

4541/1  
Chemistry  
Paper 1  
September  
2012  
1 1/4 jam



**MAJLIS PENGETUA SEKOLAH MALAYSIA  
CAWANGAN MELAKA**

**PEPERIKSAAN PERCUBAAN TINGKATAN LIMA  
TAHUN 2012**

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**CHEMISTRY**  
**Kertas 1**  
**Satu jam lima belas minit**

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**JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU**

1. *Kertas soalan ini mengandungi 50 soalan.*
2. *Jawab semua soalan.*
3. *Jawab dengan menghitamkan ruangan yang betul pada kertas jawapan.*
4. *Hitamkan satu ruangan sahaja bagi setiap soalan.*
5. *Rajah tidak dilukis mengikut skala kecuali dinyatakan*
6. *Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogramkan*

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Kertas soalan ini mengandungi 23 halaman bercetak.

## INFORMATION FOR CANDIDATES

1. *This question paper consists of 50 questions.*
2. *Answer all questions.*
3. *Answer each question by blackening the correct space on the answer sheet.*
4. *Blacken only one space for each question.*
5. *If you wish to change your answer, erase the blackened mark that you have made. Then blacken the space for the new answer.*
6. *The diagrams in the questions provided are not drawn to scale unless stated.*
7. *You may use a non-programmable scientific calculator.*

## MAKLUMAT UNTUK CALON

1. *Kertas soalan ini mengandungi 50 soalan.*
2. *Jawab semua soalan*
3. *Jawab dengan menghitamkan ruangan yang betul pada kertas jawapan.*
4. *Hitamkan satu ruangan sahaja bagi setiap soalan.*
5. *Sekiranya anda hendak menukarkan jawapan, padamkan tanda yang telah dibuat. Kemudian hitamkan jawapaaan yang baru.*
6. *Rajah yang mengirimi soalan tidak dilukis mengikut skala kecuali dinyatakan.*
7. *Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogramkan*

Question 1 to Question 50 are followed by four options A, B, C or D.

Choose the best option for each question and blackened the corresponding space on the objective answer sheet.

Bagi Soalan 1 hingga Soalan 50, tiap-tiap soalan diikuti oleh empat pilihan jawapan A, B, C dan D. Pilih satu jawapan yang terbaik bagi tiap-tiap soalan dan hitamkan ruangan yang sepadan pada kertas jawapan objektif and

- 1 Diagram 1 shows the symbol of atom X.  
*Rajah 1 menunjukkan simbol bagi atom X.*

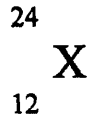


Diagram 1  
*Rajah 1*

Which of the following is true based on Diagram 1?

*Pernyataan yang mana adalah benar berdasarkan Rajah 1?*

	Proton number <i>Nombor proton</i>	Number of neutron <i>Bilangan neutron</i>
A	24	12
B	12	24
C	12	12
D	24	36

- 2 Which substance is an element?  
*Bahan manakah yang merupakan suatu unsur?*
- A Glucose  
*Glukos*
- B Helium  
*Helium*
- C Steam  
*Stim*
- D Air  
*Udara*
- 3 Which of the following statement is true?  
*Antara berikut, pernyataan yang manakah benar?*
- A Condensation is a process whereby liquid turns to gas.  
*Kondensasi ialah proses di mana cecair menjadi gas.*
- B Solid, liquid and gas are three types of particle.  
*Pepejal, cecair dan gas ialah tiga jenis zarah.*
- C Atom, molecule and ion are three state of matter  
*Atom, molekul dan ion merupakan tiga keadaan jirim*
- D Proton, neutron and electron are three subatomic particles.  
*Proton, neutron dan elektron ialah tiga zarah subatom.*

4 Which of the following is the usage of carbon-14 isotope ?  
*Antara berikut yang manakah kegunaan isotop karbon-14 ?*

- A Kill cancer cells  
*Membunuh sel-sel kanser*
- B Generate electrical energy  
*Menjana tenaga elektrik*
- C Determine the age of fossil  
*Menentukan umur fosil*
- D Diagnose thyroid problems  
*Mengesakan penyakit tiroid*

5 Diagram 2 shows the electron arrangement of an oxygen atom.  
*Rajah 2 menunjukkan susunan elektron bagi satu atom oksigen.*

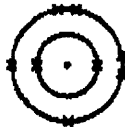


Diagram 2  
*Rajah 2*

Which of the following is true about this atom?  
*Antara berikut, yang manakah benar tentang atom ini?*

- A The number of valence electrons is 6  
*Bilangan elektron valens ialah 6*
- B The total number of electrons is 6  
*Jumlah bilangan elektron ialah 6*
- C The proton number is 16  
*Nombor proton ialah 16*
- D The nucleon number is 8  
*Nombor nukleon ialah 8*

6 Which of the following is the correct formula for sodium carbonate ?  
*Antara berikut, yang manakah formula yang betul bagi natrium karbonat ?*

- A  $\text{NaCO}_3$
- B  $\text{Na}_2\text{CO}_3$
- C  $\text{Na}(\text{CO}_3)_2$
- D  $\text{Na}_2\text{CO}$

- 7 One mole of a substance is defined as the quantity of a substance that contains the same number of particles as in  $n$  g of element X.

What are  $n$  and X?

*Satu mol bahan ditakrifkan sebagai kuantiti bahan yang mengandungi bilangan zarah yang sama seperti yang terdapat dalam  $n$  g unsur X.*

*Apakah  $n$  dan X?*

	$n$	X
A	2	Hydrogen-1 <i>Hidrogen-1</i>
B	16	Oxygen-16 <i>Oksigen-16</i>
C	35	Chlorine-35 <i>Klorin-35</i>
D	12	Carbon-12 <i>Karbon-12</i>

- 8 The empirical formula of magnesium oxide is determined by heating magnesium ribbon in excess oxygen.

Which of the following can be done to ensure that the reaction have been completed ?

*Formula empirik magnesium oksida ditentukan dengan memanaskan pita magnesium dalam oksigen berlebihan.*

*Antara berikut, yang manakah boleh dilakukan untuk memastikan tindak balas telah lengkap ?*

- A Wiped the magnesium ribbon with sandpaper.  
*Gosok pita magnesium dengan kertas pasir.*
- B Weigh the magnesium oxide while it is still hot.  
*Timbang magnesium oksida semasa ia masih panas.*
- C Open the crucible lid once a while.  
*Penutup mangkuk pijar dibuka sekali-sekala.*
- D The heating, cooling and weighing steps are repeated until constant mass is obtained.  
*Langkah pemanasan, penyejukan dan penimbangan diulang sehingga jisim tetap diperolehi.*

- 9 Which substance is a covalent compound?

*Bahan manakah adalah sebatian kovalen?*

- A Sodium oxide  
*Natrium oksida*
- B Copper(II) nitrate  
*Kuprum(II) nitrat*
- C Potassium chloride  
*Kalium klorida*
- D Ammonia  
*Ammonia*

- 10 Which statement explains why the reactivity of Group 1 elements increases when going down the group?  
*Pernyataan manakah yang menerangkan mengapa kereaktifan unsur Kumpulan 1 meningkat apabila menuruni kumpulan itu ?*
- A The valence electron gets further away from the nucleus  
*Elektron valens semakin jauh dari nukleus*
- B The melting points of the elements decreases  
*Takat lebur bagi unsur menurun*
- C The attraction force between valence electron and the nucleus become stronger  
*Daya tarikan antara elektron valens dengan nucleus semakin kuat*
- D The physical state of the elements changes from gas to liquid then to solid at room temperature  
*Keadaan fizik bagi unsur berubah daripada gas kepada cecair dan kemudian kepada pepejal pada suhu bilik*
- 11 Table 1 shows the properties of elements X, Y and Z. These elements are located in the same period in the Periodic Table.  
*Jadual 1 menunjukkan sifat oksida bagi unsur-unsur X, Y dan Z. Unsur-unsur ini terletak dalam kala yang sama dalam Jadual Berkala.*

Element <i>Unsur</i>	Property of oxide <i>Sifat bagi oksida</i>
X	Acidic <i>Bersifat asid</i>
Y	Basic <i>Bersifat bes</i>
Z	Amphoteric <i>Amfoterik</i>

Table 1  
*Jadual 1*

Arrange the three elements based on the increasing atomic size.  
*Susun ketiga-tiga unsur itu berdasarkan pertambahan saiz atom.*

- A X, Y, Z
- B X, Z, Y
- C Y, Z, X
- D Y, X, Z



- 14 Which of the following statements are true about the Periodic Table Of Elements?  
*Pernyataan yang manakah adalah benar mengenai Jadual Berkala Unsur?*
- I The horizontal rows are called groups  
*Baris mendatar dikenali sebagai kumpulan*
  - II The vertical columns are called period  
*Turus menegak dikenali sebagai kala*
  - III The group 17 elements are known as Halogen  
*Unsur kumpulan 17 dikenali sebagai Halogen*
  - IV There are 18 groups in the Periodic Table  
*Terdapat 18 kumpulan dalam Jadual Berkala*
- A I and II only  
B III and IV only  
C I, II and IV only  
D I, II, III and IV
- 15 Which statement is true about the reaction of a magnesium atom with chlorine to form magnesium chloride?  
[Proton number: Cl = 17, Mg = 12]  
*Pernyataan manakah yang benar tentang tindak balas atom magnesium dengan klorin untuk membentuk magnesium klorida?*  
[Nombor proton: Cl = 17, Mg = 12]
- A One magnesium atom donates two electrons to two chlorine atoms  
*Satu atom magnesium menderma dua elektron kepada dua atom klorin*
  - B One magnesium atom donates one electron to one chlorine atom  
*Satu atom magnesium menderma satu elektron kepada satu atom klorin*
  - C One magnesium atom shares two electrons with two chlorine atoms  
*Satu atom magnesium berkongsi dua elektron dengan dua atom klorin*
  - D One magnesium atom shares one electron with one chlorine atom  
*Satu atom magnesium berkongsi satu elektron dengan satu atom klorin*
- 16 What is the meaning of ionic bond?  
*Apakah maksud ikatan ionik?*
- A A bond formed when metal atoms contribute electrons to each other to achieve a stable electron arrangement.  
*Ikatan yang terbentuk apabila atom-atom logam menyumbangkan elektron kepada satu sama lain untuk mencapai susunan elektron yang stabil.*
  - B A bond formed by weak Van der Waals forces between the non-metal atoms.  
*Ikatan yang terbentuk oleh daya Van der Waals yang lemah di antara atom-atom bukan logam.*
  - C A bond formed when metal atom transfer electron to non-metal atom.  
*Ikatan yang terbentuk apabila atom logam memindahkan elektron kepada atom bukan logam.*
  - D A bond formed when non-metal atoms share electrons to achieve a stable electron arrangement.  
*Ikatan yang terbentuk apabila atom-atom bukan logam berkongsi elektron untuk mencapai susunan elektron yang stabil.*



- 17 Diagram 4 shows the electron arrangement of a compound between atom P and atom Q.  
*Rajah 4 memujukkan sususun elektron bagi sebatian yang terbentuk antara atom P dan atom Q.*

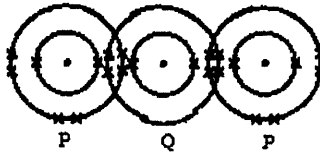


Diagram 4  
*Rajah 4*

The compound formed  
*Sebatian yang terbentuk*

- A can conduct electricity  
*boleh mengkonduksikan elektrik*
- B is soluble in water  
*larut dalam air*
- C has a high melting point  
*mempunyai takat lebur yang tinggi*
- D is a covalent compound  
*merupakan sebatian kovalen*
- 18 Diagram 5 shows an energy level diagram for neutralization process.  
*Rajah 5 menunjukkan gambarajah aras tenaga bagi tindakbalas peneutralan*

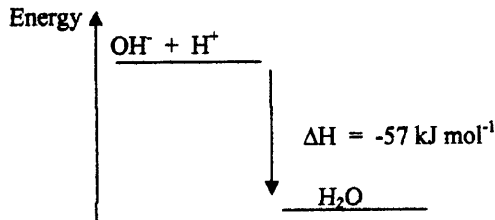


Diagram 5  
*Rajah 5*

Based on the figure above, it can be concluded that  
*Berdasarkan rajah di atas, dapat disimpulkan bahawa*

- A the heat of neutralization is  $-57 \text{ kJ mol}^{-1}$   
*haba peneutralan ialah  $-57 \text{ kJ mol}^{-1}$*
- B 57 kJ of energy is needed for the reaction  
*57 kJ tenaga diperlukan untuk tindakbalas tersebut*
- C The energy content of products is higher than energy content of reactants.  
*Kandungan tenaga hasil tindakbalas lebih tinggi daripada kandungan tenaga bahan tindakbalas*
- D the temperature at the end of the reaction is lower than that at the beginning of the reaction.  
*Suhu akhir tindak balas adalah lebih rendah daripada suhu awal tindak balas*

- 19 The following information shows the result of an experiment to determine the heat change for the combustion of propanol,  $C_3H_7OH$ .  
*Maklumat berikut menunjukkan keputusan eksperimen untuk menentukan perubahan haba bagi pembakaran propanol,  $C_3H_7OH$ .*

Volume of water in the copper can =  $300 \text{ cm}^3$   
*Isipadu air dalam bekas kuprum*

Initial temperature of water =  $27.5 \text{ }^\circ\text{C}$

*Suhu awal air*

Highest temperature of water =  $68.5 \text{ }^\circ\text{C}$

*Suhu tertinggi air*

Calculate the heat released in above experiment.

