & H & H & OH  \end{array}  $ <p>[Terima mana-mana isomer yang sesuai]<br/>[Accept any suitable isomer]</p>                                                                                     | 1                                        | 1                |
| (c)(i) | Tindak balas / <i>Reaction</i> I: Pendehidratan / <i>Dehydration</i><br>Tindak balas / <i>Reaction</i> II: Penghidrogenan / <i>Hydrogenation</i>                                                                                                                                                        | 1<br>1                                   | 2                |
| (ii)   | Butana// <i>Butane</i>                                                                                                                                                                                                                                                                                  | 1                                        | 1                |
| (d)(i) | 1. Bil.mol/ <i>No. of mol</i><br>2. Haba yang dibebaskan/ <i>Heat of releases</i><br><br><u>Contoh jawapan/ <i>sample answer</i>:</u><br><br>$n = \frac{1.2}{74} // 0.01622 \text{ mol}$<br>$Q = 43453 \text{ J} / 43.45 \text{ kJ}$                                                                    | 1<br>1                                   | 2                |
| (ii)   | $Q = mc\theta$<br>$\theta = \frac{43453}{(200 \times 4.2)} ^\circ\text{C} // 51.73 ^\circ\text{C}$                                                                                                                                                                                                      | 1                                        | 1                |
| (e)    | 1. L<br>2. Mempunyai nilai bahan api yang lebih tinggi //<br>Membebaskan lebih banyak haba semasa<br>pembakaran.<br><i>Has a higher fuel value and releases more heat<br/>           during combustion.</i><br><p style="text-align: center;">Atau / Or</p> 1. J<br>2. Tidak berjelaga / <i>No soot</i> | 1<br>1<br><br><br><br><br><br><br>1<br>1 | 2                |
|        | JUMLAH                                                                                                                                                                                                                                                                                                  |                                          | 10               |

| Soalan | Peraturan pemarkahan                                                                                                                                                                                                                                                     | Sub markah  | Jumlah markah |
|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|---------------|
| 8(a)   | Penguraian ganda dua // Pemendakan<br><i>Double decomposition // Precipitation</i>                                                                                                                                                                                       | 1           | 1             |
| (b)(i) | Formula bahan dan hasil yang betul serta seimbang<br><i>Correct formula of reactants and products of the reaction and Balanced equation</i><br><br>$\text{Na}_2\text{CO}_3 + \text{CuSO}_4 \rightarrow \text{CuCO}_3 + \text{Na}_2\text{SO}_4$                           | 1           | 1             |
| (ii)   | Hijau // Green                                                                                                                                                                                                                                                           | 1           | 1             |
| (iii)  | 1. Bilangan mol bahan // <i>Number of moles of substance</i><br>2. Jisim dan unit yang betul // <i>Mass and correct units</i><br><br>Mol = $\frac{0.5 \times 25}{1000}$ // 0.0125<br>Jisim = $[0.0125 \times 124]$ g // 1.55 g                                           | 1<br>1      | 2             |
| (c)(i) | 1. Alirkan gas Z ke dalam air kapur.<br><i>Flow gas Z into lime water.</i><br>2. Air kapur menjadi keruh<br><i>The lime water becomes cloudy</i>                                                                                                                         | 1<br>1      | 2             |
| (ii)   | 1. Tuangkan larutan garam Y ke dalam bikar/ tabung uji.<br><i>Pour the Y salt solution into a beaker/test tube.</i><br>2. Tambahkan larutan NaOH / KOH/ NH <sub>3</sub> .<br><i>Add NaOH / KOH/ NH<sub>3</sub> solution.</i><br>3. Kacau/ Goncang.<br><i>Stir/Shake.</i> | 1<br>1<br>1 | 3             |
|        | JUMLAH                                                                                                                                                                                                                                                                   |             | 10            |

