

# **MODUL GEMILANG SPM 2026**

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## **KIMIA**

### **PERATURAN PEMARKAHAN KERTAS 1**

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**Kertas jawapan ini mengandungi 2 halaman bercetak**

**PERATURAN PEMARKAHAN  
KIMIA KERTAS 1**

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

– PERATURAN PEMARKAHAN TAMAT –

# **MODUL GEMILANG SPM 2026**

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## **KIMIA**

### **PERATURAN PEMARKAHAN KERTAS 2**

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**Kertas jawapan ini mengandungi 16 halaman bercetak**

| Soalan |     | Skema Pemarkahan                                                                                                                                                                                                                                                                                                                                                                   | Sub<br>markah       | Jumlah<br>markah |
|--------|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|------------------|
| 1      | (a) | Semula jadi // Elastomer<br><i>Natural // Elastomer</i>                                                                                                                                                                                                                                                                                                                            | 1                   | 1                |
|        | (b) | Molekul<br><i>Molecule</i>                                                                                                                                                                                                                                                                                                                                                         | 1                   | 1                |
|        | (c) | Isoprena // 2-metilbut-1,3-diena<br><i>Isoprene // 2-methylbut-1,3-diene</i>                                                                                                                                                                                                                                                                                                       | 1                   | 1                |
|        | (b) | 1. Larutan ammonia ditambah ke dalam lateks.<br><i>Ammonia solution is added into latex.</i><br>2. Larutan ammonia mengandungi ion hidroksida<br><i>Ammonia solution contains hydroxide ion</i><br>3. Ion ini meneutralkan ion hidrogen yang dihasilkan<br>bakteria.<br><i>The ion will neutralise hydrogen ions that is<br/>produced by<br/>bacteria</i><br>(mana-mana 2 jawapan) | 1<br><br>1<br><br>1 | 2                |
| JUMLAH |     |                                                                                                                                                                                                                                                                                                                                                                                    |                     | 5                |

| Soalan |     | Skema Pemarkahan                                                                                                                                                                                                                                                                                 | Sub<br>markah       | Jumlah<br>markah |
|--------|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|------------------|
| 2      | (a) | W : Antimikrob<br><i>Antimicrobial</i><br>X : Ubat psikotik<br><i>Psychotic drugs</i>                                                                                                                                                                                                            | 1<br><br>1          | 2                |
|        | (b) | Melegakan kesakitan<br><i>Relieves pain</i>                                                                                                                                                                                                                                                      | 1                   | 1                |
|        | (c) | 1. Semua bakteria dibunuh.<br><i>All bacteria are killed</i><br>2. Jika tidak, bakteria akan menjadi imun kepada<br>antibiotik<br><i>Otherwise, the bacteria become immune to<br/>antibiotics</i><br>3. penyakit akan berulang semula.<br><i>The disease will recur</i><br>(mana-mana 2 jawapan) | 1<br><br>1<br><br>1 | 2                |
| JUMLAH |     |                                                                                                                                                                                                                                                                                                  |                     | 5                |

| Soalan |     | Skema Pemarkahan                                                                                     | Sub markah                                                                                                                                                            | Jumlah markah |   |
|--------|-----|------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---|
| 3      | (a) | Baris mengufuk dalam Jadual Berkala Unsur<br><i>Horizontal row in the Periodic Table of Elements</i> | 1                                                                                                                                                                     | 1             |   |
|        | (b) | Amfoterik<br><i>Amphoteric</i>                                                                       | 1                                                                                                                                                                     | 1             |   |
|        | (c) | (i)                                                                                                  | $2Q + Z_2 \rightarrow 2QZ //$<br>$2Na + Cl_2 \rightarrow 2NaCl$                                                                                                       | 1<br>1        | 2 |
|        |     | (ii)                                                                                                 | $2 \text{ mol } Q : 1 \text{ mol } Z_2$<br>$0.08 \text{ mol } Q : 0.04 \text{ mol } Z_2$<br><br>Isipadu = $(0.04 \times 24) \text{ dm}^3 //$<br>= $0.96 \text{ dm}^3$ | 1<br><br>1    | 2 |
|        |     |                                                                                                      | JUMLAH                                                                                                                                                                | 6             |   |