[Specific heat capacity of water =  $4.2 \text{ J g}^{-1} \text{ }^\circ\text{C}^{-1}$ , water density =  $1 \text{ g cm}^3$ ]

*Hitung haba yang dibebaskan dalam eksperimen di atas.*

*[Haba spesifik air =  $4.2 \text{ Jg}^{-1} \text{ }^\circ\text{C}^{-1}$ , ketumpatan air =  $1 \text{ g cm}^3$ ]*

- A 34.65 kJ  
B 51.66 kJ  
C 86.31 kJ  
D 120.96 kJ
- 20 The equation below shows a displacement reaction and its heat of reaction.  
*Persamaan di bawah menunjukkan tindakbalas penyesaran haba tindakbalasnya.*



Which of the following statements are true about the above reaction?

*Pernyataan yang mana adalah benar tindakbalas di atas?*

- I Magnesium is oxidized  
*Magnesium dioksidakan*
- II The reaction is exothermic  
*Merupakan tindakbalas eksotermik*
- III The temperature decreases during the reaction  
*Suhu semakin berkurang semasa tindakbalas*
- IV The heat released is 37.8 kJ  
*Haba yang dibebaskan ialah 37.8 kJ*
- A I and II only  
B II and IV only  
C III and IV only  
D I, II and IV only

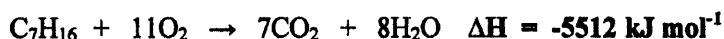
- 21 Table 2 shows the heat of combustion of three alcohols.  
*Jadual 2 di bawah menunjukkan haba pembakaran bagi tiga jenis alkohol*

Alcohol	Heat of combustion / $\text{kJ mol}^{-1}$ <i>Haba pembakaran/ <math>\text{kJ mol}^{-1}</math></i>
$\text{CH}_3\text{OH}$	-710
$\text{C}_2\text{H}_5\text{OH}$	-1370
$\text{C}_4\text{H}_9\text{OH}$	-2670

Table 2  
*Jadual 2*

Which of the following factors increases the heat of combustion of alcohols?  
*Faktor yang manakah antara berikut, meningkat haba pembakaran alkohol tersebut?*

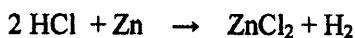
- A Size of molecules decreases  
*Saiz molekul berkurang*
- B Number of carbon atoms per molecule increases  
*Bilangan atom karbon per molekul bertambah*
- C Number of oxygen atoms per molecule increases  
*Bilangan atom oksigen per molekul bertambah*
- D Number of hydrogen atoms per molecule decreases  
*Bilangan atom hidrogen per molekul berkurang*
- 22 The following equation shows the combustion of heptane,  $\text{C}_7\text{H}_{16}$ , in excess oxygen.  
*Persamaan di bawah menunjukkan pembakaran heptana,  $\text{C}_7\text{H}_{16}$ , di dalam oksigen berlebihan.*



Calculate the mass of heptane used to release 1378 kJ of energy.  
*Hitung jisim heptana yang digunakan untuk membebaskan haba sebanyak 1387 kJ.*  
 [relative atomic mass of H = 1 and C = 12]

- A 25.0 g
- B 36.0 g
- C 77.0 g
- D 88.0 g
- 23 Which of the following absorbs heat from the surroundings?  
*Yang manakah antara berikut menyerap haba dari sekeliling?*
- A Adding acid to alkali  
*Menambah asid kepada alkali*
- B Adding concentrated acid to water  
*Menambah asid pekat kepada air*
- C Dissolving solid ammonium chloride in water  
*Melarutkan pepejal ammonium klorida di dalam air*
- D Dissolving anhydrous copper(II) sulphate in water  
*Melarutkan kuprum(II) sulfat terhidrat di dalam air*

- 24 The equation below shows a reaction to produce hydrogen gas.  
*Persamaan di bawah menunjukkan satu tindak balas untuk menghasilkan gas hidrogen.*



Which of the following will increase the rate of production of hydrogen gas?  
*Pernyataan mana yang akan meningkatkan kadar tindak balas penghasilan gas hidrogen?*

- A Increase the time of reaction  
*Meningkatkan masa tindak balas*
- B Increase the volume of acid  
*Meningkatkan isipadu asid*
- C Increase the temperature of the mixture.  
*Meningkatkan suhu tindak balas*
- D Increase the size of granulated zinc  
*Meningkatkan saiz ketulan zink*
- 25 Table 3 shows the result of an experiment .  
*Jadual 3 menunjukkan keputusan yang diperolehi dari suatu eksperimen*

Experiment <i>Eksperimen</i>	Keadaan eksperimen	Initial rate <i>Kadar awal</i>
I	1 g magnesium powder react with 50cm <sup>3</sup> of 0.1 mol dm <sup>-3</sup> hydrochloric acid <i>1 g serbuk magnesium bertindakbalas dengan 50 cm<sup>3</sup> 0.1 mol dm<sup>-3</sup> asid hidroklorik</i>	Higher <i>Lebih tinggi</i>
II	1 g magnesium ribbon react with 50cm <sup>3</sup> of 0.1 mol dm <sup>-3</sup> hydrochloric acid <i>1 g pita magnesium bertindakbalas dengan 50 cm<sup>3</sup> 0.1 mol dm<sup>-3</sup> asid hidroklorik</i>	Lower <i>Lebih rendah</i>

Table 3  
*Jadual 3*

Which of the following explains the difference in the initial rate of reaction?  
*Pernyataan yang mana menerangkan tentang perbezaan kadar awal tindak balas?*

- A Magnesium powder is purer than magnesium ribbon  
*Serbuk magnesium lebih tulen daripada pita magnesium*
- B Magnesium powder floats on the acid, whereas magnesium ribbon sinks in the acid  
*Serbuk magnesium terapung di atas permukaan asid, manakala pita magnesium tenggelam di dalam asid*
- C Magnesium ribbon is covered by a layer of oxide on its surface, whereas magnesium powder is not  
*Permukaan pita magnesium diselaputi oleh lapisan magnesium oksida, manakala serbuk magnesium tiada*
- D Magnesium powder has a larger total surface area than magnesium ribbon  
*Serbuk magnesium mempunyai jumlah luas permukaan yang lebih besar berbanding pita magnesium*

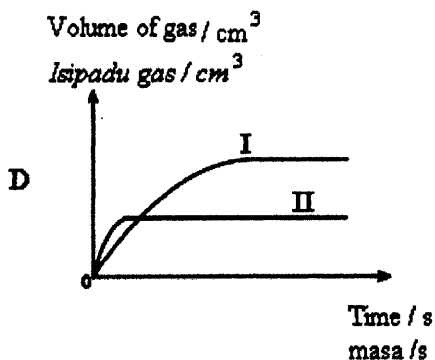
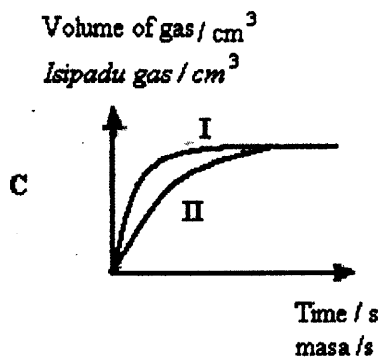
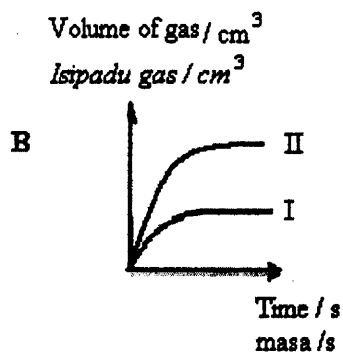
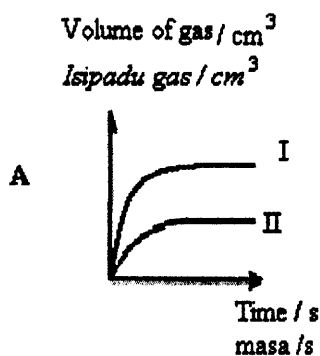
26 An experiment is carried out to study the rate of reaction between marble chips and hydrochloric acid to produce carbon dioxide gas.

Satu eksperimen telah dijalankan untuk mengkaji kadar tindak balas antara ketulan marmar dengan asid hidroklorik untuk menghasilkan gas karbon dioksida.

Experiment	Substances
I	Excess marble chips and 50.0 cm <sup>3</sup> of 2 mol dm <sup>-3</sup> hydrochloric acid <i>Ketulan marmar berlebihan dan 50.0 cm<sup>3</sup> of 2 mol dm<sup>-3</sup> hydrochloric acid</i>
II	Excess marble chips and 100.0 cm <sup>3</sup> of 1 mol dm <sup>-3</sup> hydrochloric acid <i>Ketulan marmar berlebihan dan 100.0 cm<sup>3</sup> 1 mol dm<sup>-3</sup> asid hidroklorik</i>

Which of the following graphs represent the two experiments?

Antara graf berikut, yang manakah mewakili graf bagi kedua-dua eksperimen di atas?



- 27 Diagram 6 shows an energy profile for a reaction which is represented by the following equation:  
*Rajah 6 menunjukkan profil tenaga bagi tindak balas yang diwakili oleh persamaan berikut:*

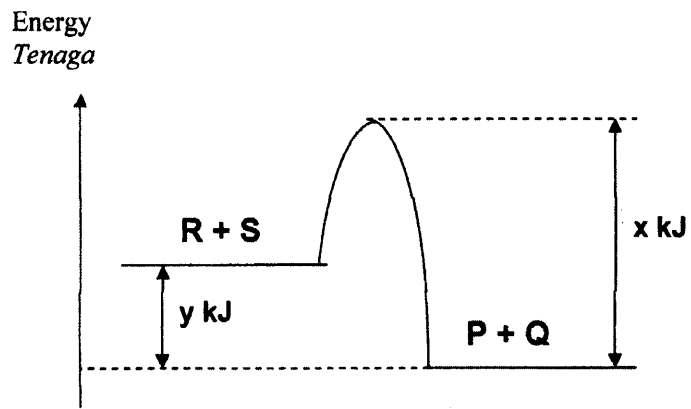
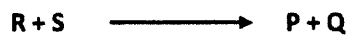


Diagram 6  
*Rajah 6*

What is the activation energy for this reaction?  
*Apakah tenaga pengaktifan bagi tindak balas ini?*

- A y kJ
  - B x kJ
  - C (y - x) kJ
  - D (x - y) kJ
- 28 The following chemical equation shows the conversion of ethanol to ethene.  
*Persamaan kimia berikut menunjukkan perubahan daripada etanol kepada etena.*



What is the name of the process shown by the above equation?  
*Apakah nama proses yang ditunjukkan dalam persamaan tersebut?*

- A Dehydration  
*Pendehidratatan*
- B Oxidation  
*Pengoksidaan*
- C Reduction  
*Penurunan*
- D Fermentation  
*Penapaian*

- 29 Which of the following substances can be used to differentiate ethane from ethene?  
*Antara bahan berikut, yang manakah dapat membezakan etana daripada etena?*
- A Sodium hydroxide solution  
*Larutan natrium hidroksida*
  - B Dilute sulphuric acid  
*Asid sulfurik cair*
  - C Bromine water  
*Air bromine*
  - D Lime water  
*Air kapur*

- 30 Diagram 7 shows the structural formula of carbon compound J  
*Rajah 7 menunjukkan formula struktur sebatian karbon J*

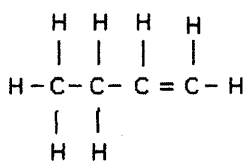


Diagram 7  
*Rajah 7*

Which of the following statements are true?  
*Antara pernyataan berikut, yang manakah benar?*

[Relative atomic mass of H = 1, C = 12 ]  
*[Jisim atom relatif H = 1, C = 12 ]*

- I Empirical formula of J is C<sub>4</sub>H<sub>8</sub>  
*Formula empirik J ialah C<sub>4</sub>H<sub>8</sub>*
  - II Name of the compound J is but-1-ene  
*Nama sebatian J ialah but-1-ena*
  - III Hydration of compound J produce butan-1-ol  
*Penghidratan sebatian J menghasilkan butan-1-ol*
  - IV Complete combustion of compound J produce carbon dioxide gas and water  
*Pembakaran lengkap sebatian J menghasilkan gas karbon dioksida dan air*
- A I and II only
  - B III and IV only
  - C I, II and III only
  - D II, III and IV only

