

|   |                                                                                                                                                                                                                                                               |                                                                                                                                                                                                 |
|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | <p>Antara berikut tindakan manakah yang paling tepat dilakukan apabila berlaku tumpahan asid sulfurik di atas meja makmal?</p> <p><i>Which of the following is the most appropriate action to take when sulfuric acid spills on the laboratory table?</i></p> |                                                                                                                                                                                                 |
|   | A                                                                                                                                                                                                                                                             | <p>Lap dengan kain kering serta-merta</p> <p><i>Wipe with a dry cloth immediately.</i></p>                                                                                                      |
|   | B                                                                                                                                                                                                                                                             | <p>Bilas dengan air dan gosok menggunakan sabun pencuci</p> <p><i>Rinse with water and scrub with dish soap.</i></p>                                                                            |
|   | C                                                                                                                                                                                                                                                             | <p>Siram dengan alkohol dan nyalakan api untuk menghapuskan asid</p> <p><i>Rinse with alcohol and light a fire to eliminate the acid.</i></p>                                                   |
|   | D                                                                                                                                                                                                                                                             | <p>Tabur serbuk peneutral seperti natrium karbonat sebelum membersihkan tumpahan asid tersebut</p> <p><i>Sprinkle neutralizing powder such as sodium carbonate before cleaning the acid</i></p> |

|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                    |                                                      |                                                        |
|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|------------------------------------------------------|--------------------------------------------------------|
| 2 | <p>Rajah 2 menunjukkan perwakilan piawai bagi atom plumbum.</p> <p><i>Diagram 2 shows the standard representation of a lead atom.</i></p> <div style="text-align: center;"> <div style="border: 1px solid black; padding: 5px; display: inline-block;"> <sup>207</sup><br/> <sub>82</sub> Pb </div> <p>Rajah 2 / Diagram 2</p> <p>Apakah bilangan proton, bilangan neutron dan bilangan elektron dalam atom plumbum?</p> <p><i>What are the number of protons, number of neutrons and number of electrons in the lead atom?</i></p> </div> |                                                    |                                                      |                                                        |
|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>Bilangan proton</b><br><i>Number of protons</i> | <b>Bilangan neutron</b><br><i>Number of neutrons</i> | <b>Bilangan elektron</b><br><i>Number of electrons</i> |
|   | A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 82                                                 | 125                                                  | 78                                                     |
|   | B                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 82                                                 | 125                                                  | 82                                                     |
|   | C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 125                                                | 82                                                   | 78                                                     |
|   | D                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 125                                                | 82                                                   | 82                                                     |



|          |                                                                                                                                                                                              |                                                                             |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| <b>3</b> | Satu mol klorin, $\text{Cl}_2$ dan satu mol ammonia, $\text{NH}_3$ mempunyai<br><i>One mole of chlorine, <math>\text{Cl}_2</math> and one mole of ammonia, <math>\text{NH}_3</math> have</i> |                                                                             |
|          | <b>A</b>                                                                                                                                                                                     | $6.02 \times 10^{23}$ atom<br><i><math>6.02 \times 10^{23}</math> atoms</i> |
|          | <b>B</b>                                                                                                                                                                                     | bilangan molekul yang sama.<br><i>the same number of molecules.</i>         |
|          | <b>C</b>                                                                                                                                                                                     | bilangan ion yang sama.<br><i>the same number of ions.</i>                  |
|          | <b>D</b>                                                                                                                                                                                     | bilangan proton yang sama.<br><i>the same number of protons.</i>            |
|          |                                                                                                                                                                                              |                                                                             |

|          |                                                                                                                  |                                                                                                      |
|----------|------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| <b>4</b> | Antara berikut, yang manakah kegunaan gas kripton?<br><i>Which of the following are the uses of krypton gas?</i> |                                                                                                      |
|          | <b>I</b>                                                                                                         | Digunakan di dalam laser untuk rawatan retina mata<br><i>Used in lasers for eye retina treatment</i> |
|          | <b>II</b>                                                                                                        | Diisikan ke dalam belon kaji cuaca<br><i>Used to fill weather balloons</i>                           |
|          | <b>III</b>                                                                                                       | Digunakan di dalam lampu rumah api<br><i>Used in lighthouse lamps</i>                                |
|          | <b>IV</b>                                                                                                        | Digunakan di dalam lampu denyar kilat pada kamera<br><i>Used in flashlight of cameras</i>            |
|          | <b>A</b>                                                                                                         | I dan II<br><i>I and II</i>                                                                          |
|          | <b>B</b>                                                                                                         | I dan IV<br><i>I and IV</i>                                                                          |
|          | <b>C</b>                                                                                                         | II dan III<br><i>II and III</i>                                                                      |
|          | <b>D</b>                                                                                                         | III dan IV<br><i>III and IV</i>                                                                      |

|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
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| 5 | <p>Rajah 5 menunjukkan pembentukan satu ikatan kimia atom nitrogen dalam ammonia, <math>\text{NH}_3</math> yang menyumbangkan sepasang elektronnya untuk membentuk ikatan dengan ion hidrogen, <math>\text{H}^+</math>.</p> <p><i>Figure 5 shows the formation of a chemical bond of the nitrogen atom in ammonia, <math>\text{NH}_3</math> donates a pair of electrons to form a bond with the hydrogen ion, <math>\text{H}^+</math>.</i></p> <div> </div> <p style="text-align: center;">Rajah 5 / Diagram 5</p> <p>Apakah jenis ikatan kimia yang terbentuk?<br/> <i>What is the type chemical bond formed?</i></p> |
| A | Ikatan ion<br><i>Ionic bond</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| B | Ikatan hidrogen<br><i>Hydrogen bond</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| C | Ikatan datif<br><i>Dative bond</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| D | Ikatan logam<br><i>Metallic bond</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6 | <p>Rajah 6 menunjukkan susunan radas bagi mengenal pasti kation yang hadir di dalam larutan akueus.</p> <p><i>Diagram 6 shows the apparatus set-up to identify the cation present in the aqueous solution.</i></p> <div> </div> <p style="text-align: center;">Rajah 6 / Diagram 6</p> <p>Apakah pemerhatian di akhir tindak balas tersebut?<br/> <i>What is the observation at the end of the reaction?</i></p> |
|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|  |          |                                                                 |
|--|----------|-----------------------------------------------------------------|
|  | <b>A</b> | Gas ammonia terbebas<br><i>Ammonia gas is released</i>          |
|  | <b>B</b> | Mendakan biru terbentuk<br><i>Blue precipitate is formed</i>    |
|  | <b>C</b> | Mendakan perang terbentuk<br><i>Brown precipitate is formed</i> |
|  | <b>D</b> | Gas tidak berwarna terbebas<br><i>Colorless gas is released</i> |

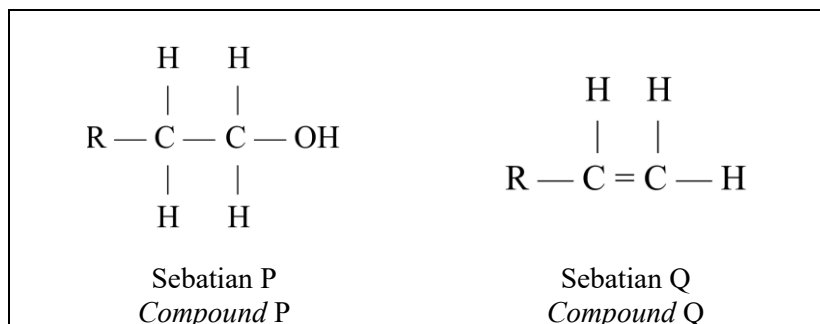
|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                           |
|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| 7 | <p>Rajah 7 menunjukkan satu pemerhatian apabila cangkerang kerang dimasukkan ke dalam sebuah bikar yang mengandungi cuka.<br/><i>Diagram 7 shows an observation when a cockle shell is put into a beaker containing vinegar.</i></p> <div> </div> <p style="text-align: center;">Rajah 7 / Diagram 7</p> <p>Persamaan kimia berikut menunjukkan tindak balas yang berlaku antara cangkerang kerang dengan cuka di dalam bikar.<br/><i>The following chemical equation shows the reaction between cockle shell and vinegar in the beaker.</i></p> <div> <math display="block">\text{CaCO}_3 + 2\text{CH}_3\text{COOH} \rightarrow (\text{CH}_3\text{COO})_2\text{Ca} + \text{H}_2\text{O} + \text{CO}_2</math> </div> <p>Antara faktor berikut, yang manakah meningkatkan kadar tindak balas tersebut?<br/><i>Which of the following factors increases the rate of reaction?</i></p> |                                                                                           |
|   | <b>A</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Meningkatkan isi padu cuka<br><i>Increase the volume of vinegar</i>                       |
|   | <b>B</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Menambahkan air ke dalam cuka<br><i>Add water into the vinegar</i>                        |
|   | <b>C</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Menambahkan ketulan ais ke dalam cuka<br><i>Add ice cubes into the vinegar</i>            |
|   | <b>D</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Menggunakan cangkerang kerang yang telah dihancurkan<br><i>Using crushed cockle shell</i> |