| Soalan                                                                                      |     | Skema Pemarkahan                                                                                                                                                              | Sub markah | Jumlah markah |
|---------------------------------------------------------------------------------------------|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|---------------|
| 4                                                                                           | (a) | Aloi merupakan campuran dua atau lebih unsur yang mana unsur yang utama ialah logam<br><i>An alloy is a mixture of two or more elements where the main element is a metal</i> | 1          | 1             |
|                                                                                             | (b) | X : gangsa<br><i>bronze</i>                                                                                                                                                   | 1          | 2             |
|                                                                                             |     | M : zink<br><i>zinc</i>                                                                                                                                                       | 1          |               |
|                                                                                             | (c) | Gunakan aloi X / loyang<br><i>Use alloy X / brass</i>                                                                                                                         | 1          | 2             |
|                                                                                             |     | Aloi X / Loyang lebih keras<br><i>Aloi X / Brass is stronger</i>                                                                                                              | 1          |               |
| Aloi X / Loyang lebih tahan kakisan<br><i>Aloi X / Brass is more resistant to corrosion</i> |     | 1                                                                                                                                                                             |            |               |
|                                                                                             |     | (max 2)                                                                                                                                                                       |            |               |
|                                                                                             | (d) | $\frac{19.5}{64.3} \times 100$<br>$= 30.3 \%$                                                                                                                                 | 1<br><br>1 | 2             |
|                                                                                             |     |                                                                                                                                                                               | JUMLAH     | 7             |

| Soalan |     |       | Skema Pemarkahan                                                                                                                                                                                                                                                                                                                                  | Sub<br>markah    | Jumlah<br>markah |
|--------|-----|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|------------------|
| 5      | (a) | (i)   | Asid kuat ialah asid yang mengion sepenuhnya dalam air menghasilkan kepekatan ion hydrogen yang tinggi.<br><i>Strong acid is an acid that ionises completely in water to produce a high concentration of hydrogen ions</i>                                                                                                                        | 1                | 1                |
|        |     | (ii)  | Ion $H^+$ daripada asid diganti dengan ion logam iaitu $Zn^{2+}$<br><i><math>H^+</math> ion from the acid is replaced with a metal ion which is <math>Zn^{2+}</math></i>                                                                                                                                                                          | 1                | 1                |
|        |     | (iii) | P1: bilangan mol HCl<br>P2: nisbah mol $CO_2$ kepada HCl<br>P3: JMR $CO_2$<br>P4: Jisim $CO_2$<br><br>Contoh jawapan<br><br>$\text{bil.mol HCl} = \frac{1.0 \times 50}{1000}$ $= 0.05 \text{ mol}$<br>2 mol HCl : 1 mol $CO_2$<br>0.05 mol HCl : 0.025 mol $CO_2$<br><br>JMR $CO_2$ = 12 + 32<br>= 44<br><br>Jisim $CO_2$ = 0.025 x 44<br>= 1.1 g | 1<br>1<br>1<br>1 | 4                |



| Soalan |     | Skema Pemarkahan                                                                                                                                                                                                                                            | Sub<br>markah                | Jumlah<br>markah |
|--------|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|------------------|
| 6      | (a) | Haba pembakaran alkohol ialah haba yang dibebaskan apabila satu mol alkohol dibakar dengan lengkap dalam oksigen berlebihan.<br><i>The heat of combustion of alcohol is the heat released when 1 mole of a alcohol is completely burnt in excess oxygen</i> | 1                            | 1                |
|        | (b) | (i) Haba pembakaran meningkat<br><i>Heat of combustion increases</i>                                                                                                                                                                                        | 1                            | 1                |
|        |     | (ii) JMR etanol = $2(12) + 5(1) + 16 + 1$<br>= 46<br><br>bil. mol etanol = $\frac{4.6}{46}$<br>= 0.1 mol<br><br>haba yang dibebaskan = $0.1 \times 1376$<br>= 137.6 kJ                                                                                      | 1<br><br><br>1<br><br>1<br>1 | 4                |
|        | (c) | propanol<br><i>propanol</i><br>nilai bahan api paling tinggi<br><i>fuel value is the highest</i><br>bilangan atom karbon per molekul paling tinggi<br><i>the number of carbon atoms per molecule is the highest</i>                                         | 1<br><br>1<br><br>1          | 3                |
|        |     |                                                                                                                                                                                                                                                             | <b>JUMLAH</b>                | <b>9</b>         |