- 31 Which of the following chemicals is used to keep latex in its liquid state?  
*Antara bahan kimia berikut, yang manakah digunakan untuk mengekalkan lateks dalam keadaan cecair?*
- A Aqueous ammonia  
*Ammonia akueous*
- B Ethanoic acid  
*Asid ethanoik*
- C Methanol  
*Metanol*
- D Water  
*Air*
- 32 What is the homologous series of methyl ethanoate?  
*Apakah siri homolog bagi metil etanoat?*
- A Ester  
*Ester*
- B Alkene  
*Alkena*
- C Alcohol  
*Alkohol*
- D Carboxylic acid  
*Asid karboksilik*
- 33 A student is required to test the presence of nitrate ions in sodium nitrate solution.  
*Seorang pelajar dikehendaki menguji kehadiran ion nitrat dalam larutan natrium nitrat.*

- |  |
|--|
| P Add concentrated sulphuric acid          |
| Q Add iron (II) sulphate solution          |
| R. Add dilute sulphuric acid               |
| S. Shake the solution                      |
| <i>P Tambah asid sulfurik pekat</i>        |
| <i>Q Tambah larutan ferum (II) sulfat</i>  |
| <i>R Tambah larutan asid sulfurik asid</i> |
| <i>S Goncangkan larutan itu</i>            |

Which of the following steps is the correct sequence to carry out the test?  
*Yang manakah antara langkah-langkah berikut adalah tertib yang betul bagi menjalankan ujian itu?*

- A P, Q, R, S
- B R, Q, S, P
- C Q, R, S, P
- D P, Q, S, R



- 34 Diagram 8 shows the process to produce compound J.  
*Rajah 8 menunjukkan proses menghasilkan sebatian J.*

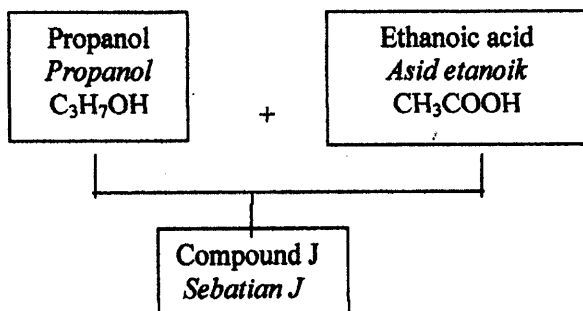


Diagram 8  
*Rajah 8*

Which of the following structural formulas is of compound J?  
*Formula struktur yang manakah mewakili sebatian J?*

- A  $CH_3 - \overset{\overset{O}{\parallel}}{C} - O - CH_2 - CH_3$
- B  $CH_3 - \overset{\overset{O}{\parallel}}{C} - O - CH_2 - CH_2 - CH_3$
- C  $CH_3 - CH_2 - \overset{\overset{O}{\parallel}}{C} - O - CH_2 - CH_3$
- D  $CH_3 - CH_2 - \overset{\overset{O}{\parallel}}{C} - O - CH_2 - CH_2 - CH_3$

- 35 Fibre glass is used to make helmet because it  
*Gentian kaca digunakan untuk membuat topi keledar kerana ia*

- A can withstand heat  
*boleh tahan haba*
- B is hard  
*adalah keras*
- C does not rust easily  
*tidak mudah berkarat*
- D is strong and light  
*kuat dan ringan*

- 36 When ethene gas is passed into an acidified potassium dichromate (VI) solution, the colour of the solution changes from orange to green.  
What is the colour change that would be observed if acidified potassium manganate (VII) is used to replace the acidified potassium dichromate (VI)?  
*Apabila gas etena dialirkan ke dalam larutan kalium dikromat (VI) berasid, warna larutan bertukar dari jingga ke hijau. Apakah perubahan warna yang diperhatikan jika larutan kalium manganate (VII) berasid digunakan menggantikan larutan berasid kalium dikromat (VI)?*
- A no colour change  
*tiada perubahan warna*
- B colourless to purple  
*tidak berwarna kepada ungu*
- C purple to colourless  
*ungu kepada tidak berwarna*
- D colourless to pink  
*tidak berwarna kepada merah jambu*
- 37 State the function of sodium perborate which is added to detergent.  
*Nyatakan fungsi natrium perborat yang ditambah ke dalam detergen.*
- A To remove protein stains  
*Untuk menanggalkan kotoran protein*
- B To convert stains into colourless substances  
*Untuk menukarkan kotoran kepada sebatian tanpa warna*
- C To enable the detergent to be poured easily  
*Untuk membolehkan detergen mudah dituangkan*
- D To control foaming in detergent  
*Untuk mengawal pembentukan buih*
- 38 Sulphuric acid is defined as a strong acid because it  
*Asid sulfurik ditakrifkan sebagai asid kuat kerana ia*
- A changes the colour of blue litmus paper to red  
*memukarkan warna biru kertas litmus kepada merah*
- B produces 2 mol of hydrogen ions when 1 mol of sulphuric acid is used  
*menghasilkan 2 mol ion hidrogen apabila 1 mol asid sulphurik digunakan*
- C can neutralise sodium hydroxide solution to form salt and water  
*boleh meneutralkan larutan natrium hidroksida untuk menghasilkan garam dan air*
- D completely ionize in water to form hydrogen ions  
*mengion sepenuhnya dalam air untuk menghasilkan ion hidrogen*
- 39 What is the oxidation number of carbon in carbon dioxide ?  
*Apakah nombor pengoksidaan karbon dalam karbon dioksida?*
- A +4
- B +1
- C +2
- D 0

- 40 Table 3 shows the chemical processes, catalysts used and products formed in the chemical industries. Which of the following is incorrectly matched?

*Jadual 3 menunjukkan proses-proses kimia, mangkin yang digunakan dan hasil tindak balas bagi industri kimia.*

	<b>Chemical Process</b> <i>Proses kimia</i>	<b>Product</b> <i>Hasil</i>	<b>Catalyst Used</b> <i>Mangkin yang digunakan</i>
A	Haber Process <i>Proses Haber</i>	Ammonia <i>Ammonia</i>	Iron <i>Besi</i>
B	Contact Process <i>Proses Sentuh</i>	Sulphuric acid <i>Asid sulfurik</i>	Vanadium(V) oxide <i>Vanadium (V) oksida</i>
C	Ostwald Process <i>Proses Ostwald</i>	Nitric acid <i>Asid nitrik</i>	Nickel <i>Nikel</i>
D	Hydrogenation of Alkene <i>Penghidrogenan Alkena</i>	Alkane <i>Alkana</i>	Platinum <i>Platinum</i>

Table 3  
Jadual 3

- 41 The following equation shows the decomposition of copper(II) carbonate when heated.  
*Persamaan kimia berikut menunjukkan penguraian kuprum(II) karbonat apabila dipanaskan.*



Calculate the mass of copper(II) carbonate left at the end of the reaction when 15g of copper (II) carbonate is heated and 8.0g of copper oxide is produced .

*Kirakan jisim kuprum(II) karbonat yang tinggal pada akhir tindak balas apabila 15 g kuprum(II) karbonat dipanaskan dan 8.0g kuprum oksida dihasilkan.*

[ Relative atomic mass : Cu ; 64 , C; 12 , O; 16 ]

[Jisim atom relatif : Cu ; 64 , C; 12, O; 16 ]

- A 12.4 g  
B 9.6 g  
C 7.0 g  
D 2.6 g
- 42 Which type of food additives does sodium benzoate belong to?  
*Natrium benzoate tergolong dalam jenis bahan tambah makanan yang mana?*
- A Preservative  
*Pengawet*  
B flavouring  
*perisa*  
C antioxidant  
*Anti oksida*  
D stabilizer  
*penstabil*

- 43 Diagram 9 shows the set up of the apparatus of a simple chemical cell. The reading on the voltmeter shows 0.0V.

*Rajah 9 menunjukkan susunan radas bagi sebuah sel kimia ringkas. Bacaan pada voltmeter adalah 0.0V*

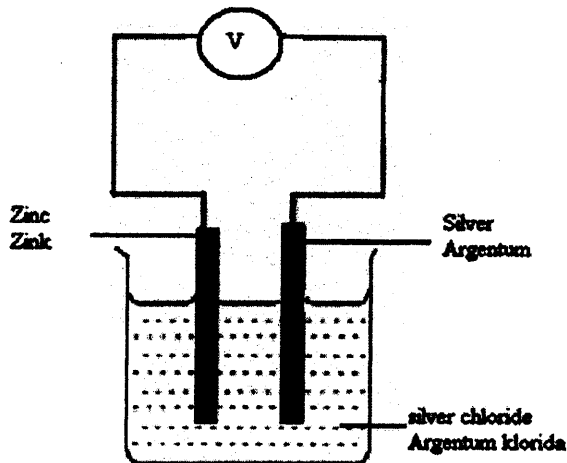


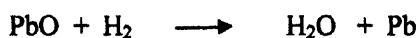
Diagram 9  
*Rajah 9*

Which is of the following steps must be taken so that the voltmeter will show a reading?  
*Yang manakah antara langkah berikut perlu diambil supaya voltmeter menunjukkan bacaan?*

- A Use silver nitrate solution to replace silver chloride as electrolyte  
*Gunakan larutan argentums nitrat untuk menggantikan argentums klorida sebagai elektrolit*
- B Insert dry cells in the circuit  
*Masukkan sel kering dalam litar*
- C Change both electrodes to carbon electrodes  
*Tukar kedua-dua elektrod kepada elektrod karbon*
- D Heat the electrolyte while taking the reading of the voltmeter  
*Panaskan elektrolit semasa mengambil bacaan voltmeter*
- 44 A patient complains to his doctor that he is always feeling anxious and depressed without any reason. What is the suitable medicine the doctor should prescribe to treat his symptom?  
*Seorang pesakit mengadu kepada doktornya yang ianya sentiasa merasa gelisah dan murung tanpa sebarang sebab. Apakah ubat yang sesuai yang boleh dipreskription oleh doktor untuk merawat gejala tersebut?*
- A clozapine  
*Klozapin*
- B aspirin  
*aspirin*
- C tranquilizer  
*Trankuiliser*
- D streptomycin  
*streptomisin*

- 45 The following methods are the most suitable ways to control rusting of iron except  
*Kaedah-kaedah berikut adalah cara yang paling sesuai untuk mengawal pengurangan besi kecuali*
- A tin-coated steel is used to make tin cans for food  
*Keluli yang diselaputi stanum digunakan untuk membuat tin makanan*
  - B using magnesium in underground pipelines  
*menggunakan magnesium untuk paip-paip bawah tanah*
  - C painting the hull of ship  
*Mengecat bahagian luar badan kapal*
  - D alloying iron with carbon, chromium and nickel to make household cutlery  
*Mengaloi besi menggunakan karbon, kromium dan nikel untuk membuat kutleri isi rumah*

- 46 The following equation shows the reaction between lead(II) oxide and hydrogen gas.  
*Persamaan kimia berikut menunjukkan tindak balas plumbum(II) oksida dan gas hydrogen.*



Which of the following statements is true about the above equation?

*Yang mana antara pernyataan berikut adalah benar tentang persamaan di atas?*

- A Hydrogen is reduced to water  
*Hidrogen diturunkan kepada air*
  - B The oxidation number of lead changes from +2 to 0  
*Nombor pengoksidaan plumbum bertukar dari +2 to 0*
  - C Hydrogen acts as the oxidising agent  
*Hidrogen bertindak sebagai agen pengoksidaan*
  - D Hydrogen is less reactive than lead  
*Hidrogen adalah kurang reaktif daripada plumbum*
- 47 Which of the following acids can produce the highest concentration of hydrogen ions when dissolve in water?  
*Yang manakah antara asid berikut boleh menghasilkan kepekatan ion hydrogen yang paling tinggi apabila larut dalam air?*
- A  $0.25 \text{ mol dm}^{-3}$  nitric acid  
 *$0.25 \text{ mol dm}^{-3}$  asid nitric*
  - B  $0.30 \text{ mol dm}^{-3}$  hydrochloric acid  
 *$0.30 \text{ mol dm}^{-3}$  asid hidroklorik*
  - C  $0.30 \text{ mol dm}^{-3}$  ethanoic acid  
 *$0.30 \text{ mol dm}^{-3}$  asid etanoik*
  - D  $0.20 \text{ mol dm}^{-3}$  sulphuric acid  
 *$0.20 \text{ mol dm}^{-3}$  asid sulfurik*

- 48 Diagram 10 shows the properties of a type of chemical cell.  
*Rajah 10 menunjukkan sifat-sifat sejenis sel kimia*