| Soalan |        | Peraturan Pemarkahan                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Sub Markah                     | Jumlah markah |
|--------|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|---------------|
| 9      | (a)(i) | 1. ammonia<br>2. molekul // <i>molecule</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1<br>1                         | 2             |
|        | (ii)   | 1. ikatan datif // <i>dative bond</i><br>2. gas Q : N <sub>2</sub> // gas nitrogen<br>3. gas R : H <sub>2</sub> // gas hydrogen<br>4.<br><div style="text-align: center;"> <math display="block">\left[ \begin{array}{c} \text{H} \\ \times \\ \bullet \\ \text{H} \times \bullet \text{N} \bullet \bullet \text{H} \\ \bullet \\ \times \\ \text{H} \end{array} \right]^+</math> </div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1<br>1<br>1<br><br>1           | 4             |
|        | (iii)  | 1. Formula kimia bahan dan hasil tindak balas yang betul<br><i>Correct chemical formula of the substance and the product of the reaction</i><br>2. Persamaan seimbang<br><i>Balanced equation</i><br>3. Bilangan mol N <sub>2</sub><br><i>Number of moles of N<sub>2</sub></i><br>4. Bilangan mol H <sub>2</sub><br><i>Number of moles of H<sub>2</sub></i><br>5. Nisbah mol<br><i>Mole ratio</i><br>6. Isipadu gas dengan unit yang betul.<br><i>Volume of gas with correct units.</i><br><br>$\text{N}_2 + 3\text{H}_2 \rightarrow 2\text{NH}_3$<br><br>Bil mol N <sub>2</sub> = $\frac{2.4}{24}$ // 0.1mol<br><br>Bil mol H <sub>2</sub> = $\frac{2.4}{24}$ // 0.1mol<br><br>3mol H <sub>2</sub> : 2mol NH <sub>3</sub> // 0.1 mol H <sub>2</sub> : 0.067mol NH <sub>3</sub><br>isipadu gas : 0.067 x 24 dm <sup>3</sup> // 1.608 dm <sup>3</sup> // 1.6 dm <sup>3</sup> | 1<br><br>1<br>1<br>1<br>1<br>1 | 6             |