| Soalan |     | Skema Pemarkahan                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Sub<br>markah | Jumlah<br>markah |
|--------|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------------|
| 7      | (a) | Tindak balas di antara asid dan alkali menghasilkan garam dan air.<br><i>Reaction between acid and alkali to produce salt and water</i>                                                                                                                                                                                                                                                                                                                                               | 1             | 1                |
|        | (b) | (i) 25.0 cm <sup>3</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1             | 1                |
|        |     | (ii) 1. Menggantikan nilai ke dalam rumus<br>2. Nisbah mol<br>3. Kepekatan dengan unit yang betul<br><br>$\frac{M_a(25)}{(1.0)(25)} = \frac{1}{1}$<br>$M_a = 1.0 \text{ mol dm}^{-3}$                                                                                                                                                                                                                                                                                                 | 1<br>1<br>1   | 3                |
|        | (c) | (i) Asid sulfurik // H <sub>2</sub> SO <sub>4</sub><br><i>Sulphuric acid</i>                                                                                                                                                                                                                                                                                                                                                                                                          | 1             | 1                |
|        |     | (ii) 1. Asid hidroklorik dalam Eksperimen I ialah asid monoprotik manakala asid sulfurik dalam Eksperimen II adalah asid diprotik<br><i>Hydrochloric acid in Experiment I is a monoprotic acid while sulphuric acid in Experiment II is a diprotic acid</i><br>2. Kepekatan ion hidrogen dalam asid sulfurik adalah dua kali ganda lebih tinggi daripada asid hidroklorik<br><i>The concentration of hydrogen ion in sulphuric acid is two times higher than in hydrochloric acid</i> | 1<br><br>1    | 2                |
|        | (d) | 1. Alirkan / Salurkan gas Q ke dalam tabung uji berisi air kapur<br><i>Flow gas Q into a test tube containing lime water</i><br>2. Air kapur menjadi keruh<br><i>Lime water becomes chalky</i>                                                                                                                                                                                                                                                                                        | 1<br><br>1    | 2                |
| JUMLAH |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               | 10               |



| Soalan |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Skema Pemarkahan | Sub<br>markah                           | Jumlah<br>markah |
|--------|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-----------------------------------------|------------------|
| 8      | (b) | <p>P1 : Unsur M dan N</p> <p>P2 : Air merupakan pelarut berkutub yang mengandungi mengandungi cas separa negatif di bahagian atom oksigen dan cas separa positif di bahagian atom hidrogen.<br/> <i>Water is a polar solvent that has partial negative charge at the oxygen atom and partial positive charge at the hydrogen atom</i></p> <p>P3 : Ion positif, <math>\text{Na}^+</math> akan tertarik ke bahagian atom oksigen molekul air yang bercas negatif manakala ion negatif, <math>\text{Cl}^-</math> akan tertarik ke bahagian atom hidrogen molekul air yang bercas positif.<br/> <i>Positive ion, <math>\text{Na}^+</math> will be attracted to the oxygen atom of water molecule which is negatively-charged while negative ion, <math>\text{Cl}^-</math> will be attracted to the hydrogen atom of water molecule which is positively-charged</i></p> <p>P4: Daya tarikan antara atom pada molekul air dengan ion pada sebatian ion cukup kuat untuk mengatasi daya tarikan elektrostatik di antara ion.<br/> <i>Attraction force between atom of water molecules with the ions of ionic compound are strong enough to overcome electrostatic attraction force between ions themselves</i></p> |                  | 1<br><br>1<br><br>1<br><br>1<br>(max 2) | 3                |