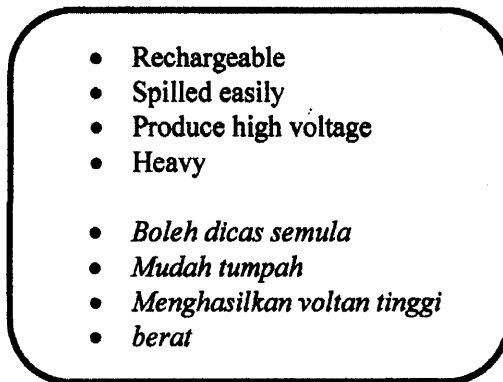


Diagram 10  
*Rajah 10*

These descriptions fit an/a  
*Deskripsi ini menepati*

- A alkaline cell  
*Sel alkali*
- B nickel-cadmium cell  
*Sel nikel kadmtum*
- C lead-acid accumulator  
*Akumulator asid plumbum*
- D mercury cell  
*Sel merkuri*
- 49 Diagram 11 shows the steps involved in the preparation of a standard solution by dilution method.  
*Rajah 11 menunjukkan langkah-langkah dalam penyediaan larutan piawai menggunakan kaedah pencairan.*

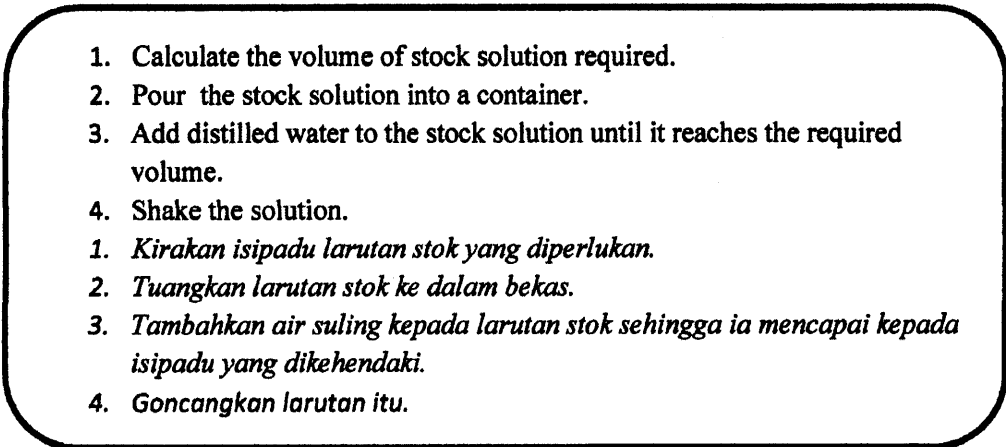


Diagram 11  
*Rajah 11*

Based on the information given , list the apparatus required to prepare the standard solution.

*Berdasarkan maklumat di atas, senaraikan radas yang diperlukan untuk menyediakan larutan piawai*

- I Beaker  
*Bikar*
- II Pipette and pipette filler  
*Pipet dan pam pipet*
- III volumetric flask and stopper  
*Kelalang volumetrik dan gabus*
- IV dropper  
*penitis*
- A II,III and IV
- B I , III and IV
- C II and III
- D I,II,III and IV

50 Table 4 shows some information of four voltaic cells labelled W,X,Y and Z.

*Jadual 4 menunjukkan sebahagian maklumat mengenai sel volta yang berlabel W,X,Y dan Z*

Cell <i>Sel</i>	Negative terminal <i>Terminal negatif</i>	Positive terminal <i>Terminal positif</i>	Voltage (V) <i>Voltan (V)</i>
W	Zinc <i>Zink</i>	Copper <i>kuprum</i>	1.1 <i>1.1</i>
X	Zinc <i>Zink</i>	Iron <i>Besi</i>	0.3 <i>0.3</i>
Y	Magnesium <i>Magnesium</i>	Zinc <i>Zink</i>	1.8 <i>1.8</i>
Z	R <i>R</i>	Iron <i>Besi</i>	0.6 <i>0.6</i>

Table 4  
*Jadual 4*

Based on this table, state the position of R in the electrochemical series.

*Berdasarkan jadual ini, nyatakan kedudukan R di dalam Siri Elektrokimia.*

- A. Between zinc and iron  
*Di antara zink dan ferum*
- B. Between magnesium and zinc  
*Di antara magnesium dan zink*
- C. Between iron and copper  
*Di antara ferum dan kuprum*
- D. Above magnesium  
*Di atas magnesium*

**END OF QUESTION PAPER**  
**KERTAS SOALAN TAMAT**

4541/2  
Chemistry  
Kertas 2  
September  
2012  
2 ½ jam

Nama

Tingkatan



MAJLIS PENGETUA SEKOLAH MALAYSIA  
CAWANGAN MELAKA

PEPERIKSAAN PERCUBAAN TINGKATAN 5  
TAHUN 2012

**CHEMISTRY**

Kertas 2

Dua jam tiga puluh minit

**JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU**

1. Kertas soalan ini mengandungi tiga bahagian: **Bahagian A, Bahagian B and Bahagian C.**
2. Jawab semua soalan dalam Bahagian A. Tulis jawapan dalam Bahagian A dalam ruangan yang disediakan..
3. Jawab satu soalan dalam Bahagian B dan satu soalan dalam Bahagian C. Jawab saoesalan dalam Bahagian B dan Bahagian C dengan terperinci. Anda boleh menggunakan persamaan kimia, rajah, jadual, graf dan kaedah yang bersesuaian untuk menerangkan jawapan anda.
4. Tunjukkan jalan kerja. Ia dapat membantu anda mendapat markah.
5. Rajah dalam soalan tidak dilukis mengikut skala.
6. Markah yang diperuntukkan bagi setiap soalan ditunjukkan dalam kurungan.
7. Anda boleh menggunakan kalkulator saintifik yang tidak diprogramkan.
8. Serahkan kertas jawapan pada akhir waktu peperiksaan.

Untuk kegunaan pemeriksa		
Bahagian	No.	Markah
A	1	
	2	
	3	
	4	
	5	
	6	
Jumlah		
B	7	
	8	
Jumlah		
C	9	
	10	
Jumlah		
<b>Jumlah Markah</b>		

Kertas soalan ini mengandungi 25 halaman bercetak

[Lihat halaman sebelah



**INFORMATION FOR CANDIDATES**  
**MAKLUMAT UNTUK CALON**

1. This question paper consists of three sections: **Section A**, **Section B** and **Section C**.  
*Kertas soalan ini mengandungi tiga bahagian: Bahagian A, Bahagian B dan Bahagian C.*
2. Answer **all** questions in Section A. Write your answers for **Section A** in the spaces provided in the question paper.  
*Jawab semua soalan dalam Bahagian A. Tuliskan jawapan bagi Bahagian A dalam ruang yang disediakan dalam kertas soalan.*
3. Answer one question from **Section B** and one question from **Section C**.  
 Write your answers for **Section B** and **Section C** on the 'writing paper' (examination pad)  
 Answer questions in **Section B** and **Section C** in detail.  
 You may use equations, diagrams, tables, graphs and other suitable methods to explain your answer.  
*Jawab satu soalan daripada Bahagian B dan satu soalan daripada Bahagian C. Tuliskan jawapan bagi Bahagian B dan Bahagian C pada kertas tulis (kertas jawapan). Jawab Bahagian B dan Bahagian C dengan terperinci. Anda boleh menggunakan persamaan, gambar rajah, jadual, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda.*
4. Show your working. It may help you to get marks.  
*Tunjukkan kerja mengira. Ini membantu anda mendapatkan markah.*
5. If you wish to change your answer, neatly cross out the answer that you have done. Then write down the new answer.  
*Sekiranya anda hendak membatalkan sesuatu jawapan, buat garisan di atas jawapan itu.*
6. The diagrams in the questions are not drawn to scale unless stated.  
*Rajah yang mengiringi soalan tidak dilukiskan mengikut skala kecuali dinyatakan.*
7. Marks allocated for each question or part question are shown in brackets.  
*Markah yang diperuntukkan bagi setiap soalan atau ceraihan soalan ditunjukkan dalam kurungan.*
8. The time suggested to answer **Section A** is 90 minutes, **Section B** is 30 minutes and **Section C** is 30 minutes.  
*Masa yang dicadangkan untuk menjawab Bahagian A ialah 90 minit, Bahagian B ialah 30 minit dan Bahagian C ialah 30 minit.*
9. You may use a non-programmable scientific calculator.  
*Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogramkan.*
10. Hand in your answer sheets at the end of the examination.  
*Serahkan semua kertas jawapan anda di akhir peperiksaan.*

**Section A**  
**Bahagian A**  
[ 60 marks ]  
[ 60 markah ]

Answer all questions in this section  
*Jawab semua soalan dalam bahagian ini.*

- 1 Diagram 1.1 shows the interconversion for the three states of matter, solid, liquid and gaseous state.  
*Rajah 1.1 menunjukkan perubahan keadaan jirim bagi tiga keadaan jirim, pepejal, cecair dan gas.*

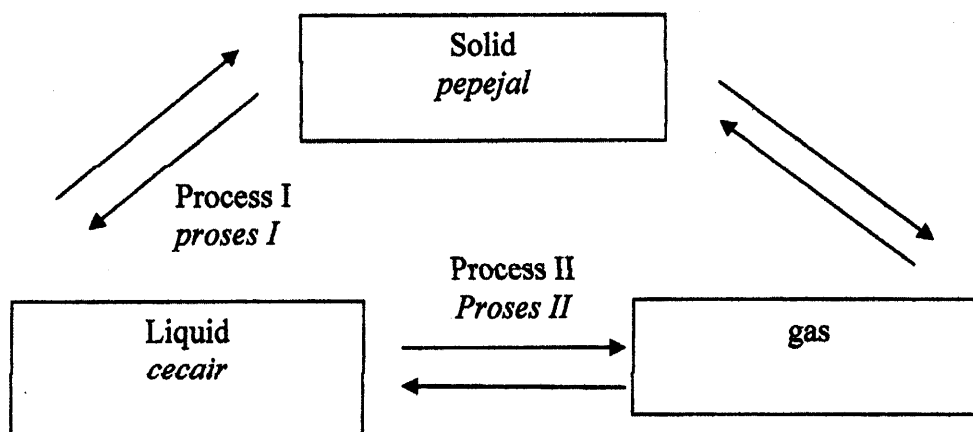


Diagram 1.1  
*Rajah 1.1*

- (a) Name process I.  
*Namakan Proses I*

.....

[1 mark]

- (b) State the changes in movement of particles in Process II.  
*Nyatakan perubahan pada pergerakan zarah-zarah dalam Proses II.*

.....

[1 mark]

- (c) What is meant by melting point.  
*Apakah maksud takat lebur?*

.....

[1 markah]

1(a)

	1
--	---

1(b)

	1
--	---

1(c)

	1
--	---

An experiment is carried out to determine the melting point of naphthalene. Solid naphthalene is put into a boiling tube and is heated using water bath. Satu eksperimen telah dijalankan untuk menentukan takat lebur naftalena. Pepejal naftalena diisi ke dalam tabung didih dan dipanaskan menggunakan kukus air.

- (d) Draw a labeled diagram to carry out this experiment in the laboratory.  
Lukis satu gambarajah berlabel untuk menjalankan eksperimen ini di makmal.

[2 marks]

1(d)

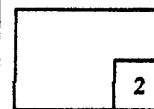


Table 1.1 below shows the result obtained by the students.

Jadual 1.1 di bawah menunjukkan keputusan yang diperolehi oleh pelajar tersebut.

Time/min Masa / min	0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5
Temperature/°C Suhu / °C	62.0	66.0	71.0	76.0	80.0	80.0	80.0	83.0	87.0	89.0

Table 1.1  
Jadual 1.1

- (e)(i) Draw a graph of temperature against time using data given in table 1.1.  
Lukis graf suhu melawan masa menggunakan data yang diberi dalam jadual 1.1.

[3 marks]

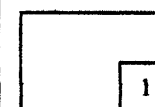
1(e)(i)



- (e)(ii) Mark on the graf the melting point of naphthalene.  
Tandakan pada rajah takat lebur bagi naftalena.

[1 mark]

1(e)(ii)



- (e)(iii) Explain why the temperature remain unchanged at  $80.0\text{ }^{\circ}\text{C}$ ?  
*Terangkan mengapa suhu kekal tidak berubah pada suhu  $80.0\text{ }^{\circ}\text{C}$ ?*

.....  
.....