|          |                                                                                                                                             |                                                    |                                                                                                                                            |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| <b>8</b> | Bahan komposit manakah yang dipadankan dengan kegunaannya dengan betul?<br><i>Which composite material is correctly matched to its use?</i> |                                                    |                                                                                                                                            |
|          |                                                                                                                                             | <b>Bahan komposit</b><br><i>Composite material</i> | <b>Kegunaan</b><br><i>Uses</i>                                                                                                             |
|          | <b>A</b>                                                                                                                                    | Kaca gentian<br><i>Fibre glass</i>                 | Membuat papan litar tercetak<br><i>To make printed circuit boards</i>                                                                      |
|          | <b>B</b>                                                                                                                                    | Kaca fotokromik<br><i>Photochromic glass</i>       | Membuat kanta mikroskop<br><i>To make telescope lens</i>                                                                                   |
|          | <b>C</b>                                                                                                                                    | Superkonduktor<br><i>Superconductor</i>            | Membuat perkabelan rangkaian komputer<br><i>To make cables in computer network</i>                                                         |
|          | <b>D</b>                                                                                                                                    | Gentian optik<br><i>Optical fibre</i>              | Membuat supermagnet untuk mesin resonans magnet nukleus (NMR)<br><i>To make supermagnets for Nuclear Magnetic Resonance (NMR) machines</i> |

|          |                                                                                                                                                                                                                                                                                                                                            |                                 |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|
| <b>9</b> | Persamaan ion berikut menunjukkan tindak balas antara zink dengan asid.<br><i>The following ionic equation shows the reaction between zinc and acid.</i> $\text{Zn} + 2\text{H}^+ \rightarrow \text{Zn}^{2+} + \text{H}_2$ Apakah perubahan nombor pengoksidaan bagi hidrogen?<br><i>What is the oxidation number change for hydrogen?</i> |                                 |
|          | <b>A</b>                                                                                                                                                                                                                                                                                                                                   | 0 kepada +1<br><i>0 to +1</i>   |
|          | <b>B</b>                                                                                                                                                                                                                                                                                                                                   | 0 kepada +2<br><i>0 to +2</i>   |
|          | <b>C</b>                                                                                                                                                                                                                                                                                                                                   | +1 kepada 0<br><i>+1 to 0</i>   |
|          | <b>D</b>                                                                                                                                                                                                                                                                                                                                   | +1 kepada +2<br><i>+1 to +2</i> |

10

Rajah 10 menunjukkan formula struktur sebatian P dan sebatian Q.  
*Diagram 10 shows the structural formula of compounds P and Q.*



Rajah 10 / Diagram 10

Antara berikut, yang manakah benar tentang tindak balas untuk menukarkan sebatian P menjadi sebatian Q?

*Which of the following is true about the reaction to convert compound P into compound Q?*

|  |          | <b>Nama tindak balas</b><br><i>Name of reaction</i> | <b>Mangkin</b><br><i>Catalyst</i>                         |
|--|----------|-----------------------------------------------------|-----------------------------------------------------------|
|  | <b>A</b> | Pengesteran<br><i>Esterification</i>                | Asid sulfurik pekat<br><i>Concentrated sulphuric acid</i> |
|  | <b>B</b> | Penghidratan<br><i>Hydration</i>                    | Asid fosforik<br><i>Phosphoric acid</i>                   |
|  | <b>C</b> | Pendehidratan<br><i>Dehydration</i>                 | Serpihan porselin<br><i>Porcelain chips</i>               |
|  | <b>D</b> | Penghidrogenan<br><i>Hydrogenation</i>              | Nikel<br><i>Nickel</i>                                    |

**11**

Rajah 11 menunjukkan susunan radas bagi menentukan haba pembakaran etanol,  $C_2H_5OH$ .  
*Diagram 11 shows the experimental set-up to determine the heat of combustion of ethanol,  $C_2H_5OH$ .*

Termometer  
*Thermometer*

Penghadang angin  
*Wind shield*

Tin kuprum  
*Copper can*

Pelita  
*Spirit lamp*

Y

Segi tiga tanah liat  
*Clay triangle*

X

Bongkah kayu  
*Wooden block*

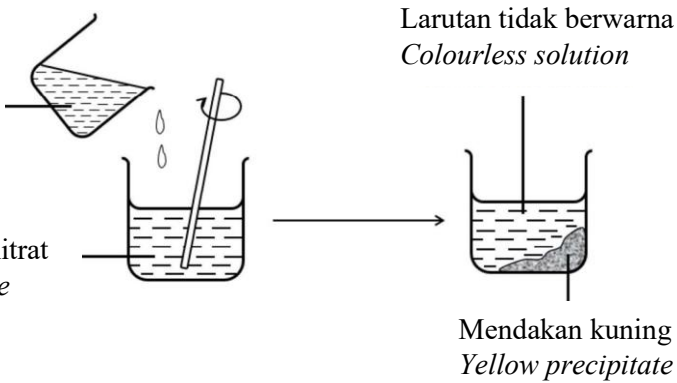
Rajah 11 / *Diagram 11*

Apakah X dan Y?  
*What is X and Y?*

|  |          | X                               | Y                               |
|--|----------|---------------------------------|---------------------------------|
|  | <b>A</b> | Etanol<br><i>Ethanol</i>        | Air<br><i>Water</i>             |
|  | <b>B</b> | Air<br><i>Water</i>             | Etanol<br><i>Ethanol</i>        |
|  | <b>C</b> | Naftalena<br><i>Naphthalene</i> | Air<br><i>Water</i>             |
|  | <b>D</b> | Air<br><i>Water</i>             | Naftalena<br><i>Naphthalene</i> |

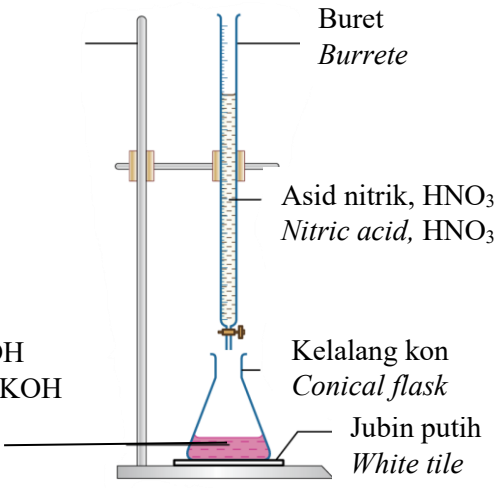
|          |                                                                                                                                                                                                                         |          |                                        |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------------------------------------|
| 12       | <p>Rajah 12 menunjukkan proses X.<br/>Diagram 12 shows process X.</p> <div> </div> <p>Rajah 12 / Diagram 12</p> <p>Apakah proses X?<br/>What is process X?</p> |          |                                        |
|          | <table border="1"> <tr> <td><b>A</b></td> <td>Pengoksidaan<br/><i>Oxidation</i></td> </tr> </table>                                                            | <b>A</b> | Pengoksidaan<br><i>Oxidation</i>       |
| <b>A</b> | Pengoksidaan<br><i>Oxidation</i>                                                                                                                                                                                        |          |                                        |
|          | <table border="1"> <tr> <td><b>B</b></td> <td>Pengesteran<br/><i>Esterification</i></td> </tr> </table>                                                        | <b>B</b> | Pengesteran<br><i>Esterification</i>   |
| <b>B</b> | Pengesteran<br><i>Esterification</i>                                                                                                                                                                                    |          |                                        |
|          | <table border="1"> <tr> <td><b>C</b></td> <td>Penghidrogenan<br/><i>Hydrogenation</i></td> </tr> </table>                                                      | <b>C</b> | Penghidrogenan<br><i>Hydrogenation</i> |
| <b>C</b> | Penghidrogenan<br><i>Hydrogenation</i>                                                                                                                                                                                  |          |                                        |
|          | <table border="1"> <tr> <td><b>D</b></td> <td>Pempolimeran<br/><i>Polymerisation</i></td> </tr> </table>                                                       | <b>D</b> | Pempolimeran<br><i>Polymerisation</i>  |
| <b>D</b> | Pempolimeran<br><i>Polymerisation</i>                                                                                                                                                                                   |          |                                        |