|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | JUMLAH                                         | 10               |
|--------|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|------------------|
| Soalan | Skema Pemarkahan |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Sub<br>markah                                  | Jumlah<br>markah |
| 9      | (a)              | P1 : Larut<br><i>Dissolves</i><br><br>P2 : Kuprum(II) sulfat / $\text{CuSO}_4$ // Kuprum(II) klorida / $\text{CuCl}_2$ // Kuprum(II) nitrat / $\text{Cu}(\text{NO}_3)_2$<br><i>Copper(II) sulphate / <math>\text{CuSO}_4</math> // Copper(II) chloride / <math>\text{CuCl}_2</math> // Copper(II) nitrate / <math>\text{Cu}(\text{NO}_3)_2</math></i><br><br>P3 : Natrium karbonat / $\text{Na}_2\text{CO}_3$ // Kalium karbonat / $\text{K}_2\text{CO}_3$<br><i>Sodium carbonate / <math>\text{Na}_2\text{CO}_3</math> // Potassium carbonate / <math>\text{K}_2\text{CO}_3</math></i> | 1<br><br>1<br><br>1                            | 3                |
|        | (b)              | P1 : $5 \text{ cm}^3$<br><br>P2 : bilangan mol $\text{Pb}^{2+} = \frac{5 \times 0.5}{1000}$ // 0.0025 mol<br><br>P3 : bilangan mol $\text{I}^- = \frac{5 \times 1}{1000}$ // 0.005 mol<br><br>P4 : mol $\text{Pb}^{2+}$ : mol $\text{I}^-$<br>0.0025 : 0.005<br><br>P5 : 1 : 2<br><br>P6 : Persamaan kimia yang seimbang<br>$\text{Pb}^{2+} + 2\text{I}^- \rightarrow \text{PbI}_2$<br><br>P7 : Kuning                                                                                                                                                                                  | 1<br><br>1<br><br>1<br><br>1<br><br>1<br><br>1 | 7                |

| Soalan |     | Skema Pemarkahan                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Sub<br>markah                                         | Jumlah<br>markah |
|--------|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|------------------|
| 9      | (c) | <p>Eksperimen I dan Eksperimen II</p> <ol style="list-style-type: none"> <li>Kadar tindak balas Eksperimen II lebih tinggi daripada Eksperimen I<br/><i>The rate of reaction of Experiment II is higher than Experiment I</i></li> <li>Asid nitrik merupakan asid monoprotik, manakala asid sulfurik merupakan asid diprotik<br/><i>Nitric acid is a monoprotic acid while sulphuric acid is a diprotic acid</i></li> <li>Kepekatan ion hidrogen bagi asid sulfurik adalah dua kali ganda asid nitrik / Bilangan ion hidrogen per unit isi padu asid sulfurik lebih tinggi<br/><i>The concentration of hydrogen ion in sulphuric acid is two times more than in nitric acid / The number of hydrogen ions per unit volume in sulphuric acid is higher</i></li> <li>Frekuensi perlanggaran antara ion hidrogen dan ion tiosulfat Eksperimen II lebih tinggi daripada Eksperimen I<br/><i>The frequency of collision between hydrogen ion and thiosulphate ion in Experiment II is higher than Experiment I</i></li> <li>Frekuensi perlanggaran berkesan antara ion hidrogen dan ion tiosulfat dalam Eksperimen II lebih tinggi daripada Eksperimen I<br/><i>The frequency of effective collision between hydrogen ion and thiosulphate ion in Experiment II is higher than Experiment I</i></li> </ol> | <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> | 10               |