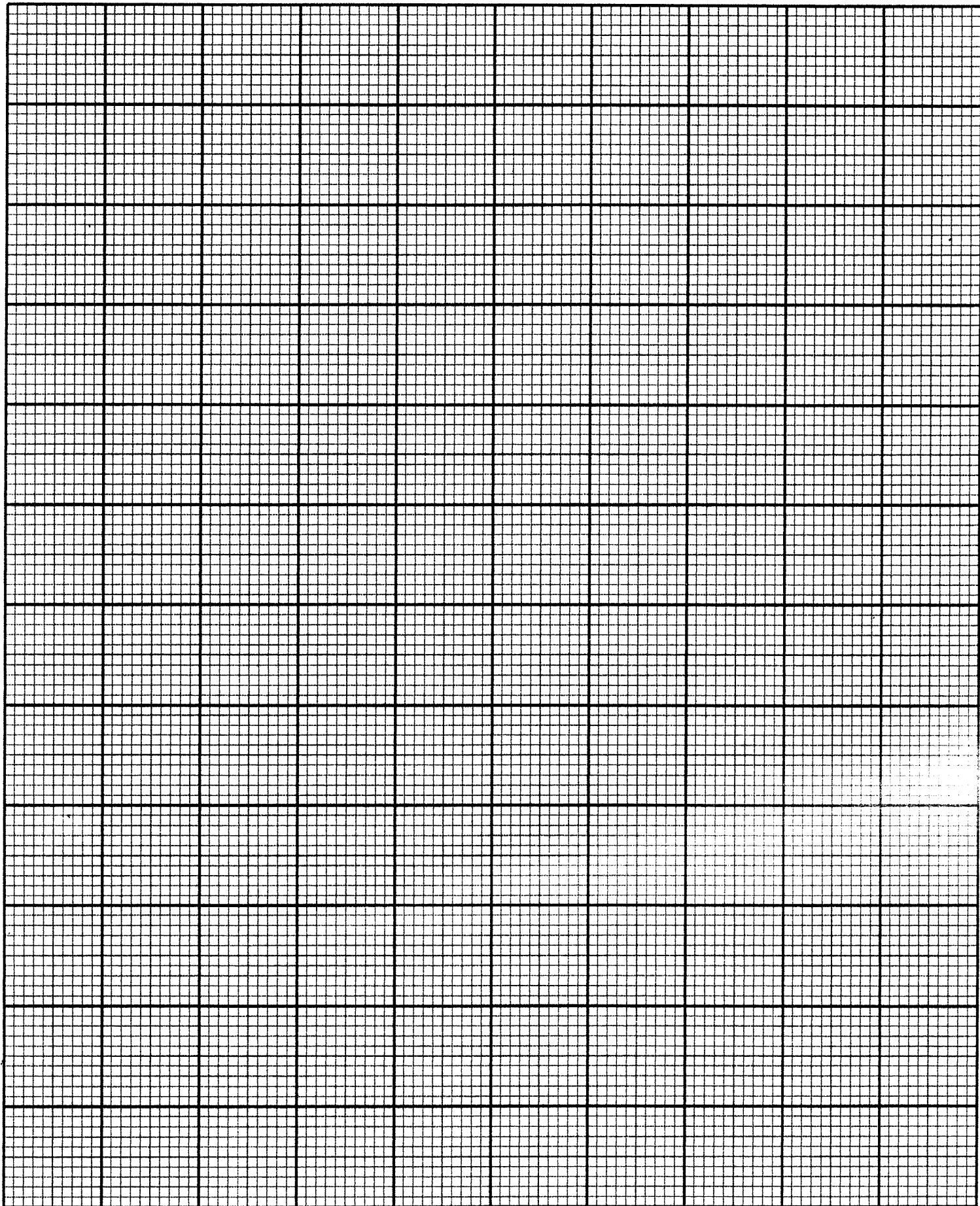
[ 1mark]

1(e)(iii)

	1
--	---

Total A1

	10
--	----



- 2 Diagram 2.1 shows an apparatus set-up to determine the empirical formula of magnesium oxide.

*Rajah 2.1 menunjukkan susunan radas untuk menentukan formula empirik magnesium oksida.*

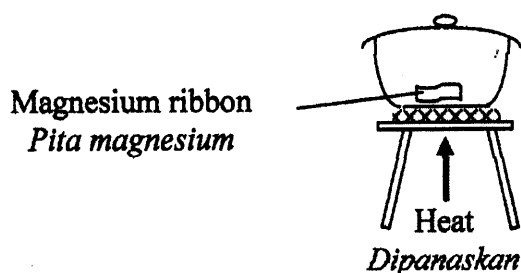


Diagram 2.1  
*Rajah 2.1*

- (a) Why is it necessary to clean the magnesium with sand paper before the weighing process?

*Mengapakah perlunya magnesium dibersihkan menggunakan kertas pasir sebelum proses menimbang?*

[1 mark]

2(a)

	1
--	---

Table 2.2 shows the results for the experiment to determine the empirical formula of magnesium oxide.

*Jadual 2.2 menunjukkan keputusan bagi satu eksperimen untuk menentukan formula empirik bagi magnesium oksida.*

Mass of crucible + lid <i>Jisim mangkuk pijar + penutup</i>	28.24 g
Mass of crucible + lid + magnesium ribbon <i>Jisim mangkuk pijar + penutup + pita magnesium</i>	30.64 g
Mass of crucible + lid + magnesium oxide <i>Jisim mangkuk pijar + penutup + magnesium oxide</i>	32.24 g

Table 2.2  
*Jadual 2.2*

- (b) Based on Table 2.2, complete Table 2.3 and determine the empirical formula of magnesium oxide.

*Berdasarkan Jadual 2.2, lengkapkan Jadual 2.3 dan seterusnya tentukan formula empirik bagi magnesium oksida:*

[Relative atomic mass: O = 16, Mg = 24]

[Jisim atom relatif: O = 16, Mg = 24]

Element <i>Unsur</i>	Mg	O
Mass (g) <i>Jisim</i>		
Number of moles <i>Bilangan mol</i>		
Simplest ratio of moles <i>Nisbah ringkas bilangan mol</i>		
Empirical formula <i>Formula empiric</i>		

Table 2.3  
*Jadual 2.3*

[4 marks]

- (c) What must be done to ensure that the reaction has completed?

*Apakah yang perlu dilakukan untuk memastikan tindak balas telah lengkap?*

.....

[1 mark]

- (d) Write the chemical equation for the reaction in the experiment.

*Tuliskan persamaan kimia bagi tindak balas dalam eksperimen itu.*

.....

[2marks]

- (e) Can the empirical formula of copper (II) oxide be determined using this same method? Give the reason why.

*Bolehkah formula empirik bagi kuprum(II) oksida ditentukan menggunakan cara yang sama? Berikan alasannya .*

.....

[2marks]

2(b)

	4
--	---

2(c)

	1
--	---

2(d)

	2
--	---

2(e)

	2
--	---

Total A2

	10
--	----

3 Diagram 3.1 shows the set-up of apparatus of an electrolytic cell. In beaker A, energy is changed from chemical energy to electrical energy.

Rajah 3.1 menunjukkan susunan radas bagi sel elektrolisis. Perubahan tenaga yang berlaku dalam bikar A ialah dari tenaga kimia kepada tenaga elektrik.

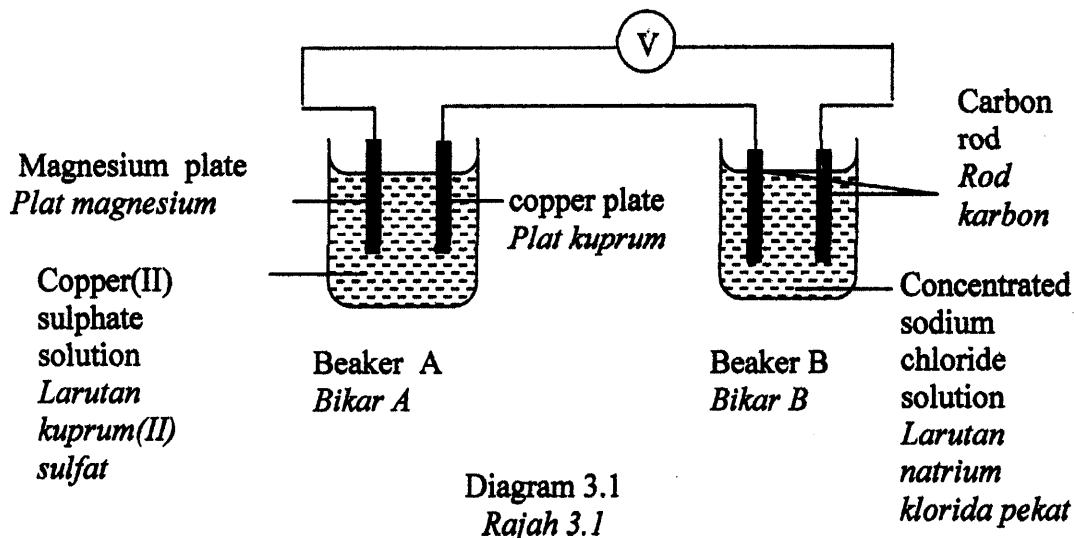


Diagram 3.1  
Rajah 3.1

(a) Name all the anions present in the solution in beaker B.  
Namakan semua anion yang hadir dalam larutan di bikar B.

.....  
[1 mark]

3(a)

	1
--	---

(b) (i) What is the expected observation at anode and cathode in beaker B ?  
Apakah pemerhatian yang dijangkakan pada anod dan katod di bikar B?

.....  
.....  
[2 marks]

3(b)(i)

	2
--	---

(ii) Explain your answer in (b) (i)  
Jelaskan jawapan anda dalam (b) (i)

.....  
.....  
[2 marks]

3(b)(ii)

	2
--	---

(c) (i) What is the product formed at the cathode in beaker A?  
Apakah hasil yang terbentuk di katod dalam bikar A?

.....  
[1 mark]

3(c)(i)

	1
--	---



- (ii) Write the half equation for the reaction that occurs at the cathode.  
*Tulis setengah persamaan bagi tindakbalas yang berlaku di katod.*

.....

[1 mark]

3(c)(ii)

	1
--	---

- (d) (i) Name the type of reaction that occurs at the anode in beaker B.  
*Namakan jenis tindakbalas yang berlaku di anod dalam bikar B.*

.....

[1 mark]

3(d)(i)

	1
--	---

- (ii) If the copper plate is replaced by a zinc plate, describe what will happen to the voltmeter reading. Explain your answer.  
*Jika plat kuprum diganti dengan plat zink, nyatakan apa yang berlaku pada bacaan voltmeter. Jelaskan jawapan anda.*

.....

.....

[2 marks]

3(d)(ii)

	2
--	---

Total A3

	10
--	----

- 4 Diagram 4.1 shows the apparatus set-up for the titration of  $25.0 \text{ cm}^3$  of  $0.5 \text{ moldm}^{-3}$  sodium hydroxide, NaOH solution with dilute sulphuric acid,  $\text{H}_2\text{SO}_4$ , using phenolphthalein as an indicator.

Rajah 4.1 menunjukkan susunan radas bagi penitratan antara  $25.0 \text{ cm}^3$  larutan natrium hidroksida, NaOH  $0.5 \text{ moldm}^{-3}$  dengan asid sulfurik cair,  $\text{H}_2\text{SO}_4$ , menggunakan fenolftalein sebagai penunjuk.

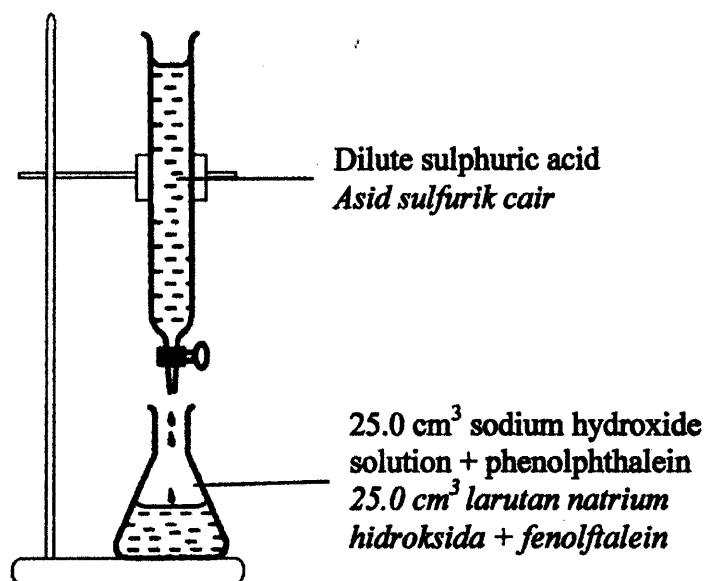


Diagram 4.1  
Rajah 4.1

- (a) (i) Name the type of reaction that occurs in the conical flask.  
*Namakan jenis tindak balas yang berlaku dalam kelalang kon itu.*

.....  
[1 mark]

4(a)(i)

	1
--	---

- (ii) Write a balanced chemical equation for the reaction in 4(a)(i).  
*Tulis persamaan kimia yang seimbang bagi tindak balas dalam 4(a)(i)*

.....  
[2 marks]

4(a)(ii)

	2
--	---

- (iii) State the colour change of the solution in the conical flask when the end point of titration is reached.  
*Nyatakan perubahan warna bagi larutan dalam kelalang kon itu apabila takat akhir pentitratan dicapai.*

.....  
[1 mark]

4(a)(iii)

	1
--	---

- (iv)  $20.0 \text{ cm}^3$  of sulphuric acid is needed to neutralize completely the sodium hydroxide solution in the conical flask.  
Calculate the molarity of the sulphuric acid.  
 *$20.0 \text{ cm}^3$  asid sulfurik diperlukan untuk meneutralkan dengan lengkap larutan natrium hidroksida dalam kelalang kon itu.  
Hitung kemolaran asid sulfurik itu.*

4(a)(iv)

	2
--	---

[2 marks]

- (b) Table 4.1 shows the pH value of a few solutions.  
*Jadual 4.1 menunjukkan nilai pH beberapa larutan.*

Solution <i>Larutan</i>	pH value <i>Nilai pH</i>
P	1
Q	14
R	5
S	11

Table 4.1  
*Jadual 4.1*

Based on Table 4.1, predict which solution is  
*Berdasarkan Jadual 4.1, ramalkan yang manakah larutan*

- (i)  $0.1 \text{ mol dm}^{-3}$  of hydrochloric acid?  
*Asid hidroklorik  $0.1 \text{ mol dm}^{-3}$ ?*

.....