|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |          |                            |
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| 13       | <p>Ain cuba mencampurkan minyak zaitun dengan air sebagai bahan asas penyediaan kosmetik menggunakan bahan semulajadi. Rajah 13 menunjukkan air dan minyak zaitun tidak bercampur dengan sehati.<br/>Ain tried to mix olive oil with water as a basic ingredient in the preparation of cosmetics using natural ingredients. Diagram 13 shows that water and olive oil do not mix well.</p> <div> </div> <p>Rajah 13 / Diagram 13</p> <p>Apakah bahan yang sesuai digunakan oleh Ain untuk memastikan kedua-dua bahan asas tersebut bercampur sehati?<br/>What is the appropriate material used by Ain to ensure that the two basic ingredients are mixed well?</p> |          |                            |
|          | <table border="1"> <tr> <td><b>A</b></td> <td>Kanji<br/><i>Starch</i></td> </tr> </table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>A</b> | Kanji<br><i>Starch</i>     |
| <b>A</b> | Kanji<br><i>Starch</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |          |                            |
|          | <table border="1"> <tr> <td><b>B</b></td> <td>Lesitin<br/><i>Lecithin</i></td> </tr> </table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>B</b> | Lesitin<br><i>Lecithin</i> |
| <b>B</b> | Lesitin<br><i>Lecithin</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |          |                            |
|          | <table border="1"> <tr> <td><b>C</b></td> <td>Gelatin<br/><i>Gelatine</i></td> </tr> </table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>C</b> | Gelatin<br><i>Gelatine</i> |
| <b>C</b> | Gelatin<br><i>Gelatine</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |          |                            |
|          | <table border="1"> <tr> <td><b>D</b></td> <td>Cuka<br/><i>Vinegar</i></td> </tr> </table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>D</b> | Cuka<br><i>Vinegar</i>     |
| <b>D</b> | Cuka<br><i>Vinegar</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |          |                            |

|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
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| <p><b>14</b></p> | <p>Rajah 14 menunjukkan pemerhatian satu eksperimen yang telah dijalankan oleh seorang pelajar di dalam makmal.<br/> <i>Diagram 14 shows the observation of an experiment that has been carried out by a student in the laboratory.</i></p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>Larutan kalium iodida<br/><i>Potassium iodide solution</i></p>  </div> </div> <p style="text-align: center;">Rajah 14 / <i>Diagram 14</i></p> <p>Berdasarkan Rajah 14, pernyataan yang manakah paling tepat untuk menerangkan eksperimen tersebut secara kualitatif dan kuantitatif?<br/> <i>Based on Diagram 14, which statement is most accurate to describe the experiment qualitatively and quantitatively?</i></p> |
| <p><b>A</b></p>  | <p>1 mol larutan plumbum(II) nitrat bertindak balas dengan 1 mol larutan kalium iodida menghasilkan 1 mol mendakan plumbum(II) iodida dan 1 mol larutan kalium nitrat.<br/> <i>1 mole of lead(II) nitrate solution reacts with 1 mole of potassium iodide solution to produce 1 mole of lead(II) iodide precipitate and 1 mole of potassium nitrate solution.</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <p><b>B</b></p>  | <p>1 mol larutan plumbum(II) nitrat bertindak balas dengan 2 mol larutan kalium iodida menghasilkan 1 mol mendakan plumbum(II) iodida dan 2 mol larutan kalium nitrat.<br/> <i>1 mole of lead(II) nitrate solution reacts with 2 mole of potassium iodide solution to produce 1 mole of lead(II) iodide precipitate and 2 mole of potassium nitrate solution.</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <p><b>C</b></p>  | <p>2 mol larutan plumbum(II) nitrat bertindak balas dengan 1 mol larutan kalium iodida menghasilkan 2 mol mendakan plumbum(II) iodida dan 1 mol larutan kalium nitrat.<br/> <i>2 mole of lead(II) nitrate solution reacts with 1 mole of potassium iodide solution to produce 2 mole of lead(II) iodide precipitate and 1 mole of potassium nitrate solution.</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <p><b>D</b></p>  | <p>2 mol larutan plumbum(II) nitrat bertindak balas dengan 2 mol larutan kalium iodida menghasilkan 1 mol mendakan plumbum(II) iodida dan 1 mol larutan kalium nitrat.<br/> <i>2 mole of lead(II) nitrate solution reacts with 2 mole of potassium iodide solution to produce 1 mole of lead(II) iodide precipitate and 1 mole of potassium nitrate solution.</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

|           |                                                                                                                                                                                                                                                                                                    |                                                                                                                                                  |
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| <b>15</b> | Asid hidroklorik cair bertindak balas lebih cepat dengan serbuk zink berbanding kepingan zink. Antara berikut yang manakah menerangkan pernyataan tersebut?<br><i>Dilute hydrochloric acid reacts faster with zinc powder than with zinc sheet. Which of the following explains the statement?</i> |                                                                                                                                                  |
|           |                                                                                                                                                                                                                                                                                                    |                                                                                                                                                  |
|           | <b>A</b>                                                                                                                                                                                                                                                                                           | Zarah-zarah dalam serbuk zink mempunyai tenaga kinetik yang lebih tinggi<br><i>The particles in the zinc powder have a higher kinetic energy</i> |
|           | <b>B</b>                                                                                                                                                                                                                                                                                           | Zarah-zarah dalam kepingan zink tersusun sangat rapat<br><i>The particles in the zinc sheet are arranged very closely</i>                        |
|           | <b>C</b>                                                                                                                                                                                                                                                                                           | Serbuk zink mempunyai jumlah luas permukaan yang lebih besar<br><i>Zinc powder has a greater total surface area</i>                              |
|           | <b>D</b>                                                                                                                                                                                                                                                                                           | Terdapat lapisan zink oksida yang terbentuk pada kepingan zink<br><i>There is a layer of zinc oxide that forms on the zinc sheet</i>             |

|           |                                                                                                                      |                                                                                              |
|-----------|----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| <b>16</b> | Antara berikut, yang manakah sifat sebatian ion?<br><i>Which of the following is the property of ionic compound?</i> |                                                                                              |
|           |                                                                                                                      |                                                                                              |
|           | <b>A</b>                                                                                                             | Tidak larut dalam air<br><i>Does not dissolve in water</i>                                   |
|           | <b>B</b>                                                                                                             | Larut dalam pelarut organik<br><i>Dissolve in organic solvent</i>                            |
|           | <b>C</b>                                                                                                             | Takat lebur dan takat didih yang tinggi<br><i>High melting and boiling points</i>            |
|           | <b>D</b>                                                                                                             | Mengkonduksikan elektrik dalam keadaan pepejal<br><i>Conducts electricity in solid state</i> |

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
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| 17 | <p>Rajah 17 menunjukkan proses X.<br/> <i>Diagram 17 shows process X.</i></p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: left;"> <p>Kaki retot<br/> <i>Retort stand</i></p> <p>Larutan kalium hidroksida, KOH<br/> <i>Potassium hydroxide solution, KOH</i></p> <p>+</p> <p>Beberapa titis fenolftalein<br/> <i>Few drops of phenolphthalein</i></p> </div> <div style="text-align: center;">  </div> </div> <p style="text-align: center;">Rajah 17 / <i>Diagram 17</i></p> <p>Mengapakah fenolftalein diperlukan dalam pentitratan?<br/> <i>Why phenolphthalein is needed in titration?</i></p> |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| A  | <p>Memudahkan pemerhatian terhadap perubahan warna larutan dalam kelalang kon<br/> <i>Easier to observe the colour changes of solution in conical flask</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| B  | <p>Menambahkan kealkalian kalium hidroksida<br/> <i>Adding alkalinity of potassium hydroxide</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| C  | <p>Meningkatkan kadar tindakbalas<br/> <i>Increase the rate of reaction</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| D  | <p>Menentukan takat akhir peneutralan<br/> <i>Determine the end point of neutralisation</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
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| 18 | <p>Rajah 18 menunjukkan susunan zarah-zarah bagi suatu bahan yang mengalami perubahan keadaan fizikal melalui proses W.</p> <p><i>Diagram 18 shows the arrangement of particles of a substance that undergoes change in the physical state through process W.</i></p> <div> </div> <p style="text-align: center;">Rajah 18 / Diagram 18</p> <p>Antara bahan berikut, yang manakah mengalami proses W?</p> <p><i>Which of the following substances undergo process W?</i></p> |
|    | <p><b>A</b> Klorin<br/><i>Chlorine</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|    | <p><b>B</b> Iodin<br/><i>Iodine</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|    | <p><b>C</b> Bromin<br/><i>Bromine</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|    | <p><b>D</b> Natrium klorida<br/><i>Sodium chloride</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

