



# **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 mengandungi 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**



**SERTAI TELEGRAM @exercise\_students**



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

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## **KIMIA KERTAS 2**

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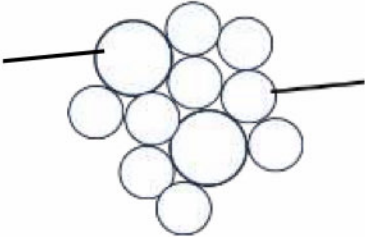
### **PERATURAN PEMARKAHAN**

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Modul ini mengandungi 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="display: flex; align-items: center; justify-content: center;"> <div style="text-align: center; margin-right: 20px;"> Stanum<br/><i>Tin</i> </div>  <div style="text-align: center; margin-left: 20px;"> Kuprum<br/><i>Copper</i> </div> </div> | 1<br><br>1    | 2                |
| (b)(i)  | Batu- bata // Mangkuk // Pinggan // [mana-mana objek yang sesuai]<br><i>Bricks // Bowl // Plate // [any suitable object]</i><br>Reject: peralatan dapur                                                                                                                                                                                                                                                                                                                                              | 1             | 1                |
| (ii)    | 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>                                                                                                                                                                                                                                                                                    | 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<br>Asid karboksilik A: CH <sub>2</sub> O                                                                                                                                                                                                  | 1<br>1        | 2                |
| (c)(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>$\text{C}_3\text{H}_7\text{OH} + \frac{9}{2}\text{O}_2 \rightarrow 3\text{CO}_2 + 4\text{H}_2\text{O}$ | 1<br><br>1    | 2                |
| (c)(ii) | 1. Bilangan mol // <i>Number or mole</i><br>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<br>1        | 2                |
|         | 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)    | 1. Struktur monomer, bilangan karbon dan ikatan ganda dua yang betul.<br>2. Struktur polimer, bilangan karbon dan ikatan tunggal yang betul<br>[Mana-mana jawapan yang sesuai dengan 6(a)]<br><br>1. <i>Correct monomer structure, number of carbon, and double bond.</i><br>2. <i>Correct polymer structure, number of carbon, and single bond.</i><br><i>Any answer that corresponds to 6(a)</i><br><br>$  \begin{array}{c}  \text{H} \quad \text{H} \\    \quad   \\  n \text{ C} = \text{C} \\    \quad   \\  \text{H} \quad \text{CH}_3  \end{array}  \rightarrow  \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  $<br>$  \begin{array}{c}  \text{H} \quad \text{H} \\    \quad   \\  n \text{ C} = \text{C} \\    \quad   \\  \text{H} \quad \text{H}  \end{array}  \rightarrow  \left( \begin{array}{c}  \text{H} \quad \text{H} \\    \quad   \\  \text{C} - \text{C} \\    \quad   \\  \text{H} \quad \text{H}  \end{array} \right)_n  $ | 1<br><br>1    | 2                |
| (c)(i) | P:Termoplastik // <i>Thermoplastic</i><br>Q :Termoset // <i>Thermosetting</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1<br><br>1    | 2                |



| Soalan | Peraturan pemarkahan                                                                                                                                                                                                                                          | Sub markah                           | Jumlah 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/ sample answer:</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 pembakaran.<br><i>Has a higher fuel value and releases more heat during combustion.</i><br><br>Atau / Or<br><br>1. J<br>2. Tidak berjelaga / <i>No soot</i> | 1<br>1<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 = $[0.0125 \times 124] \text{ g}$ // 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                                         |                                    |                                         |                                                                                                                                 |                                                                                                      |                                                                      |                                                                               |                           |   |