[1 mark]

4(b)(i)

	1
--	---

- (ii)  $0.1 \text{ mol dm}^{-3}$  of ethanoic acid?  
*Asid etanoik  $0.1 \text{ mol dm}^{-3}$ ?*

.....

[1 mark]

4(b)(ii)

	1
--	---

- (iii) has the highest concentration of hydroxide ion?  
*mempunyai kepekatan ion hidroksida yang paling tinggi?*

.....  
 [1 mark]

4(b)(iii)

	1
--	---

- (c) Which solution will produce carbon dioxide gas when calcium carbonate powder is added?  
*Larutan manakah akan menghasilkan gas karbon dioksida apabila ditambah serbuk kalsium karbonat?*

.....  
 [1 mark]

4(c)

	1
--	---

Total A4

	10
--	----

5

Table 5.1 shows the results of the experiments carried out by a group of students in the laboratory to collect 50 cm<sup>3</sup> hydrogen gas .

*Jadual 5.1 menunjukkan keputusan eksperimen yang dijalankan oleh sekumpulan pelajar di dalam makmal untuk mengumpulkan 50 cm<sup>3</sup> gas hidrogen*

Experiment <i>Eksperimen</i>	Reactants <i>Bahan Tindak balas</i>	Time/s <i>Masa/s</i>
I	50 cm <sup>3</sup> of 1 moldm <sup>-3</sup> sulphuric acid + 1 g granulated zinc <i>50 cm<sup>3</sup> 1 moldm<sup>-3</sup> asid sulfurik + 1 g ketulan zink</i>	40
II	50 cm <sup>3</sup> of 1 moldm <sup>-3</sup> sulphuric acid + 1 g powdered zinc <i>50 cm<sup>3</sup> 1 moldm<sup>-3</sup> asid sulfurik + 1 g serbuk zink</i>	26

Table 5.1  
*Jadual 5.1*

Based on the table,  
*Berdasarkan jadual ini,*

- (a) Write the ionic equation for the reaction in experiment I.  
*Tuliskan persamaan ion bagi tindak balas dalam eksperimen I.*

.....  
 [1 mark]

5(a)

	1
--	---

(b) Calculate the average rate of reaction for both experiments.  
*Kirakan kadar tindak balas purata bagi kedua-dua eksperimen.*

(i) Experiment I  
*Eksperimen I*

(ii) Experiment II  
*Eksperimen II*

[2 marks]

5(b)(i)(ii)

	2
--	---

(c) (i) Compare the rate of reactions for Experiment I and Experiment II.  
*Bandingkan kadar tindak balas bagi Eksperimen I dan Eksperimen II.*

[ 1mark]

5(c)(i)

	1
--	---

(ii) Using the collision theory, explain your answer in (c)(i)  
*Dengan menggunakan teori perlanggaran, terangkan jawapan di (c)(i)*

[3marks]

5(c)(ii)

	3
--	---

(d) The graph of hydrogen gas against time for Experiment I is as shown in the diagram below.

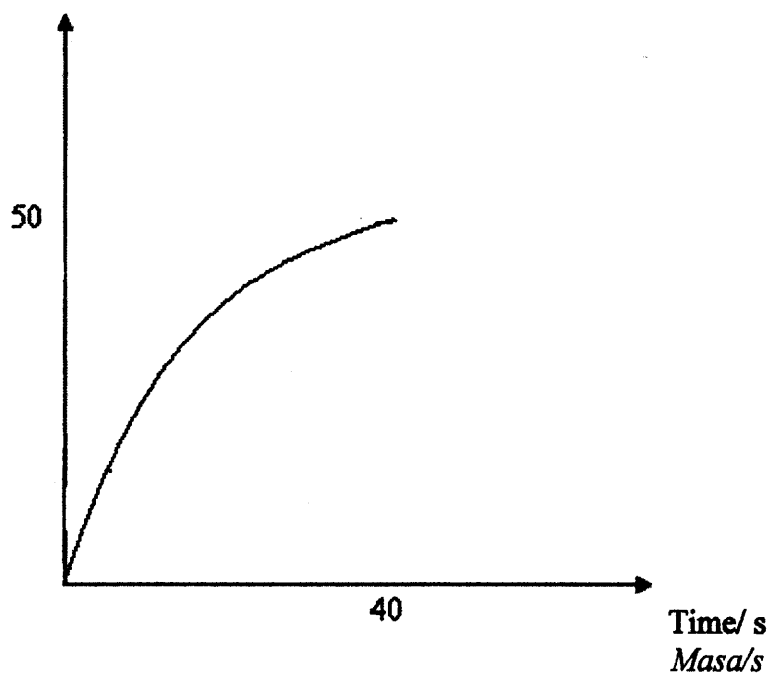
Sketch the curve that you would obtain for Experiment II in this graph.

*Graf gas hidrogen melawan masa untuk Eksperimen I adalah ditunjukkan di rajah di bawah.*

*Lakarkan lengkung yang akan didapati bagi Eksperimen II pada graf ini*

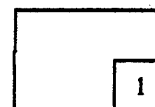
Volume of gas/cm<sup>3</sup>

*Isipadu gas/ cm<sup>3</sup>*



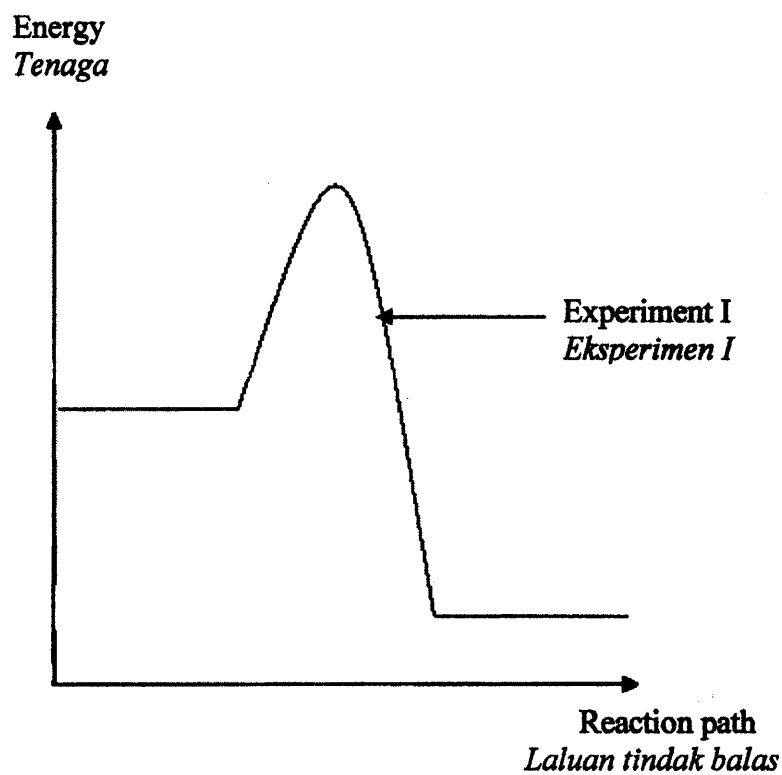
5(d)

[1 mark]



- (e) The rate of reaction for experiment I can be increased by adding  $5\text{cm}^3$  of  $1\text{mol dm}^{-3}$  copper sulphate solution into the acid. Complete the energy profile diagram and draw the activation energy for this increased rate of reaction.

*Kadar tindak balas bagi eksperimen I boleh ditingkatkan dengan menambah  $5\text{cm}^3$   $1\text{mol dm}^{-3}$  larutan kuprum(II) sulfat ke dalam asid. Lengkapkan gambar rajah profil tenaga ini dan lukiskan tenaga pengaktifan bagi kadar tindak balas yang ditingkatkan ini.*



[2 marks]

5(e)

	2
--	---

Total A5

	10
--	----

- 6 An experiment is carried out to determine the heat of combustion for ethanol,  $C_2H_5OH$ . Table below shows the result obtained when  $200\text{ cm}^3$  of water in a copper can is heated using ethanol lamp.

[ Relative atomic mass : C; 12, O; 16, H;1 ]

Satu eksperimen telah dijalankan untuk menentukan haba pembakaran etanol,  $C_2H_5OH$ . Jadual di bawah menunjukkan keputusan yang diperolehi apabila  $200\text{ cm}^3$  air yang diisi di dalam sebuah bekas kuprum dipanaskan menggunakan pelita berisi etanol.

[Jisim atom relatif : C;12 , O;16 , H;1 ]

Initial temperature of water / °C <i>Suhu awal air °C</i>	29.0
Highest temperature of water / °C <i>Suhu tertinggi air / °C</i>	61.0
Mass of ethanol used / g <i>Jisim etanol yang digunakan / g</i>	0.92
Heat specific of water <i>Muatan haba tentu air</i>	$4.2\text{ Jg}^{-1}\text{ }^\circ\text{C}^{-1}$

- (a) Draw a labeled diagram to show how this experiment can be carried out in the laboratory.

*Lukis sebuah gambarajah berlabel untuk menunjukkan bagaimana eksperimen ini dapat dijalankan di dalam makmal*

6(a)

[2 markah]

	2
--	---

- (b) (i) Calculate  
(i) heat given out in the experiment.

*Hitung*

*(i) haba yang dibebaskan dalam eksperimen tersebut.*

6(b)(i)

[1 mark]

	1
--	---



- (ii) No of mol of ethanol used  
*Bilangan mol etanol yang digunakan*

[1 mark] 6(b)(ii)

	1
--	---

- (c) Calculate heat of combustion for ethanol.  
*Hitung haba pembakaran etanol.*

[2marks] 6(c)

	2
--	---

- (d) Write the chemical equation when ethanol is burnt completely in oxygen.  
*Tuliskan persamaan kimia apabila etanol terbakar lengkap dalam oksigen.*

.....  
 [2 marks] 6(d)

	2
--	---

- (e) Draw the energy level diagram for heat of combustion of ethanol.  
*Lukis gambarajah aras tenaga bagi haba pembakaran etanol.*

[2 marks] 6(e)

	2
--	---

Total A6

	10
--	----

**Section B**  
[20 marks]

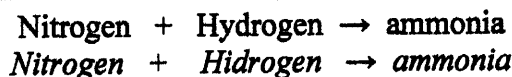
Answer any **one** question.

The time suggested to answer this section is 30 minutes.

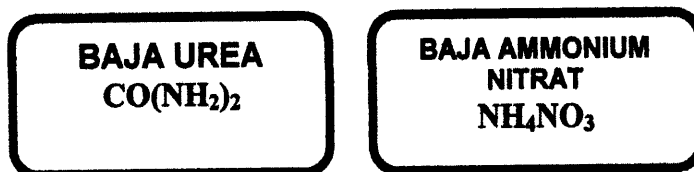
*Jawab salah satu soalan*

*Masa 30 minit dicadangkan untuk menjawab bahagian ini*

- 7 Equation below shows the reaction for the industrial production of ammonia.  
*Persamaan di bawah menunjukkan tindakbalas penghasilan ammonia dalam industri.*



- (a) (i) Name the industrial process of producing ammonia.  
*Namakan proses industri bagi penghasilan ammonia.* [1 mark]
- (ii) Write the chemical equation in (a)(i).  
*Tuliskan persamaan kimia dalam (a)(i).* [2 marks]
- (b) State three conditions needed for the reaction to occur.  
*Nyatakan tiga keadaan yang diperlukan untuk membolehkan tindakbalas itu berlaku.* [3 marks]
- (c) Ammonia is used to prepare ammonium nitrate, a chemical fertilizer.  
Describe briefly how you can prepare ammonium nitrate in the laboratory. You are required to write the chemical equation involved.  
*Ammonia digunakan untuk menghasilkan ammonium nitrat iaitu sejenis baja kimia.*  
*Huraikan dengan ringkas bagaimana anda dapat menyediakan ammonium nitrat di dalam makmal. Dalam jawapan anda sertakan persamaan kimia yang terlibat.* [7 marks]
- (d) Diagram shows two type of fertilizer in the market.  
*Rajah menunjukkan dua jenis baja yang terdapat di pasaran.*



State which fertilizer is best used to increase the yield. Give a reason to your answer.