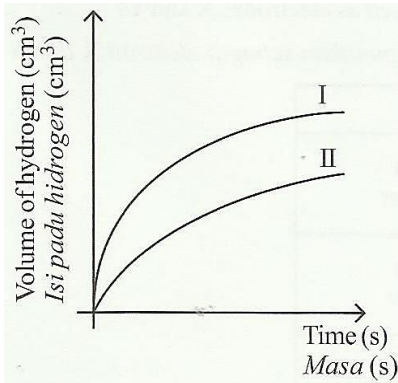
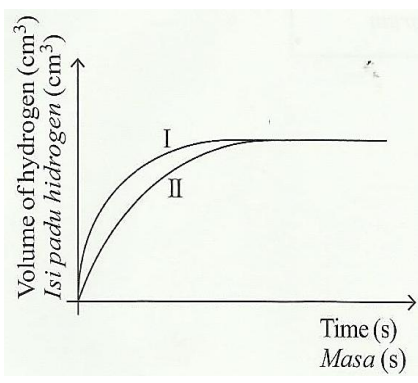
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|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 19 | <p>Rajah 19 menunjukkan formula struktur perisa makanan yang diperolehi dalam buah buahan.</p> <p><i>Diagram 19 shows a structure formulae of food flavouring which found in fruits.</i></p> <div> <math display="block">  \begin{array}{ccccccc}  &amp; \text{H} &amp; \text{H} &amp; \text{H} &amp; \text{O} &amp; &amp; \text{H} &amp; \text{H} \\  &amp;   &amp;   &amp;   &amp;    &amp; &amp;   &amp;   \\  \text{H} &amp; - \text{C} &amp; - \text{C} &amp; - \text{C} &amp; - \text{C} &amp; - \text{O} &amp; - \text{C} &amp; - \text{C} &amp; - \text{H} \\  &amp;   &amp;   &amp;   &amp; &amp; &amp;   &amp;   \\  &amp; \text{H} &amp; \text{H} &amp; \text{H} &amp; &amp; &amp; \text{H} &amp; \text{H}  \end{array}  </math> </div> <p style="text-align: center;">Rajah 19 / Diagram 19</p> <p>Antara berikut yang manakah boleh digunakan untuk membuat perisa makanan itu?</p> <p><i>Which of the following can be used to make the food flavouring?</i></p> |
|    | <p><b>A</b> Asid butanoik dan Etanol<br/><i>Butanoic acid and Ethanol</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|    | <p><b>B</b> Asid etanoik dan Etanol<br/><i>Ethanoic acid and Ethanol</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|    | <p><b>C</b> Asid propanoik dan Etanol<br/><i>Propanoic acid and Ethanol</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|    | <p><b>D</b> Asid propanoik dan Propanol<br/><i>Propanoic acid and Propanol</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

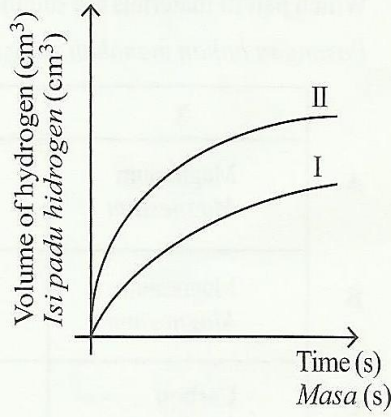
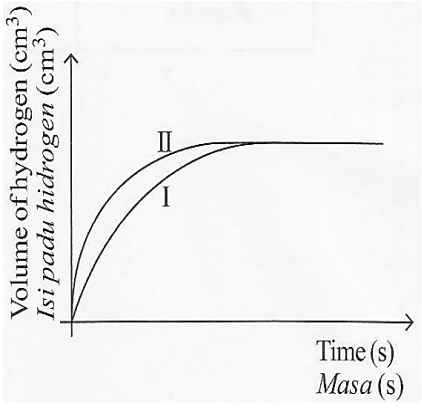
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| 20 | <p>Rajah 20 menunjukkan satu polimer semula jadi yang merupakan makanan ruji rakyat Malaysia.<br/> <i>Diagram 20 shows a natural polymer which is a staple food for Malaysians.</i></p> <div> </div> <p style="text-align: center;">Rajah 20 / Diagram 20</p> <p>Apakah monomer bagi polimer itu?<br/> <i>What is the monomer for the polymer?</i></p> |
|    |                                                                                                                                                                                                                                                                                                                                                                                                       |
| A  | <p>Isoprena<br/> <i>Isoprene</i></p>                                                                                                                                                                                                                                                                                                                                                                  |
| B  | <p>Asid amino<br/> <i>Amino acid</i></p>                                                                                                                                                                                                                                                                                                                                                              |
| C  | <p>Selulosa<br/> <i>Cellulose</i></p>                                                                                                                                                                                                                                                                                                                                                                 |
| D  | <p>Glukosa<br/> <i>Glucose</i></p>                                                                                                                                                                                                                                                                                                                                                                    |

|    |                                                                                                                                                                                                                                                                                                                   |
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| 21 | <p>Rajah 21 menunjukkan model atom suatu sebatian.<br/> <i>Diagram 21 shows the atom model of a compound</i></p> <div> </div> <p style="text-align: center;">Rajah 21 / Diagram 21</p> <p>Antara berikut, yang manakah benar tentang sebatian itu?</p> |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

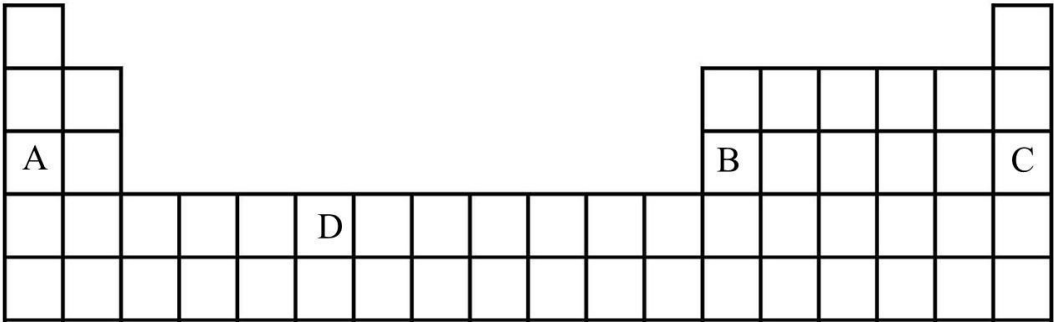
|          |                                                                                                                       |  |
|----------|-----------------------------------------------------------------------------------------------------------------------|--|
|          | <i>Which of the following is correct about the compound?</i>                                                          |  |
| <b>A</b> | Takat lebur dan takat didih tinggi<br><i>High melting and boiling point</i>                                           |  |
| <b>B</b> | Terbentuk daripada perkongsian electron atom logam<br><i>Formed from the sharing of electrons of metal atoms</i>      |  |
| <b>C</b> | Takat lebur dan takat didih sangat rendah<br><i>Very low melting and boiling point</i>                                |  |
| <b>D</b> | Wujud daya tarikan Van der Waals dalam molekulnya<br><i>Van der Waals force of attraction exists in its molecules</i> |  |