|                                                                                                                                 | (b)(i)                                                                                               | Bahan yang boleh menghantarkan elektrik samada dalam keadaan leburan ataupun akueus dan mengalami perubahan kimia.<br><i>Substances that can conduct electricity in either molten state or aqueous solution and undergo chemical changes.</i>                                                                                                                                                                                                                                                                                                                                                                                                                              | 1                                | 1                                          |                                    |                                         |                                                                                                                                 |                                                                                                      |                                                                      |                                                                               |                           |   |
|---------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|--------------------------------------------|------------------------------------|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|-------------------------------------------------------------------------------|---------------------------|---|
|                                                                                                                                 | (ii)                                                                                                 | Panaskan elektrolit sehingga <u>lebur</u> .<br><i>Heat the electrolyte until it <u>melts</u>.</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1                                | 1                                          |                                    |                                         |                                                                                                                                 |                                                                                                      |                                                                      |                                                                               |                           |   |
|                                                                                                                                 | (iii)                                                                                                | <table><tr><th>Elektrolit<br/><i>Electrolyte</i></th><th>Wayar penyambung<br/><i>Connecting wire</i></th></tr><tr><td>1. Ikatan ion<br/><i>Ionic bond</i></td><td>2. Ikatan logam<br/><i>Metallic bond</i></td></tr><tr><td>3. Boleh menghantarkan elektrik dalam keadaan leburan atau akueus<br/><i>Can conduct electricity in molten and aqueous state</i></td><td>4. Boleh menghantarkan elektrik dalam semua keadaan<br/><i>Can conduct electricity in all states.</i></td></tr><tr><td>5. Mempunyai ion yang bebas bergerak<br/><i>Has freely moving ion</i></td><td>6. Mempunyai elektron yang dinyahsetempat<br/><i>Has delocalised electrons</i></td></tr></table> | Elektrolit<br><i>Electrolyte</i> | Wayar penyambung<br><i>Connecting wire</i> | 1. Ikatan ion<br><i>Ionic bond</i> | 2. Ikatan logam<br><i>Metallic bond</i> | 3. Boleh menghantarkan elektrik dalam keadaan leburan atau akueus<br><i>Can conduct electricity in molten and aqueous state</i> | 4. Boleh menghantarkan elektrik dalam semua keadaan<br><i>Can conduct electricity in all states.</i> | 5. Mempunyai ion yang bebas bergerak<br><i>Has freely moving ion</i> | 6. Mempunyai elektron yang dinyahsetempat<br><i>Has delocalised electrons</i> | 1+1<br><br>1+1<br><br>1+1 | 6 |
| Elektrolit<br><i>Electrolyte</i>                                                                                                | Wayar penyambung<br><i>Connecting wire</i>                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                  |                                            |                                    |                                         |                                                                                                                                 |                                                                                                      |                                                                      |                                                                               |                           |   |
| 1. Ikatan ion<br><i>Ionic bond</i>                                                                                              | 2. Ikatan logam<br><i>Metallic bond</i>                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                  |                                            |                                    |                                         |                                                                                                                                 |                                                                                                      |                                                                      |                                                                               |                           |   |
| 3. Boleh menghantarkan elektrik dalam keadaan leburan atau akueus<br><i>Can conduct electricity in molten and aqueous state</i> | 4. Boleh menghantarkan elektrik dalam semua keadaan<br><i>Can conduct electricity in all states.</i> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                  |                                            |                                    |                                         |                                                                                                                                 |                                                                                                      |                                                                      |                                                                               |                           |   |
| 5. Mempunyai ion yang bebas bergerak<br><i>Has freely moving ion</i>                                                            | 6. Mempunyai elektron yang dinyahsetempat<br><i>Has delocalised electrons</i>                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                  |                                            |                                    |                                         |                                                                                                                                 |                                                                                                      |                                                                      |                                                                               |                           |   |
|                                                                                                                                 | JUMLAH                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                  | 20                                         |                                    |                                         |                                                                                                                                 |                                                                                                      |                                                                      |                                                                               |                           |   |

| Soalan | Peraturan Pemarkahan                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Sub Markah | Jumlah markah |
|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|---------------|
| 10 (a) | 1. Kadar tindak balas ialah pengurangan jisim kulit telur per unit masa<br><i>The reaction rate is the reduction in marble mass per unit time</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 1          | 7             |
|        | 2. Label paksi X dan Y berserta unit<br><i>Label the X and Y axes along with units</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1          |               |
|        | 3. Skala pada paksi X dan Y yang seragam<br><i>Uniform scale on the X and Y axes</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1          |               |
|        | 4. Plot graf pada titik yang betul<br><i>Plot the graph at the correct points</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 1          |               |
|        | 5. Menyambungkan titik-titik dengan garisan yang licin<br><i>Connect the points with a smooth line</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1          |               |
|        | <div> <p>The graph plots 'Mass of egg shell, g' on the y-axis (0 to 11.0) against 'Time, s' on the x-axis (0 to 480.0). Set I data points are approximately (0, 11.0), (60, 9.5), (120, 8.5), (180, 7.5), (240, 6.8), (300, 6.2), (360, 6.0), (420, 6.0), (480, 6.0). Set II data points are approximately (0, 11.0), (60, 7.0), (120, 4.5), (180, 3.0), (240, 1.8), (300, 1.2), (360, 1.0), (420, 1.0), (480, 1.0). A red tangent line is drawn on Set II at 120.0s, with a slope triangle showing a vertical change of 1.0g and a horizontal change of 40.8s.</p> </div> <div> <p>Kadar tindak balas minit kedua Set II (tangen)<br/> <i>Second set minute reaction rate (tangent)</i></p> <p>6. Lukis tangen // <i>Draw the tangent</i></p> <p>7. 0.0247 g s<sup>-1</sup> (± 0.005)</p> </div> | 1          |               |
|        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1          |               |