| Soalan |     | Skema Pemarkahan                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Sub<br>markah                                | Jumlah<br>markah |
|--------|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|------------------|
| 9      | (c) | <p>Eksperimen I dan Eksperimen III</p> <p>6. Kadar tindak balas Eksperimen III lebih tinggi daripada Eksperimen I<br/><i>The rate of reaction of Experiment III is higher than Experiment I</i></p> <p>7. Suhu pada Eksperimen III lebih tinggi daripada Eksperimen I<br/><i>The temperature in Experiment III is higher than in Experiment I</i></p> <p>8. Tenaga kinetik ion hidrogen dan ion tiosulfat dalam Eksperimen III lebih tinggi daripada Eksperimen I<br/><i>The kinetic energy of the hydrogen ions and thiosulphate ions in Experiment III is higher than in Experiment I</i></p> <p>9. Lebih banyak zarah bertenaga dapat mengatasi tenaga pengaktifan.<br/><i>Higher energy particles are able to overcome the activation energy</i></p> <p>10. Frekuensi perlanggaran berkesan antara ion hidrogen dan ion tiosulfat dalam Eksperimen III lebih tinggi daripada Eksperimen I.<br/><i>The frequency of effective collision between hydrogen ion and thiosulphate ion in Experiment III is higher than Experiment I</i></p> | <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> |                  |

|        |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | JUMLAH                                                                  | 20               |
|--------|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|------------------|
| Soalan | Skema Pemarkahan |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Sub<br>markah                                                           | Jumlah<br>markah |
| 10     | (a)              | <p>Kalium nitrat<br/><i>Potassium nitrat</i><br/>(Terima mana-mana jawapan yang sesuai)<br/>(<i>accept any suitable answers</i>)</p> <p>Untuk melengkapkan litar dengan membenarkan ion-ion bebas melaluinya<br/><i>To complete the circuit by allowing ions to move freely through it</i></p> <p>Zink<br/><i>Zinc</i></p> <p>Elektrod menjadi nipis<br/><i>Electrode become thinner</i></p> <p><math>\text{Zn} \rightarrow \text{Zn}^{2+} + 2\text{e}^-</math></p> <p><math>E^\circ = +0.40 - (-0.76)</math><br/><math>= +1.16\text{V}</math></p> <p><math>\text{Zn}_{(\text{p})} \mid \text{Zn}^{2+}_{(\text{ak})} \parallel \text{O}_{2(\text{g})}, \text{OH}^{-}_{(\text{ak})} \mid \text{Pt}_{(\text{p})}</math></p> <p>Bahan kimia mengikut urutan anod ke katod<br/><i>Chemicals are arranged from anode to cathode</i></p> <p>Keadaan fizikal bahan<br/><i>Physical state of the substance</i></p> | <p>1</p> <p>1</p> <p>1</p> <p>2</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> | 10               |

| Soalan |     |       | Skema Pemarkahan                                                                       | Sub<br>markah | Jumlah<br>markah |
|--------|-----|-------|----------------------------------------------------------------------------------------|---------------|------------------|
| 10     | (b) | (i)   | $\text{Cu}^{2+}, \text{SO}_4^{2-}, \text{H}^+, \text{OH}^-$                            | 2             | 10               |
|        |     | (ii)  | Set I<br>$2\text{Cl}^- \rightarrow \text{Cl}_2 + 2\text{e}^-$                          | 2             |                  |
|        |     |       | Set II<br>$4\text{OH}^- \rightarrow \text{O}_2 + 2\text{H}_2\text{O} + 4\text{e}^-$    | 2             |                  |
|        |     | (iii) | Hasil di anod :<br>Set I : klorin<br><i>chlorine</i>                                   | 1             |                  |
|        |     |       | Set II : oksigen<br><i>oxygen</i>                                                      | 1             |                  |
|        |     | (iv)  | Pemerhatian di anod :                                                                  |               |                  |
|        |     |       | Set I : Larutan tak berwarna bertukar perang<br><i>Colourless solution turns brown</i> | 1             |                  |
|        |     |       | Set II : Tiada perubahan<br><i>No changes</i>                                          | 1             |                  |
| JUMLAH |     |       |                                                                                        | 20            |                  |