| 22                              | <p>Jadual 2 menunjukkan keadaan bahan tindak balas yang digunakan dalam eksperimen I dan eksperimen II.</p> <p><i>Table 2 shows the condition of reactants used in experiment I and experiment II.</i></p> <table border="1"> <tr> <th>Eksperimen<br/><i>Experiment</i></th><th>Keadaan bahan tindak balas<br/><i>Condition of reactants</i></th></tr> <tr> <td>I</td><td>Ketulan zink berlebihan + 50 cm<sup>3</sup> asid hidroklorik 2.0 mol dm<sup>-3</sup><br/><i>Excess zinc granules + 50 cm<sup>3</sup> of 2.0 mol dm<sup>-3</sup> hydrochloric acid</i></td></tr> <tr> <td>II</td><td>Serbuk zink berlebihan + 50 cm<sup>3</sup> asid hidroklorik 2.0 mol dm<sup>-3</sup><br/><i>Excess zinc powder + 50 cm<sup>3</sup> of 2.0 mol dm<sup>-3</sup> hydrochloric acid</i></td></tr> </table> <p>Jadual 22 / Table 22</p> <p>Graf manakah yang menunjukkan lengkung yang betul bagi eksperimen I dan eksperimen II?<br/><i>Which graph shows the correct curve for experiment I and experiment II?</i></p> | Eksperimen<br><i>Experiment</i> | Keadaan bahan tindak balas<br><i>Condition of reactants</i> | I | Ketulan zink berlebihan + 50 cm <sup>3</sup> asid hidroklorik 2.0 mol dm <sup>-3</sup><br><i>Excess zinc granules + 50 cm<sup>3</sup> of 2.0 mol dm<sup>-3</sup> hydrochloric acid</i> | II | Serbuk zink berlebihan + 50 cm <sup>3</sup> asid hidroklorik 2.0 mol dm <sup>-3</sup><br><i>Excess zinc powder + 50 cm<sup>3</sup> of 2.0 mol dm<sup>-3</sup> hydrochloric acid</i> |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|-------------------------------------------------------------|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Eksperimen<br><i>Experiment</i> | Keadaan bahan tindak balas<br><i>Condition of reactants</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                 |                                                             |   |                                                                                                                                                                                        |    |                                                                                                                                                                                     |
| I                               | Ketulan zink berlebihan + 50 cm <sup>3</sup> asid hidroklorik 2.0 mol dm <sup>-3</sup><br><i>Excess zinc granules + 50 cm<sup>3</sup> of 2.0 mol dm<sup>-3</sup> hydrochloric acid</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                 |                                                             |   |                                                                                                                                                                                        |    |                                                                                                                                                                                     |
| II                              | Serbuk zink berlebihan + 50 cm <sup>3</sup> asid hidroklorik 2.0 mol dm <sup>-3</sup><br><i>Excess zinc powder + 50 cm<sup>3</sup> of 2.0 mol dm<sup>-3</sup> hydrochloric acid</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                 |                                                             |   |                                                                                                                                                                                        |    |                                                                                                                                                                                     |

|  |                                                                                                                                                                                                                                   |
|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <div> <div> <b>A</b>  </div> <div> <b>C</b>  </div> </div> |
|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|  |          |                                                                                   |          |                                                                                    |
|--|----------|-----------------------------------------------------------------------------------|----------|------------------------------------------------------------------------------------|
|  | <b>B</b> |  | <b>D</b> |  |
|--|----------|-----------------------------------------------------------------------------------|----------|------------------------------------------------------------------------------------|

|           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                   |  |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|--|
| <b>23</b> | <p>Rajah 23 menunjukkan kaca mata yang diperbuat daripada sejenis kaca. Kaca mata ini dapat melindungi mata daripada sinar ultraungu (UV) yang berbahaya.<br/> <i>Diagram 23 shows a spectacle made from a type of glass. The spectacle can protect our eyes from dangerous ultraviolet (UV) rays.</i></p> <div>  </div> <p>Rajah 23 / <i>Diagram 23</i></p> <p>Antara berikut yang manakah bahan kimia yang digunakan dalam kaca itu?<br/> <i>Which of the following substance is the chemical used in the glass?</i></p> |                                                   |  |
|           | <b>A</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Boron oksida<br><i>Boron oxide</i>                |  |
|           | <b>B</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Argentum klorida<br><i>Silver chloride</i>        |  |
|           | <b>C</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Plumbum (II) klorida<br><i>Lead (II) chloride</i> |  |
|           | <b>D</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Plumbum (II) oksida<br><i>Lead (II) oxide</i>     |  |

|    |                                                                                                                                                                                                                                                           |
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| 24 | <p>Antara kedudukan berikut, yang manakah menunjukkan saiz atom paling kecil?<br/> <i>Among the following positions, which one shows the smallest atomic size?</i></p>  |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|    |                                                                                                                                                                                                                                          |                                    |
|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| 25 | <p>Pelembap ialah salah satu bahan asas kosmetik. Yang manakah <b>bukan</b> contoh pelembap?<br/> <i>Moisturizer is one of the basic ingredients in cosmetics. Which of the following is <b>not</b> an example of a moisturizer?</i></p> |                                    |
|    | I                                                                                                                                                                                                                                        | Gliserin<br><i>Glycerin</i>        |
|    | II                                                                                                                                                                                                                                       | Paraben<br><i>Paraben</i>          |
|    | III                                                                                                                                                                                                                                      | Gam xantan<br><i>Gam xanthan</i>   |
|    | IV                                                                                                                                                                                                                                       | Minyak jojoba<br><i>Jojoba oil</i> |
|    |                                                                                                                                                                                                                                          |                                    |
|    | A                                                                                                                                                                                                                                        | I dan II<br><i>I and II</i>        |
|    | B                                                                                                                                                                                                                                        | I dan III<br><i>I and III</i>      |
|    | C                                                                                                                                                                                                                                        | II dan III<br><i>II and III</i>    |
|    | D                                                                                                                                                                                                                                        | II dan IV<br><i>II dan IV</i>      |

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                        |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| 26 | <p>Rajah 26 menunjukkan suatu sebatian karbon.<br/> <i>Diagram 26 shows a carbon compound.</i></p> <div style="text-align: center;"> <math display="block">  \begin{array}{ccccccccc}  &amp; &amp; \text{H} &amp; &amp; \text{H} &amp; &amp; \text{H} &amp; &amp; \text{H} &amp; &amp; \text{H} \\  &amp; &amp;   &amp; &amp;   &amp; &amp;   &amp; &amp;   &amp; &amp;   \\  \text{H} &amp; - &amp; \text{C} &amp; - &amp; \text{C} &amp; - &amp; \text{C} &amp; - &amp; \text{C} &amp; - &amp; \text{C} &amp; - &amp; \text{OH} \\  &amp; &amp;   &amp; &amp;   &amp; &amp;   &amp; &amp;   &amp; &amp;   \\  &amp; &amp; \text{H} &amp; &amp; \text{H} &amp; &amp; \text{H} &amp; &amp; \text{H} &amp; &amp; \text{H}  \end{array}  </math> </div> <p style="text-align: center;">Rajah 26 / Diagram 26</p> <p>Antara berikut, yang manakah isomer bagi sebatian tersebut?<br/> <i>Which of the following is the isomer of the compound?</i></p> |                                        |
|    | <b>A</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Etanol<br><i>Ethanol</i>               |
|    | <b>B</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Butan-1-ol<br><i>Butan-1-ol</i>        |
|    | <b>C</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Pentan-2-ol<br><i>Penthan-2-ol</i>     |
|    | <b>D</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 2-etilbutanol<br><i>2-ethylbutanol</i> |

|    |                                                                                                                                                   |                                                                                              |
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| 27 | <p>Zarah-zarah manakah antara berikut yang bergabung untuk membentuk ikatan datif?<br/> <i>Which particles combine to form a dative bond?</i></p> |                                                                                              |
|    | <b>A</b>                                                                                                                                          | Molekul air dan molekul etana<br><i>Water molecule and etane molecule</i>                    |
|    | <b>B</b>                                                                                                                                          | Molekul air dan molekul klorin<br><i>Water molecule and chlorine molecule</i>                |
|    | <b>C</b>                                                                                                                                          | Molekul air dan molekul ammonia<br><i>Water molecule and ammonia molecule</i>                |
|    | <b>D</b>                                                                                                                                          | Molekul air dan molekul karbon dioksida<br><i>Water molecule and carbon dioxide molecule</i> |