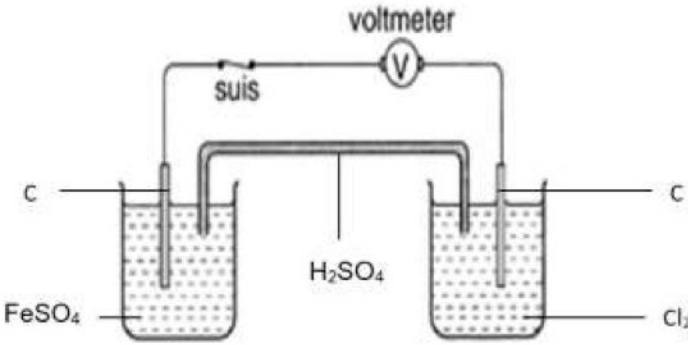
|     |                                                                                                                                                                                                                                                                          |   |   |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|
| (b) | 1. Kadar tindak balas Set II lebih tinggi berbanding Set I<br><i>The reaction rate of Set II is higher compared to Set I</i>                                                                                                                                             | 1 | 5 |
|     | 2. Kepekatan asid nitrik bagi Set II lebih tinggi berbanding Set I<br><i>The concentration of nitric acid in Set II is higher compared to Set I</i>                                                                                                                      | 1 |   |
|     | 3. Bilangan ion hidrogen per unit isipadu Set II lebih tinggi berbanding Set I<br><i>The number of hydrogen ions per unit volume in Set II is higher compared to Set I</i>                                                                                               | 1 |   |
|     | 4. Frekuensi perlanggaran antara kulit telur/ $\text{CaCO}_3$ dengan ion hidrogen bagi Set II lebih tinggi berbanding Set I<br><i>The frequency of collisions between egg shells/ <math>\text{CaCO}_3</math> and hydrogen ions in Set II is higher compared to Set I</i> | 1 |   |
|     | 5. Frekuensi perlanggaran berkesan bagi Set II lebih tinggi berbanding Set I<br><i>The frequency of effective collisions in Set II is higher compared to Set I</i>                                                                                                       | 1 |   |
| (c) | 1. Formula kimia bahan dan hasil tindak balas<br><i>Chemical formula of substances and reaction products</i>                                                                                                                                                             | 1 | 5 |
|     | 2. Persamaan seimbang<br><i>Balanced equation</i><br><br>$\text{CaCO}_3 + 2\text{HNO}_3 \rightarrow \text{Ca}(\text{NO}_3)_2 + \text{H}_2\text{O} + \text{CO}_2$                                                                                                         | 1 |   |
|     | 3. Bil mol $\text{CaCO}_3$ yang bertindak balas<br><i>Number of moles of <math>\text{CaCO}_3</math> that react</i>                                                                                                                                                       | 1 |   |
|     | 4. Nisbah mol<br><i>Molar ratio</i>                                                                                                                                                                                                                                      | 1 |   |
|     | 5. Kepekatan asid nitrik dengan unit<br><i>Concentration of nitric acid with units</i>                                                                                                                                                                                   | 1 |   |

|  |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                            |          |
|--|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|----------|
|  |     | <p>Bil mol <math>\text{CaCO}_3 = 5 / [40+12+(3 \times 16)]</math><br/> <math>= 0.05 \text{ mol}</math></p> <p>1 mol <math>\text{CaCO}_3</math> : 2 mol <math>\text{HNO}_3</math> /<br/> 0.05 mol <math>\text{CaCO}_3</math> : 0.1 mol <math>\text{HNO}_3</math></p> <p>Kepekatan <math>\text{HNO}_3 = 1 \text{ moldm}^{-3}</math></p>                                                                                                                                                                                                                                                                                                |                            |          |
|  | (d) | <p>1. Tambahkan <math>2 \text{ cm}^3</math> asid sulfurik cair dan <math>2 \text{ cm}^3</math> larutan ferum(II) sulfat ke dalam tabung uji yang mengandungi larutan garam. Goncangkan campuran.<br/> <i>Add <math>2 \text{ cm}^3</math> of dilute sulphuric acid and <math>2 \text{ cm}^3</math> of ferum(II) sulphate solution into a test tube containing the salt solution. Shake the mixture.</i></p> <p>2. Titiskan beberapa titis asid sulfurik pekat secara <u>berhati-hati</u>.<br/> <i>Carefully add a few drops of concentrated sulphuric acid</i></p> <p>3. Cincin perang terbentuk.<br/> <i>A brown ring forms.</i></p> | <p>1</p> <p>1</p> <p>1</p> | <p>3</p> |
|  |     | JUMLAH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                            | 20       |