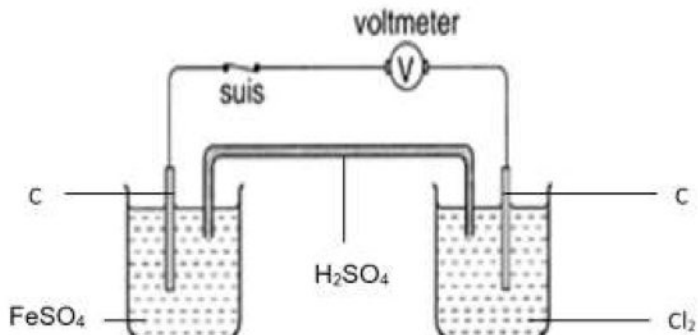
| Soalan | Peraturan Pemarkahan                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Sub Markah                                                     | Jumlah markah |
|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|---------------|
| 10 (a) | <p>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></p> <p>2. Label paksi X dan Y berserta unit<br/><i>Label the X and Y axes along with units</i></p> <p>3. Skala pada paksi X dan Y yang seragam<br/><i>Uniform scale on the X and Y axes</i></p> <p>4. Plot graf pada titik yang betul<br/><i>Plot the graph at the correct points</i></p> <p>5. Menyambungkan titik-titik dengan garisan yang licin<br/><i>Connect the points with a smooth line</i></p> <div> <p>Jisim kulit telur, g<br/>Mass of egg shell, g</p> <p>Set I</p> <p>Set II</p> <p>Masa, s<br/>Time, s</p> </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. <math>0.0247 \text{ g s}^{-1} (\pm 0.005)</math></p> | <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> | 7             |



|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                              |          |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|----------|
| (b) | <p>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></p> <p>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></p> <p>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></p> <p>4. Frekuensi perlanggaran antara kulit telur/ <math>\text{CaCO}_3</math> 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></p> <p>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></p> | <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> | <p>5</p> |
| (c) | <p>1. Formula kimia bahan dan hasil tindak balas<br/><i>Chemical formula of substances and reaction products</i></p> <p>2. Persamaan seimbang<br/><i>Balanced equation</i></p> <p><math>\text{CaCO}_3 + 2\text{HNO}_3 \rightarrow \text{Ca}(\text{NO}_3)_2 + \text{H}_2\text{O} + \text{CO}_2</math></p> <p>3. Bil mol <math>\text{CaCO}_3</math> yang bertindak balas<br/><i>Number of moles of <math>\text{CaCO}_3</math> that react</i></p> <p>4. Nisbah mol<br/><i>Molar ratio</i></p> <p>5. Kepekatan asid nitrik dengan unit<br/><i>Concentration of nitric acid with units</i></p>                                                                                                                                                                                                                                                                                                                                                                  | <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> | <p>5</p> |



### Bahagian C

| Soalan                                                                                                               |                                                                                                                       | Peraturan Pemarkahan                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Sub Markah                                          | Jumlah markah |                |                |                                                  |                                                         |                                                                                                                      |                                                                                                                       |                                            |   |
|----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|---------------|----------------|----------------|--------------------------------------------------|---------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|--------------------------------------------|---|
| 11                                                                                                                   | (a)(i)                                                                                                                | <div>1. Pengoksidaan dan penurunan berlaku serentak.<br/><i>Oxidation and reduction occurs simultaneously</i></div> <div>2. Gambar rajah berfungsi dan larutan dilorek, Voltmeter<br/><i>Functional diagram and shaded solution, Voltmeter</i></div> <div>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></div> <div></div> | <div>1</div> <div>1</div> <div>1</div>              | 3             |                |                |                                                  |                                                         |                                                                                                                      |                                                                                                                       |                                            |   |
|                                                                                                                      | (ii)                                                                                                                  | <div>1. Bahan betul ikut susunan<br/><i>Materials are in the correct order</i></div> <div>2. Arah betul<br/><i>Right direction</i><br/><math>C \mid Fe^{2+}, Fe^{3+} \parallel Cl_2, Cl^- \mid C</math></div> <div>3. E<sub>cell</sub> = +1.36 – (+0.77)<br/>= + 0.59 V</div>                                                                                                                                                                                                                                                                           | <div>1</div> <div>1</div> <div>1</div> <div>1</div> | 4             |                |                |                                                  |                                                         |                                                                                                                      |                                                                                                                       |                                            |   |
|                                                                                                                      | (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/ kurang positif daripada Cu.<br/><i>E° value of X more negatif/ less positive than Cu</i></td><td>5. Nilai E° Y lebih positif/ kurang negatif daripada Cu.<br/><i>E° value of Y more positive/ less negative 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/ kurang positif daripada Cu.<br><i>E° value of X more negatif/ less positive than Cu</i> | 5. Nilai E° Y lebih positif/ kurang negatif daripada Cu.<br><i>E° value of Y more positive/ less negative than Cu</i> | <div>1+1</div> <div>1</div> <div>1+1</div> | 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/ kurang positif daripada Cu.<br><i>E° value of X more negatif/ less positive than Cu</i> | 5. Nilai E° Y lebih positif/ kurang negatif daripada Cu.<br><i>E° value of Y more positive/ less negative 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