| Soalan | Skema Pemarkahan                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Sub<br>markah                                                                             | Jumlah<br>markah |
|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|------------------|
| 11     | <p>(a)</p> <p>1. Isotop ialah atom unsur yang sama yang mempunyai bilangan proton yang sama tetapi bilangan neutron yang berbeza<br/><i>Isotopes are atoms of the same element with same number of protons but different number of neutrons</i></p> <p>2. nombor nukleon<br/><i>nucleon number</i></p> <p>3. bilangan proton = <math>11 - 6</math><br/>= 5</p> <p>Struktur atom</p> <p>4. bilangan proton dan bilangan neutron dalam nukleus<br/><i>number of protons and neutrons in the nucleus</i></p> <p>5. bilangan elektron<br/><i>number of electrons</i></p> <div data-bbox="571 1070 917 1384" data-label="Chemical-Block"> </div> <p>6. Sifat kimia isotop X adalah sama<br/><i>The chemical properties of X is the same</i></p> <p>7. Sifat fizik isotop X adalah berbeza<br/><i>The physical properties of X is different</i></p> <p>8. <math>10.81 = \frac{(80 \times 11) + (20 \times a)}{100}</math></p> <p>9. <math>a = 10.05</math></p> | <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> | 9                |

| Soalan | Skema Pemarkahan |                                                                                                   | Sub markah | Jumlah markah |
|--------|------------------|---------------------------------------------------------------------------------------------------|------------|---------------|
| 11     | (b)              | 1. Y - Penyejukan lampau<br>Y - <i>Supercooling</i><br>2. Mengacau asetamida sepanjang eksperimen | 1<br><br>1 | 4             |

|               |     |                                                                                                                                                                                                                                                                                                                                         |   |           |
|---------------|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-----------|
|               |     | <i>Stir the acetamide continuously throughout the experiment</i>                                                                                                                                                                                                                                                                        | 1 |           |
|               |     | 3. Mengelap air pada permukaan tabung didih sebelum dimasukkan dalam kelalang kon<br><i>Wipe the water off the surface of the boiling tube before placing it into the conical flask</i>                                                                                                                                                 | 1 |           |
|               |     | 4. Menyejukkan tabung didih dalam kelalang kon<br><i>Cool the boiling tube inside the conical flask</i>                                                                                                                                                                                                                                 |   |           |
|               | (c) | 1. Letakkan kasa dawai di atas tungku kaki tiga<br><i>Place a wire gauze on top of the tripod stand</i>                                                                                                                                                                                                                                 | 1 | 7         |
|               |     | 2. Gantikan kukus air dengan minyak<br><i>Replace the water bath with an oil bath</i>                                                                                                                                                                                                                                                   | 1 |           |
|               |     | 3. Penuhi satu per tiga tabung didih dengan pepejal W.<br><i>Fill one-third of the boiling tube with solid W</i>                                                                                                                                                                                                                        | 1 |           |
|               |     | 4. Isikan minyak masak ke dalam sebuah bikar sehingga separuh penuh.<br><i>Fill a beaker with cooking oil until it is half-full</i>                                                                                                                                                                                                     | 1 |           |
|               |     | 5. Masukkan tabung didih ke dalam bikar dan apitkan tabung didih. Pastikan aras W dalam tabung didih berada di bawah paras minyak masak di dalam bikar.<br><i>Place the boiling tube into the beaker and secure it with a clamp. Ensure that the level of W in the boiling tube is below the level of the cooking oil in the beaker</i> | 1 |           |
|               |     | 6. Panaskan minyak dan kacau W secara perlahan. Apabila suhu mencapai $[70 - 80]^{\circ}\text{C}$ , mulakan jam randik.<br><i>Heat the oil and stir W gently. Once the temperature reaches <math>[70-80]^{\circ}\text{C}</math>, start the stopwatch</i>                                                                                | 1 |           |
|               |     | 7. Catatkan suhu W pada selang masa 30 saat sehingga mencapai $120^{\circ}\text{C}$ .<br><i>Record the temperature of W at 30-second intervals until it reaches <math>120^{\circ}\text{C}</math>.</i>                                                                                                                                   | 1 |           |
| <b>JUMLAH</b> |     |                                                                                                                                                                                                                                                                                                                                         |   | <b>20</b> |

### PERATURAN PEMARKAHAN TAMAT