SERTAI TELEGRAM @exercise\_students

Bahagian C

| Soalan |        | Peraturan Pemarkahan                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Sub Markah                                                                                                                         | Jumlah markah |              |              |                                                 |                                                         |                                                                                                                                   |                                                                                                                                    |                     |   |
|--------|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|---------------|--------------|--------------|-------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|---------------------|---|
| 11     | (a)(i) | 1. Pengoksidaan dan penurunan berlaku serentak.<br><i>Oxidation and reduction occurs simultaneously</i>                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1                                                                                                                                  | 3             |              |              |                                                 |                                                         |                                                                                                                                   |                                                                                                                                    |                     |   |
|        |        | 2. Gambar rajah berfungsi dan larutan dilorek,Voltmeter<br><i>Functional diagram and shaded solution, Voltmeter</i>                                                                                                                                                                                                                                                                                                                                                                                                                         | 1                                                                                                                                  |               |              |              |                                                 |                                                         |                                                                                                                                   |                                                                                                                                    |                     |   |
|        |        | 3. Label :Cl <sub>2</sub> , FeSO <sub>4</sub> , H <sub>2</sub> SO <sub>4</sub> , elektod karbon<br><i>Label: Cl<sub>2</sub>, FeSO<sub>4</sub>, H<sub>2</sub>SO<sub>4</sub>, carbon electrode</i>                                                                                                                                                                                                                                                                                                                                            | 1                                                                                                                                  |               |              |              |                                                 |                                                         |                                                                                                                                   |                                                                                                                                    |                     |   |
|        |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                    |               |              |              |                                                 |                                                         |                                                                                                                                   |                                                                                                                                    |                     |   |
|        | (ii)   | 1. Bahan betul ikut susunan<br><i>Materials are in the correct order</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1                                                                                                                                  | 4             |              |              |                                                 |                                                         |                                                                                                                                   |                                                                                                                                    |                     |   |
|        |        | 2. Arah betul<br><i>Right direction</i><br>$C   Fe^{2+}, Fe^{3+}    Cl_2, Cl^-   C$                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1                                                                                                                                  |               |              |              |                                                 |                                                         |                                                                                                                                   |                                                                                                                                    |                     |   |
|        |        | 3. $E_{cell} = +1.36 - (+0.77)$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 1                                                                                                                                  |               |              |              |                                                 |                                                         |                                                                                                                                   |                                                                                                                                    |                     |   |
|        |        | $= + 0.59 V$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1                                                                                                                                  |               |              |              |                                                 |                                                         |                                                                                                                                   |                                                                                                                                    |                     |   |
|        | (b)(i) | <table><tr><th>Ali</th><th>Rama</th></tr><tr><td>1.Benar/True</td><td>2.Benar/True</td></tr><tr><td>3.Tindak balas berlaku<br/><i>Reaction occur</i></td><td>Tindak balas tidak berlaku<br/><i>Reaction not occur</i></td></tr><tr><td>4.Nilai E° X lebih negatif/<br/>kurang positif daripada<br/>Cu.<br/><i>E° value of X more<br/>negatif/ less positive<br/>than Cu</i></td><td>5.Nilai E° Y lebih positif/<br/>kurang negatif daripada<br/>Cu.<br/><i>E° value of Y more<br/>positive/ less negative<br/>than Cu</i></td></tr></table> | Ali                                                                                                                                | Rama          | 1.Benar/True | 2.Benar/True | 3.Tindak balas berlaku<br><i>Reaction occur</i> | Tindak balas tidak berlaku<br><i>Reaction not occur</i> | 4.Nilai E° X lebih negatif/<br>kurang positif daripada<br>Cu.<br><i>E° value of X more<br/>negatif/ less positive<br/>than Cu</i> | 5.Nilai E° Y lebih positif/<br>kurang negatif daripada<br>Cu.<br><i>E° value of Y more<br/>positive/ less negative<br/>than Cu</i> | 1+1<br>1<br><br>1+1 | 5 |
|        |        | Ali                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Rama                                                                                                                               |               |              |              |                                                 |                                                         |                                                                                                                                   |                                                                                                                                    |                     |   |
|        |        | 1.Benar/True                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2.Benar/True                                                                                                                       |               |              |              |                                                 |                                                         |                                                                                                                                   |                                                                                                                                    |                     |   |
|        |        | 3.Tindak balas berlaku<br><i>Reaction occur</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Tindak balas tidak berlaku<br><i>Reaction not occur</i>                                                                            |               |              |              |                                                 |                                                         |                                                                                                                                   |                                                                                                                                    |                     |   |
|        |        | 4.Nilai E° X lebih negatif/<br>kurang positif daripada<br>Cu.<br><i>E° value of X more<br/>negatif/ less positive<br/>than Cu</i>                                                                                                                                                                                                                                                                                                                                                                                                           | 5.Nilai E° Y lebih positif/<br>kurang negatif daripada<br>Cu.<br><i>E° value of Y more<br/>positive/ less negative<br/>than Cu</i> |               |              |              |                                                 |                                                         |                                                                                                                                   |                                                                                                                                    |                     |   |
|        |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                    |               |              |              |                                                 |                                                         |                                                                                                                                   |                                                                                                                                    |                     |   |
|        |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                    |               |              |              |                                                 |                                                         |                                                                                                                                   |                                                                                                                                    |                     |   |
|        |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                    |               |              |              |                                                 |                                                         |                                                                                                                                   |                                                                                                                                    |                     |   |
|        |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                    |               |              |              |                                                 |                                                         |                                                                                                                                   |                                                                                                                                    |                     |   |