|    |                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                   |
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| 28 | <p>Rajah 28 menunjukkan cakera brek yang diperbuat daripada seramik termaju. Manakah antara sifat berikut yang paling sesuai dengan kegunaannya?<br/> <i>Diagram 28 shows brake disc made from advanced ceramic. Which of the following properties best suits its use?</i></p> <div> </div> <p style="text-align: center;">Rajah 28 / Diagram 28</p> |                                                                   |
|    | A                                                                                                                                                                                                                                                                                                                                                                                                   | <p>Mudah pecah<br/> <i>Easy to break</i></p>                      |
|    | B                                                                                                                                                                                                                                                                                                                                                                                                   | <p>Penebat elektrik<br/> <i>Electrical insulation</i></p>         |
|    | C                                                                                                                                                                                                                                                                                                                                                                                                   | <p>Lengai secara kimia<br/> <i>Chemically inert</i></p>           |
|    | D                                                                                                                                                                                                                                                                                                                                                                                                   | <p>Tahan kejutan terma<br/> <i>Resistant to thermal shock</i></p> |

|    |                                                                                                                                                                                                                                                                                                                                                                                               |  |
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| 29 | <p>Rajah menunjukkan salah satu kegunaan getah sintetik<br/> <i>Diagram shows one of the uses of synthetic rubber</i></p> <div> </div> <p style="text-align: center;">Rajah 29 / Diagram 29</p> <p>Manakah antara berikut adalah benar bagi getah sintetik tersebut?<br/> <i>Which of the following is true about synthetic rubber?</i></p> |  |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|

|  |          |                                                            |                                                                                                   |
|--|----------|------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
|  |          | Getah sintetik<br><i>Synthetic rubber</i>                  | Ciri-ciri<br><i>Characteristics</i>                                                               |
|  | <b>A</b> | Tiokol<br>Thiokol                                          | Tahan terhadap minyak dan pelarut<br><i>Oil and solvent resistance</i>                            |
|  | <b>B</b> | Getah nitril<br><i>Nitrile rubber</i>                      | Tahan terhadap minyak dan pelarut<br><i>Oil and solvent resistance</i>                            |
|  | <b>C</b> | Getah silikon<br><i>Silicone rubber</i>                    | Tahan suhu yang tinggi dan bersifat lengai<br><i>High temperature resistance and inert</i>        |
|  | <b>D</b> | Getah stirena-butadiena<br><i>Styrene-butadiene rubber</i> | Tahan pelepasan dan tahan haba yang tinggi<br><i>Abrasion resistance and high heat resistance</i> |

**30**

Jadual 4 menunjukkan bilangan proton dan elektron bagi atom unsur-unsur J, L, P dan Q. Huruf-huruf J, L, P dan Q bukan simbol sebenar bagi unsur-unsur itu.  
*Table 4 shows the number of protons and electrons for atom of elements J, L, P and Q. The letters J, L, P and Q are not the actual symbols of the elements.*

| Atom<br><i>Atom</i> | Bilangan proton<br><i>Number of proton</i> | Bilangan elektron<br><i>Number of electron</i> |
|---------------------|--------------------------------------------|------------------------------------------------|
| J                   | 8                                          | 8                                              |
| L                   | 11                                         | 11                                             |
| P                   | 12                                         | 12                                             |
| Q                   | 17                                         | 17                                             |

Jadual 30 / *Table 30*

Formula dan jenis ikatan manakah yang betul apabila dua daripada unsur-unsur itu bertindak balas?

*Which is the correct formula and type of bond when two of the elements react?*

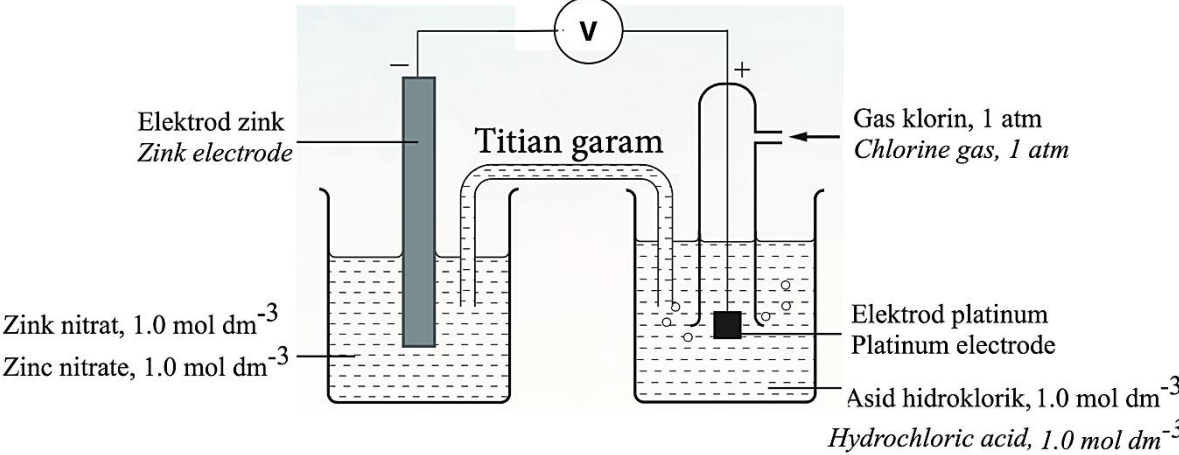
|            | Formula<br><i>Formula</i> | Jenis ikatan<br><i>Type of bond</i> |
|------------|---------------------------|-------------------------------------|
| <b>I</b>   | L <sub>2</sub> J          | Ion<br><i>Ionic</i>                 |
| <b>II</b>  | LJ <sub>2</sub>           | Kovalen<br><i>Covalent</i>          |
| <b>III</b> | P <sub>2</sub> Q          | Ion<br><i>Ionic</i>                 |
| <b>IV</b>  | PQ <sub>2</sub>           | Ion<br><i>Ionic</i>                 |

|          |                                 |
|----------|---------------------------------|
| <b>A</b> | I dan III<br><i>I and III</i>   |
| <b>B</b> | I dan IV<br><i>I and IV</i>     |
| <b>C</b> | II dan III<br><i>II and III</i> |
| <b>D</b> | II dan IV<br><i>II and IV</i>   |

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                            |                                                                                                                           |
|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| 31 | <p>Chempaka membuat sabun semula jadi dan mendapati bahawa nilai pH larutan sabun ialah 9. Apabila larutan tersebut ditambahkan dengan bahan X, nilai pH larutan sabun tersebut berubah kepada 8.</p> <p>Antara yang berikut, yang manakah merupakan bahan X dan penerangan manakah yang menyebabkan nilai pH larutan sabun tersebut berubah?</p> <p><i>Chempaka make a natural soap and finds the pH value of the soap solution is 9. When the solution is added with substance X, the pH value of the soap solution change to 8.</i></p> <p><i>Which of the following is the substance X and which explanation causes the pH value of the soap solution change?</i></p> |                                            |                                                                                                                           |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                            |                                                                                                                           |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>Bahan X</b><br><i>Substance X</i>       | <b>Penerangan</b><br><i>Explanation</i>                                                                                   |
|    | <b>A</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Asid etanoik<br><i>Ethanoic acid</i>       | Kepekatan ion $H^+$ berkurang<br><i>Concentration of <math>H^+</math> ion decreases</i>                                   |
|    | <b>B</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Air suling<br><i>Distilled water</i>       | Kepekatan ion $OH^-$ berkurang<br><i>Concentration of <math>OH^-</math> ion decreases</i>                                 |
|    | <b>C</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Metilbenzena<br><i>Methylbenzene</i>       | Kepekatan ion $H^+$ sama dengan ion $OH^-$<br><i>Concentration of <math>H^+</math> ion equal to <math>OH^-</math> ion</i> |
|    | <b>D</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Larutan ammonia<br><i>Ammonia solution</i> | Kepekatan ion $OH^-$ tidak berubah<br><i>Concentration of <math>OH^-</math> ion remains unchange</i>                      |