*Nyatakan baja yang paling sesuai digunakan bagi meningkatkan hasil tanaman. Beri sebab kepada jawapan anda.*

*[relative atomic mass: C, 12 ; O, 16 ; N, 14 ; H, 1 ]*

[4 marks]

- (e) Carry out a test to verify the presence of nitrate ions in a solution.  
*Jalankan satu ujian makmal untuk mengesahkan kehadiran ion nitrat dalam suatu larutan.*

- 8 Diagram 8.1 shows part of the Periodic Table of the Elements.  
Rajah 8.1 menunjukkan sebahagian Jadual Berkala Unsur

1								18
	2			13	14	15	16	17
					A		B	C
D				E				F
		G						H

Diagram 8.1

Rajah 8.1

A, B, C, D, E, F, G and H are not the actual symbols of the elements.  
A, B, C, D, E, F, G dan H bukan simbol sebenar bagi unsur.

Based on diagram 8.1,  
Berdasarkan rajah 8.1,

- (a) (i) Write the electron arrangement for atoms A, D and F.  
*Tulis susunan elektron bagi atom-atom A, D dan F.* [3 marks]
- (ii) Element F will form two different types of compounds when it reacts with element A and D respectively.  
Describe the bond formations in these two compounds.  
*Unsur F akan membentuk dua jenis sebatian yang berbeza apabila ia bertindak balas secara berasingan dengan unsur A dan unsur D.*  
*Huraikan pembentukan ikatan yang terhasil dalam sebatian-sebatian ini.* [12 marks]
- (b) (i) State a transition element.  
*Nyatakan satu unsur peralihan.* [1 mark]
- (ii) List two special characteristics of transition elements and give an example for each of this property.  
*Senaraikan dua ciri istimewa unsur peralihan dan beri satu contoh bagi setiap ciri tersebut.* [4 marks]

**Section C**  
[20 marks]

*Answer any one question.*

*The time suggested to answer this section is 30 minutes*

*Jawab salah satu soalan*

*Masa 30 minit dicadangkan untuk menjawab bahagian ini*

9

The information below is about organic compound Q.

*Maklumat berikut adalah berkaitan dengan sebatian organik Q.*

Composition by mass:  
*Komposisi mengikut jisim:*

Carbon : 60 %  
*Karbon*

Hydrogen : 13.33 %  
*hidrogen*

Oxygen : 26.67 %  
*Oksigen*

[Relative molecular mass ,60]  
*[jisim molekul Relatif, 60]*

- (a) Based on information given,  
*Berdasarkan maklumat yang diberi,*
- Determine the molecular formula for compound Q  
*Tentukan formula molekul sebatian Q*
  - name the compound Q  
*namakan sebatian Q*
  - draw the structural formula for compound Q.  
*Lukiskan formula struktur sebatian Q*

[relative atomis mass: C, 12 ; H, 1 ; O,16]  
*[Jisim atom relatif: C, 12 ; H, 1 ; O, 16 ]*

[6 marks]

- (b) Hexane and hexene burnt completely in excess oxygen to produce carbon dioxide and water. Compare the sootiness of the flame produced during the reaction. Explain your answer.  
*Heksana dan heksena terbakar lengkap dalam oksigen untuk menghasilkan karbon dioksida dan air. Bandingkan kejelagaan nyalaan yang terhasil semasa tindak balas ini.*  
*Terangkan jawapan anda.*

[4 marks]

Statement below shows the characteristics of vulcanised rubber.

*Pernyataan di bawah menunjukkan sifat-sifat getah tervulkan..*

**The use of natural rubber is further extended by combining natural rubber with sulphur to produce vulcanised rubber which is more elastic and tougher.**

***Penggunaan getah asli diperluaskan dengan menggabungkan getah asli dengan sulfur untuk menghasilkan getah tervulkan yang lebih elastik dan lebih kuat***

- (c) Based on above statement, describe an experiment to compare the elasticity of natural rubber compared to vulcanized rubber. Your answer should include;  
*Berdasarkan pernyataan di atas, huraikan satu eksperimen untuk membandingkan kekenyalan getah asli berbanding getah tervulkan. Jawapan anda mestilah mengandungi:*
- (i) Labeled diagram  
*Gambarajah berlabel*
  - (ii) Procedure of the experiment  
*Prosedur eksperimen*
  - (iii) Result of the experiment  
*Keputusan eksperimen*

[10 marks]

- 10 Diagram 10.1 shows three test tubes, each containing a mixture of a certain halogen and halide solutions in 1,1,1- trichloroethane in an experiment to investigate the displacement of halogen from its halide solution.

Rajah 10.1 menunjukkan tiga tabung uji, masing-masing mengandungi campuran sesuatu halogen dan larutan halida dalam 1,1,1-trikloroetana untuk menjalankan eksperimen mengkaji penyesaran halogen daripada larutan halidanya.

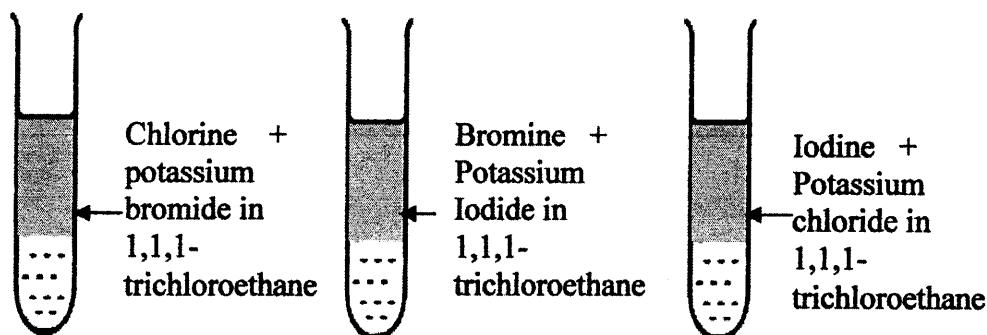


Diagram 10.1  
Rajah 10.1

- (a) The observations for the experiments are recorded in table 10.2.  
Pemerhatian bagi eksperimen-eksperimen itu dicatatkan dalam jadual 10.2

Experiment <i>Experimen</i>	Mixture <i>Campuran</i>	Observation in the 1,1,1- trichloroethane layer <i>Pemerhatian dalam lapisan 1,1,1-trikloroetana</i>
I	Chlorine and potassium bromide <i>Klorin dan larutan kalium bromida</i>	Brown colour <i>Warna perang</i>
II	Bromine and potassium iodide <i>Bromin dan larutan kalium iodida</i>	Purple colour <i>Warna ungu</i>
III	Iodine and potassium chloride <i>Iodine dan kalium klorida</i>	Purple colour <i>Warna ungu</i>

Table 10.2  
Jadual 10.2

- (i) Based on table 10.2, explain the observation obtained for each of the experiment. Write the chemical equations for the reactions that take place.  
Berdasarkan jadual 10.2, terangkan pemerhatian yang didapati bagi setiap eksperimen tersebut.  
Tuliskan persamaan kimia bagi tindak balas yang berlaku.

[6 marks]

- (ii) Arrange the halogen in the descending order of strength as the oxidising agent and the halide ions in the descending order of strength as the reducing agent.  
*Susunkan halogen mengikut tertib menurun kekuatannya sebagai agen pengoksidaan manakala ion halida disusun mengikut tertib berkurang kekuatannya sebagai agen penurunan.*

[2 marks]

- (b) Diagram 10.3 shows the apparatus set-up of an experiment to investigate the transfer of electrons at a distance.

*Rajah 10.3 menunjukkan susunan radas eksperimen untuk mengkaji pemindahan elektron pada suatu jarak*

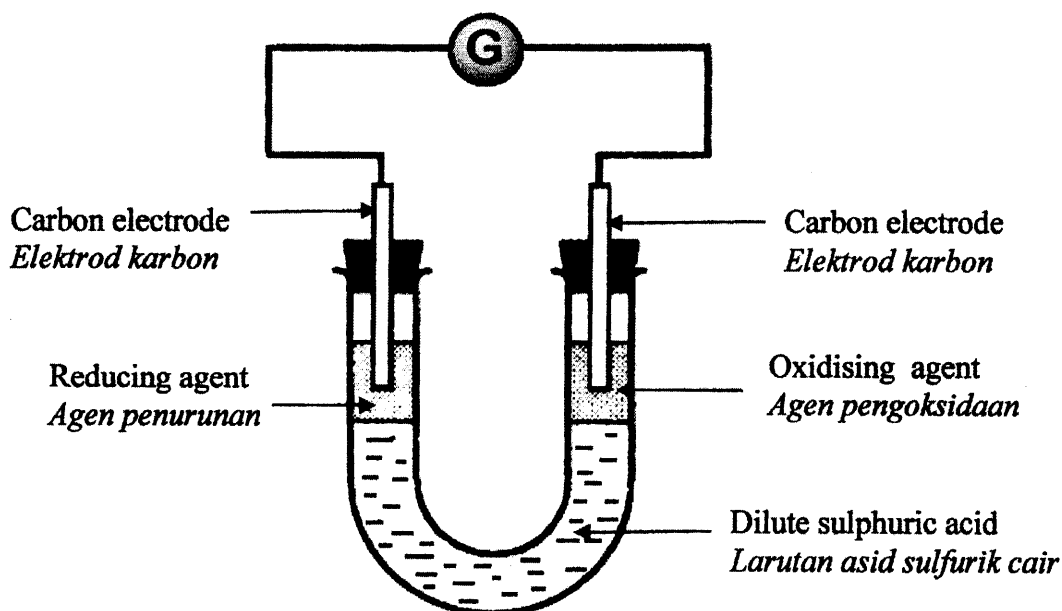


Diagram 10.3  
*Rajah 10.3*

By referring to the set up of the apparatus, describe the method to carry out the experiment. Include in your descriptions, the names of the suitable substances to be used as the oxidising agent and reducing agent, the procedures, the observation, and the oxidation and reduction half – equations.

*Dengan merujuk kepada susunan radas di atas, huraikan kaedah untuk menjalankan eksperimen ini. Masukkan dalam huraian anda, nama bahan yang sesuai untuk digunakan sebagai agen pengoksidaan dan agen penurunan, langkah-langkah dan pemerhatian eksperimen serta setengah persamaan pengoksidaan dan setengah persamaan penurunan.*

[12 marks]

**END OF QUESTION PAPER**  
**KERTAS SOALAN TAMAT**

# PERIODIC TABLE OF ELEMENTS

18

1 H Hydrogen 1																	2 He Helium 4				
3 Li Lithium 7																	9 F Fluorine 19				
4 Be Beryllium 9																	8 O Oxygen 16				
11 Na Sodium 23																	17 Cl Chlorine 35.5				
12 Mg Magnesium 24																	16 S Sulfur 32				
13 B Boron 11	14 C Carbon 12	15 N Nitrogen 14	16 O Oxygen 16	17 F Fluorine 19	18 Ne Neon 20																
19 K Potassium 39	20 Ca Calcium 40	21 Sc Scandium 45	22 Ti Titanium 48	23 V Vanadium 51	24 Cr Chromium 52	25 Mn Manganese 55	26 Fe Iron 56	27 Co Cobalt 59	28 Ni Nickel 59	29 Cu Copper 64	30 Zn Zinc 65	31 Ga Gallium 70	32 Ge Germanium 73	33 As Arsenic 75	34 Se Selenium 79	35 Br Bromine 80	36 Kr Krypton 84				
37 Rb Rubidium 85.5	38 Sr Strontium 88	39 Y Yttrium 89	40 Zr Zirconium 91	41 Nb Niobium 93	42 Mo Molybdenum 96	43 Tc Technetium 98	44 Ru Ruthenium 101	45 Rh Rhodium 103	46 Pd Palladium 106	47 Ag Silver 108	48 Cd Cadmium 112	49 In Indium 115	50 Sn Tin 119	51 Sb Antimony 122	52 Te Tellurium 128	53 I Iodine 127	54 Xe Xenon 131				
55 Cs Cesium 144	56 Ba Barium 137	57 La Lanthanum 139	72 Hf Hafnium 178.5	73 Ta Tantalum 181	74 W Tungsten 184	75 Re Rhenium 186	76 Os Osmium 190	77 Ir Iridium 192	78 Pt Platinum 195	79 Au Gold 197	80 Hg Mercury 201	81 Tl Thallium 204	82 Pb Lead 207	83 Bi Bismuth 209	84 Po Polonium 210	85 At Astatine 210	86 Rn Radon 222				
87 Fr Francium 223	88 Ra Radium 226	89 Ac Actinium 227	104* *Unq	105* *Unp	106* *Unh	107* *Uns	108* *Uno	109* *Une													

11 Na Sodium 23
--------------------------

← Proton Number  
 ← Symbol of Elements  
 ← Name of the element  
 ← Relative atomic mass