|        |                                                                                                                                                                                                                                                                 |   |    |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|----|
| (ii)   | 1. X=Mg/Zn/Fe/Sn/Pb                                                                                                                                                                                                                                             | 1 | 8  |
|        | 2. Y=Ag                                                                                                                                                                                                                                                         | 1 |    |
|        | 3. Sukat dan tuang [25-100]cm <sup>3</sup> larutan kuprum(II) sulfat [0.1-2.0] mol dm <sup>-3</sup> ke dalam cawan plastik.<br><i>Measure and pour [25-100]cm<sup>3</sup> of [0.1-2.0] mol dm<sup>-3</sup> copper(II) sulphate solution into a plastic cup.</i> | 1 |    |
|        | 4. Rekod suhu awal<br><i>Record initial temperature</i>                                                                                                                                                                                                         | 1 |    |
|        | 5. Tambah satu spatula serbuk X ke dalam larutan kuprum(II) sulfat.<br><i>Add one spatula of X powder into copper(II) sulphate solution</i>                                                                                                                     | 1 |    |
|        | 6. Campuran dikacau<br><i>Stir the mixture</i>                                                                                                                                                                                                                  | 1 |    |
|        | 7. Rekod suhu tertinggi dicapai oleh campuran.<br><i>Record the highest temperature achieved by the mixture</i>                                                                                                                                                 | 1 |    |
|        | 8. Ulang langkah 1 hingga 7 dengan menggantikan serbuk X dengan serbuk Y.<br><i>Repeat steps 1 to 7 by replacing X powder with Y powder.</i>                                                                                                                    | 1 |    |
| JUMLAH |                                                                                                                                                                                                                                                                 |   | 20 |

TAMAT