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 32 | <p>Rajah 32 menunjukkan susunan elektron bagi ion X.</p> <p><i>Diagram 32 shows the electron arrangement of X ion.</i></p> <div> </div> <p style="text-align: center;">Ion X<br/><i>X ion</i><br/>Rajah/ <i>Diagram 32</i></p> <p>Persamaan kimia yang manakah antara berikut mewakili tindak balas antara atom bagi unsur X dengan air?</p> <p><i>Which chemical equation represents the chemical reaction between atom with element X with water?</i></p> |
| A  | $X_2 + H_2O \rightarrow HX + HOX$                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| B  | $X_2 + 2H_2O \rightarrow 2HOX + 2H_2$                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| C  | $2X + 2H_2O \rightarrow 2XOH + H_2$                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| D  | $2X + H_2O \rightarrow 2XOH + O_2$                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                              |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| 33 | <p>Dalam satu eksperimen, <math>100\text{ cm}^3</math> asid hidroklorik <math>0.5\text{ mol dm}^{-3}</math> dicampurkan dengan <math>100\text{ cm}^3</math> larutan natrium hidroksida <math>0.5\text{ mol dm}^{-3}</math> di dalam cawan polistirena. Suhu campuran itu bertambah sebanyak <math>7.0\text{ }^{\circ}\text{C}</math>.</p> <p>[Muatan haba tentu larutan = <math>4.2\text{ Jg}^{-1}\text{ }^{\circ}\text{C}^{-1}</math>; Ketumpatan larutan = <math>1\text{ g cm}^{-3}</math>]</p> <p><i>In an experiment, <math>100\text{ cm}^3</math> of <math>0.5\text{ mol dm}^{-3}</math> hydrochloric acid is mixed with <math>100\text{ cm}^3</math> of sodium hydroxide solution, <math>0.5\text{ mol dm}^{-3}</math> in a polystyrene cup. The temperature of the mixture increases by <math>7.0\text{ }^{\circ}\text{C}</math>.</i></p> <p><i>[Specific heat capacity of the solution = <math>4.2\text{ Jg}^{-1}\text{ }^{\circ}\text{C}^{-1}</math>; Density of solution = <math>1\text{ g cm}^{-3}</math>]</i></p> <p>Pernyataan yang manakah yang benar sekiranya eksperimen diulang dengan menggantikan asid hidroklorik <math>0.5\text{ mol dm}^{-3}</math> dan larutan natrium hidroksida <math>0.5\text{ mol dm}^{-3}</math> dengan asid hidroklorik <math>1.0\text{ mol dm}^{-3}</math> dan larutan natrium hidroksida <math>1.0\text{ mol dm}^{-3}</math> sementara keadaan-keadaan lain kekal malar?</p> <p><i>Which statements are correct if the experiment is repeated by replacing <math>0.5\text{ mol dm}^{-3}</math> hydrochloric acid and <math>0.5\text{ mol dm}^{-3}</math> sodium hydroxide solution with <math>1.0\text{ mol dm}^{-3}</math> hydrochloric acid and of <math>1.0\text{ mol dm}^{-3}</math> sodium hydroxide solution while other conditions remain the same?</i></p> |                                                                                                              |
|    | <b>I</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Perubahan suhu campuran meningkat dua kali ganda<br><i>Temperature change of mixture increases two times</i> |
|    | <b>II</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Haba tindak balas meningkat dua kali ganda<br><i>Heat of reaction increases two times</i>                    |
|    | <b>III</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Perubahan haba meningkat dua kali ganda<br><i>Heat change increases two times</i>                            |
|    | <b>IV</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Bilangan mol air meningkat dua kali ganda<br><i>Number of mol of water increases two times</i>               |
|    | <b>A</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | I dan II<br><i>I and II</i>                                                                                  |
|    | <b>B</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | I dan III<br><i>I and III</i>                                                                                |
|    | <b>C</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | II dan IV<br><i>II and IV</i>                                                                                |
|    | <b>D</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | III dan IV<br><i>III and IV</i>                                                                              |

|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 34       | <p>Rajah 34 menunjukkan susunan radas bagi satu sel kimia.<br/> <i>Diagram 34 shows a set-up of apparatus of a chemical cell.</i></p>  <p style="text-align: center;">Rajah/ Diagram 34</p> <p>Yang manakah merupakan notasi sel yang betul bagi sel kimia tersebut?<br/> <i>Which of the following is the correct cell notation of the chemical cell?</i></p> |
| <b>A</b> | $\text{Zn}^{2+}_{(\text{ak})} \mid \text{Zn}_{(\text{p})} \parallel \text{Cl}^{-}_{(\text{ak})}, \text{Cl}_{2(\text{g})} \mid \text{Pt}_{(\text{p})}$ $\text{Zn}^{2+}_{(\text{aq})} / \text{Zn}_{(\text{s})} \parallel \text{Cl}^{-}_{(\text{aq})}, \text{Cl}_{2(\text{g})} / \text{Pt}_{(\text{s})}$                                                                                                                                            |
| <b>B</b> | $\text{Pt}_{(\text{p})} \mid \text{Cl}_{2(\text{g})}, \text{Cl}^{-}_{(\text{ak})} \parallel \text{Zn}_{(\text{p})} \mid \text{Zn}^{2+}_{(\text{ak})}$ $\text{Pt}_{(\text{s})} / \text{Cl}_{2(\text{g})}, \text{Cl}^{-}_{(\text{aq})} \parallel \text{Zn}_{(\text{s})} / \text{Zn}^{2+}_{(\text{aq})}$                                                                                                                                            |
| <b>C</b> | $\text{Zn}_{(\text{p})} \mid \text{Zn}^{2+}_{(\text{ak})} \parallel \text{Cl}_{2(\text{g})}, \text{Cl}^{-}_{(\text{ak})} \mid \text{Pt}_{(\text{p})}$ $\text{Zn}_{(\text{s})} / \text{Zn}^{2+}_{(\text{aq})} \parallel \text{Cl}_{2(\text{g})}, \text{Cl}^{-}_{(\text{aq})} / \text{Pt}_{(\text{s})}$                                                                                                                                            |
| <b>D</b> | $\text{Pt}_{(\text{p})} \mid \text{Cl}^{-}_{(\text{ak})}, \text{Cl}_{2(\text{g})} \mid \text{Zn}^{2+}_{(\text{ak})} \mid \text{Zn}_{(\text{p})}$ $\text{Pt}_{(\text{s})} / \text{Cl}^{-}_{(\text{aq})}, \text{Cl}_{2(\text{g})} / \text{Zn}^{2+}_{(\text{aq})} / \text{Zn}_{(\text{s})}$                                                                                                                                                         |

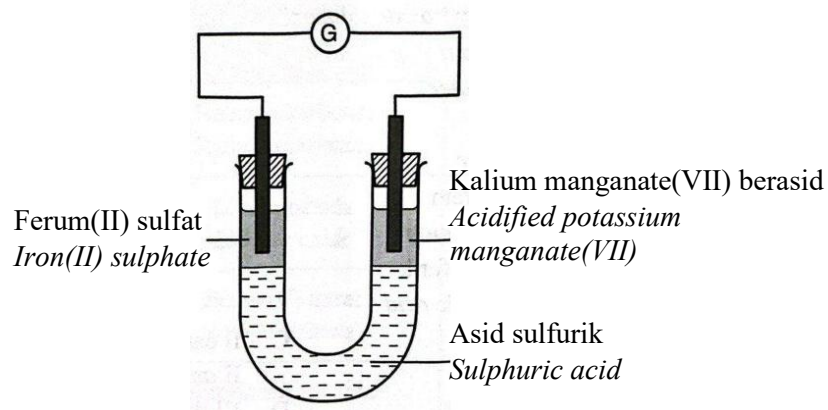
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 35 | <p>Rajah 35 menunjukkan formula struktur suatu sebatian organik yang terhasil melalui tindak balas antara sejenis alkohol dan asid karboksilik.</p> <p><i>Diagram 35 shows the structural formula of an organic compound which produced from a chemical reaction between an alcohol and a carboxylic acid.</i></p> <div style="text-align: center;"> </div> <p>Rajah/ Diagram 35</p> <p>Apakah nama IUPAC bagi alkohol yang digunakan untuk menghasilkan sebatian organik dalam Rajah 35?</p> <p><i>What is the IUPAC name of the alcohol used to produce organic compound in Diagram 35?</i></p> |
| A  | 2-metilpropanol<br><i>2-methylpropanol</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| B  | 2-metilbutanol<br><i>2-metilbutanol</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| C  | Propanol<br><i>Propanol</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| D  | Butanol<br><i>Butanol</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 36 | <p>Persamaan kimia berikut mewakili tindak balas antara zink dengan larutan kuprum(II) nitrat.</p> <p><i>The following chemical equation represents the reaction between zinc and copper(II) nitrate solution.</i></p> $\text{Zn} + \text{Cu}^{2+} \rightarrow \text{Zn}^{2+} + \text{Cu} \quad \Delta H = -210 \text{ kJ mol}^{-1}$ <p>Berapakah jisim zink yang diperlukan untuk membebaskan 5250 J tenaga haba?</p> <p>[Jisim atom relatif: Zn=65; Muatan haba tentu bagi larutan= 4.2 J g<sup>-1</sup> °C]</p> <p><i>What is the mass of zinc required to release 5250 J of heat energy?</i></p> <p><i>[Relative atomic mass: Zn=65; Specific heat capacity of the solution= 4.2 J g<sup>-1</sup> °C]</i></p> |
| A  | 1.625 g                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| B  | 3.031 g                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| C  | 3.250 g                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| D  | 4.875 g                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

37

Rajah 37 menunjukkan susunan radas untuk mengkaji pemindahan elektron pada suatu jarak.

*Diagram 37 shows the apparatus set-up to study the transfer of electrons at a distance.*



Rajah/ Diagram 37

Apakah perubahan nombor pengoksidaan bagi bahan yang dioksidakan dan diturunkan?

*What is the change in oxidation number for the substance that is oxidised and reduced?*

|  |          | <b>Bahan yang dioksidakan</b><br><i>Substance that is oxidised</i> | <b>Bahan yang diturunkan</b><br><i>Substance that is reduced</i> |
|--|----------|--------------------------------------------------------------------|------------------------------------------------------------------|
|  | <b>A</b> | $+2 \rightarrow +3$                                                | $-1 \rightarrow +2$                                              |
|  | <b>B</b> | $+2 \rightarrow +3$                                                | $+7 \rightarrow +2$                                              |
|  | <b>C</b> | $-1 \rightarrow +2$                                                | $+2 \rightarrow 0$                                               |
|  | <b>D</b> | $+2 \rightarrow +7$                                                | $+3 \rightarrow +2$                                              |

- 38** Semasa menjalankan satu eksperimen, Alston menjumpai dua botol pepejal putih bagi sebatian ion yang berlabel pepejal M dan pepejal R.  
 Rajah 38 menunjukkan maklumat bagi kedua-dua pepejal putih tersebut.  
*While carry out an experiment, Alston found two bottles of white solid of ionic compound which labelled with solid M and solid R.*  
*Diagram 38 shows the information of the two white solids.*

**Pepejal putih M/  
White solid M**

- Tak terlarutkan di dalam air/ *Insoluble in water*
- Terurai oleh haba menghasilkan baki berwarna putih dan gas tidak berwarna yang mengeruhkan air kapur/ *Decompose by heat produce white residue and colourless gas which can turn lime water chalky*

**Pepejal putih R/  
White solid R**

- Terlarutkan di dalam air menghasilkan larutan tidak berwarna yang boleh bertindak balas dengan asid hidroklorik menghasilkan gas tidak berwarna/ *Soluble in water form colourless solution which can reacts with hydrochloric acid produce colourless gas*
- Tidak terurai oleh tindakan haba/ *Do not decompose by heat*

Rajah/ Diagram 38

Apakah pepejal putih M dan pepejal putih R?  
*What is white solid M and white solid R?*

|  |          | <b>Pepejal putih M<br/>White solid M</b>         | <b>Pepejal putih R<br/>White solid R</b>    |
|--|----------|--------------------------------------------------|---------------------------------------------|
|  | <b>A</b> | Magnesium karbonat<br><i>Magnesium carbonate</i> | Natrium karbonat<br><i>Sodium carbonate</i> |
|  | <b>B</b> | Kalsium nitrat<br><i>Calcium nitrate</i>         | Kalium nitrat<br><i>Potassium nitrate</i>   |
|  | <b>C</b> | Aluminium karbonat<br><i>Aluminium carbonate</i> | Zink karbonat<br><i>Zinc carbonate</i>      |
|  | <b>D</b> | Argentum nitrat<br><i>Silver nitrate</i>         | Barium karbonat<br><i>Barium carbonate</i>  |

|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |          |                                        |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------------------------------------|
| 39       | <p>Rajah 39 menunjukkan satu siri tindak balas kimia bagi sebatian organik X dan sebatian organik Y. Kedua-dua sebatian X dan Y mempunyai dua atom karbon.<br/> <i>Diagram 39 shows a series of chemical reaction of organic compound X and organic compound Y. Both compound X and Y has two carbon atoms.</i></p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">           Sebatian X<br/>           (Gas tidak berwarna)<br/> <i>Compound X</i><br/>           (Colourless gas)         </div> <div style="margin-bottom: 10px;">↓ + KMnO<sub>4</sub>/ H<sup>+</sup></div> <div style="border: 1px solid black; padding: 5px;"> <b>Pemerhatian:</b><br/>           Larutan ungu kalium manganat(VII) berasid menjadi tidak berwarna<br/> <b>Observation:</b><br/> <i>Purple acidified potassium manganate(VII) solution turns colourless</i> </div> </div> <div style="text-align: center;"> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">           Sebatian Y<br/>           (Cecair tidak berwarna)<br/> <i>Compound Y</i><br/>           (Colourless liquid)         </div> <div style="margin-bottom: 10px;">↓ + KMnO<sub>4</sub>/ H<sup>+</sup></div> <div style="border: 1px solid black; padding: 5px;"> <b>Pemerhatian:</b><br/>           Larutan ungu kalium manganat(VII) berasid menjadi tidak berwarna. Cecair tidak berwarna berbau cuka terhasil.<br/> <b>Observation:</b><br/> <i>Purple acidified potassium manganate(VII) turns colourless. Colourless liquid with vinegar smell produced.</i> </div> </div> </div> <p style="text-align: center;">Rajah/ Diagram 39</p> <p>Apakah proses bagi menukarkan sebatian X kepada sebatian Y?<br/> <i>What is the process to change compound X to compound Y?</i></p> |          |                                        |
|          | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 5%; text-align: center;"><b>A</b></td> <td>Penghidrogenan<br/><i>Hydrogenation</i></td> </tr> </table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>A</b> | Penghidrogenan<br><i>Hydrogenation</i> |
| <b>A</b> | Penghidrogenan<br><i>Hydrogenation</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |          |                                        |
|          | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 5%; text-align: center;"><b>B</b></td> <td>Pendehidratan<br/><i>Dehydration</i></td> </tr> </table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>B</b> | Pendehidratan<br><i>Dehydration</i>    |
| <b>B</b> | Pendehidratan<br><i>Dehydration</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |          |                                        |
|          | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 5%; text-align: center;"><b>C</b></td> <td>Pengoksidaan<br/><i>Oxidation</i></td> </tr> </table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>C</b> | Pengoksidaan<br><i>Oxidation</i>       |
| <b>C</b> | Pengoksidaan<br><i>Oxidation</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |          |                                        |
|          | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 5%; text-align: center;"><b>D</b></td> <td>Penghidratan<br/><i>Hydration</i></td> </tr> </table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>D</b> | Penghidratan<br><i>Hydration</i>       |
| <b>D</b> | Penghidratan<br><i>Hydration</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |          |                                        |

|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>40</b></p> | <p>Rajah 40 menunjukkan relau bagas yang digunakan untuk mengekstrak logam Q daripada bijihnya, hematit.</p> <p><i>Diagram 40 shows a blast furnace which used to extract metal Q from its ore, hematite.</i></p> <div> <p>Campuran hematit, arang kok dan <math>\text{CaCO}_3</math></p> <p><i>Mixture of hematite, charcoal and <math>\text{CaCO}_3</math></i></p> <p>Logam Q diekstrak</p> <p><i>Metal Q extracted</i></p> </div> <p>Rajah/ Diagram 40</p> <p>Hematit mengandungi ferum(III) oksida. Logam Q yang diekstrak ditambahkan secara berlebihan ke dalam larutan kuprum(II) sulfat.</p> <p>Pernyataan manakah yang benar tentang tindak balas antara logam Q dan copper(II) sulphate solution?</p> <p><i>Hematite contains iron(III) oxide. Metal Q extracted is added until excess into copper(II) sulphate solution.</i></p> <p><i>Which statement is correct about the reaction between metal Q and copper(II) sulphate solution?</i></p> |
| <p><b>A</b></p>  | <p>Ion <math>\text{Cu}^{2+}</math> merupakan agen penurunan</p> <p><i><math>\text{Cu}^{2+}</math> ion is a reducing agent</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <p><b>B</b></p>  | <p>Larutan biru berubah menjadi hijau</p> <p><i>Blue solution turns green</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <p><b>C</b></p>  | <p>Enapan kelabu terbentuk</p> <p><i>Grey deposit formed</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <p><b>D</b></p>  | <p>Logam Q diturunkan</p> <p><i>Metal Q reduced</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

JAWAPAN KIMIA K1 SET 2 TRIAL SPM 2025:

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