\* - Not exist naturally  
 \* - elements not yet discovered

58 Ce Cerium 140	59 Pr Praseodymium 141	60 Nd Neodymium 144	61* Pm Promethium 147	62 Sm Samarium 150	63 Eu Europium 152	64 Gd Gadolinium 157	65 Tb Terbium 159	66 Dy Dysprosium 162.5	67 Ho Holmium 165	68 Er Erbium 167	69 Tm Thulium 169	70 Yb Ytterbium 173	71 Lu Lutetium 175
90 Th Thorium 232	91 Pa Protactinium 231	92 U Uranium 238	93* Np Neptunium 237	94* Pu Plutonium 242	95* Am Americium 243	96* Cm Curium 247	97* Bk Berkelium 247	98* Cf Californium 251	99* Es Einsteinium 254	100* Fm Fermium 253	101* Md Mendelevium 256	102* No Nobelium 254	103* Lr Lawrencium 260

Lanthanide Series

Actinide Series



4541/3  
Chemistry  
Kertas 3  
September  
2012  
1 ½ jam



Nama

Tingkatan

**MAJLIS PENGETUA SEKOLAH MALAYSIA  
CAWANGAN MELAKA**

**PEPERIKSAAN PERCUBAAN TINGKATAN LIMA**

**TAHUN 2012**

**CHEMISTRY**

**Kertas 3**

**Satu jam tiga puluh minit**

**JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU**

1. *Tuliskan nama dan tingkatan pada ruang yang disediakan.*
2. *Kertas soalan ini adalah dalam dwi bahasa.*
3. *Calon hendaklah membaca arahan pada halaman 2.*

Untuk kegunaan pemeriksa sahaja		
Soalan	Markah Penuh	Markah diperolehi
1	21	
2	12	
3	17	
Jumlah	50	

**Kertas soalan ini mengandungi 10 halaman bercetak**

**INFORMATION FOR CANDIDATES**

1. This question paper consists of three questions. Answer all questions.  
*Kertas soalan ini mengandungi tiga soalan. Jawab semua soalan.*
2. Write your answer for Question 1 and 2 in the spaces provided in the question paper.  
*Tulis jawapan anda bagi Soalan 1 dan 2 pada ruang yang disediakan dalam kertas soalan ini.*
3. Write your answers for Question 3 on the writing paper provided by the invigilators.  
*Tulis jawapan anda bagi Soalan 3 pada kertas tulis yang disediakan.*
4. You may use equations, diagrams, tables, graph and other suitable methods to explain your answer.  
*Anda boleh menggunakan persamaan, rajah, jadual, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda.*
5. Show your working, it may help you to get marks.  
*Tunjukkan kerja mengira, ini membantu anda mendapatkan markah.*
6. If you wish to change your answer, cross out the answer that you have done. Then write down the new answer.  
*Jika anda hendak menukar jawapan, batalkan jawapan yang telah dibuat. Kemudian tulis jawapan yang baru.*
7. Marks allocated for each question or part question are shown in brackets.  
*Markah yang diperuntukkan bagi setiap soalan atau ceraihan soalan ditunjukkan dalam kurungan.*
8. The time suggested to answer each of the questions is 30 minutes.  
*Masa yang dicadangkan untuk menjawab setiap soalan ialah 30 minit.*
9. You may use a non-programmable scientific calculator.  
*Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.*
10. Hand in your answer sheets at the end of the examination.  
*Serahkan kertas jawapan anda di akhir peperiksaan*

Answer all question  
Jawab semua soalan

- 1 Diagram 1.1 shows the apparatus set-up used to investigate the electrical conductivity of four compounds Q, R, S and T in their molten state.

Rajah 1.1 menunjukkan susunan radas yang digunakan untuk mengkaji kekonduksian elektrik empat sebatian, Q, R, S dan T dalam keadaan leburan.

For  
Examiner's  
Use

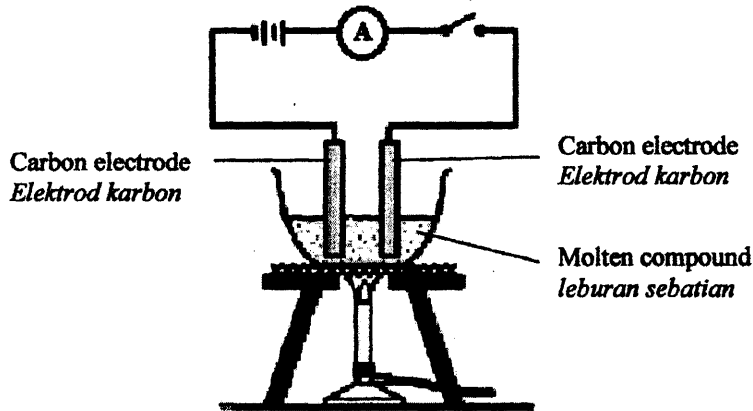


Diagram 1.1  
Rajah 1.1

Diagram 1.2 and 1.3 shows the readings of the ammeter when the switch is turned on.

Rajah 1.2 dan 1.3 menunjukkan bacaan ammeter apabila suis dihidupkan.

Compound Sebatian	Ammeter reading Bacaan ammeter
Q	<p>The diagram shows an ammeter scale with markings at 0, 0.2, 0.4, 0.6, 0.8, and 1.0. The needle is positioned exactly on the 0.2 mark.</p>

Diagram 1.2  
Rajah 1.2

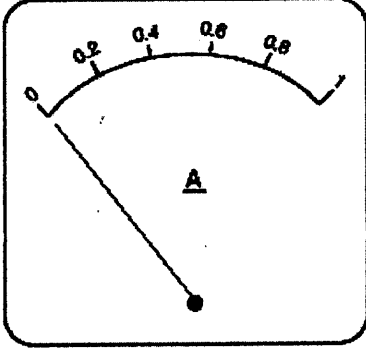
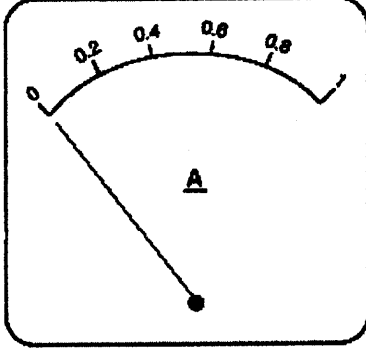
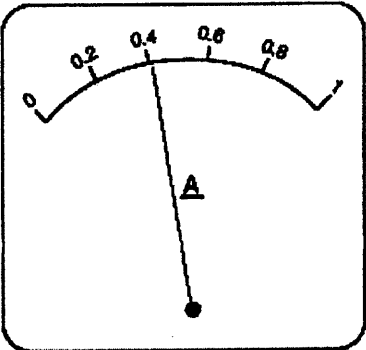
Compound Sebatian	Ammeter reading Bacaan ammeter
R	
S	
T	

Diagram 1.3  
Rajah 1.3

- (a) Construct a table to record the ammeter readings for all the compounds used in this experiment.

*Bina satu jadual untuk merekodkan bacaan ammeter bagi semua sebatian yang digunakan dalam eksperimen ini.*

[3 marks]

1(a)

3

- (b) Based on observation from Diagram 1.2 and 1.3, state the inference.

*Berdasarkan pemerhatian daripada Rajah 1.2 dan 1.3, nyatakan inferens.*

.....

.....

[3 marks]

1(b)

3

- (c) Classify compound Q, R, S and T into ionic compound and covalent compound.

*Kelaskan sebatian Q, R, S and T kepada sebatian ion dan sebatian kovalen.*

Ionic compound <i>Sebatian ion</i>	Covalent compound <i>Sebatian kovalen</i>

[3 marks]

1(c)

3

(d) In this experiment, predict which compounds have high melting and boiling points.

*Dalam eksperimen ini, ramalkan sebatian manakah yang mempunyai takat lebur dan takat didih yang tinggi.*

.....  
 [3 marks]

For  
Examiner's  
Use

1(d)

3	
---	--

(e) For this experiment, state the:  
*Bagi eksperimen ini, nyatakan:*

(i) Manipulated variable:  
*Pembolehubah dimanipulasikan:*

.....

(ii) Responding variable:  
*Pembolehubah bergerak balas:*

.....

(iii) Constant variable:  
*Pembolehubah dimalarkan:*

.....

[3 marks]

1(e)

3	
---	--

(f) State one hypothesis for this experiment.  
*Nyatakan satu hipotesis bagi eksperimen ini.*

.....  
 .....

[3 marks]

1(f)

3	
---	--

(g) State the operational definition for ionic compound in this experiment.  
*Nyatakan definisi secara operasi bagi sebatian ionik dalam eksperimen ini.*

.....  
 .....

[3 marks]

1(g)

3	
---	--

- 2 An experiment was carried out to construct an electrochemical series of metals. Diagram 2.1 shows the apparatus set-up to measure the potential difference between copper and metal M. The experiment was repeated by replacing metal M with metal K and L.

For  
Examiner's  
Use

Satu eksperimen telah dijalankan untuk membina siri elektrokimia bagi logam. Rajah 2.1 menunjukkan susunan radas untuk mengukur beza keupayaan antara kuprum dan logam M. Eksperimen ini diulang menggunakan logam K dan L untuk menggantikan logam M.

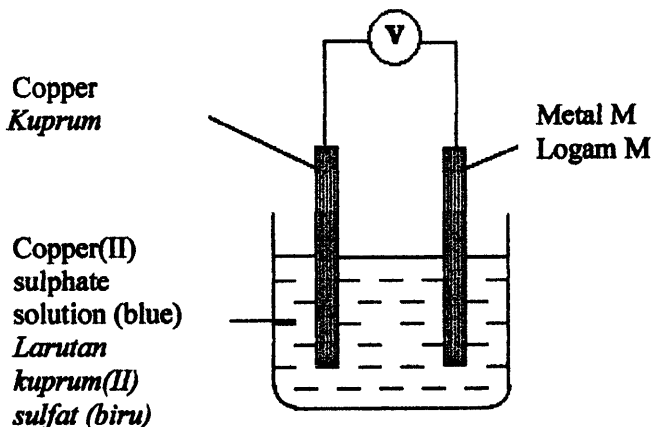
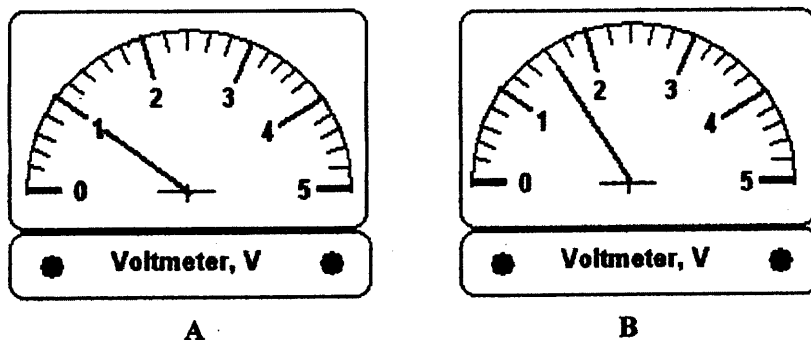
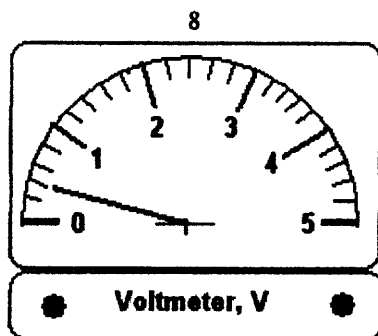


Diagram 2.1  
Rajah 2.1

Diagram 2.2 shows the potential difference of three voltmeters A, B and C for the chemical cells with pairs of metal copper / M, copper / K, and copper / L respectively. Rajah 2.2 menunjukkan beza keupayaan bagi tiga voltmeter A, B dan C untuk sel kimia dengan pasangan logam kuprum / M, kuprum / K dan kuprum / L masing-masing.





C  
Diagram 2.2  
Rajah 2.2

(a)

Pairs of Metal <i>Pasangan logam</i>	Voltmeter <i>Voltmeter</i>	Potential difference (V) <i>Beza keupayaan (V)</i>	Positive terminal <i>Terminal positif</i>
Copper / M <i>Kuprum / M</i>	A		Copper <i>Kuprum</i>
Copper / K <i>Kuprum / K</i>	B		Copper <i>Kuprum</i>
Copper / L <i>Kuprum / L</i>	C		L

Table 1  
*Jadual 1*

Record the voltmeter readings for the pairs of metal in Table 1.  
*Rekod bacaan voltmeter bagi pasangan logam dalam Jadual 1.*

[3 marks]

2(a)

3	

(b) Arrange copper, M, K and L metals in ascending order in the electrochemical series.

*Susun kuprum, logam M, K dan L mengikut tertib menaik dalam siri elektrokimia.*

[3 marks]

2(b)

3	

(c) State the relationship between the distance between two metals in electrochemical series and potential difference.

*Nyatakan hubungan bagi jarak antara dua logam dalam siri elektrokimia dengan beza keupayaan.*

[3 marks]

2(c)

3	



(d) Diagram 2.3 shows the observation for the chemical cell of copper and metal M after 30 minutes.

Rajah 2.3 menunjukkan pemerhatian bagi sel kimia untuk pasangan kuprum dan logam M selepas 30 minit.

For  
Examiner's  
Use

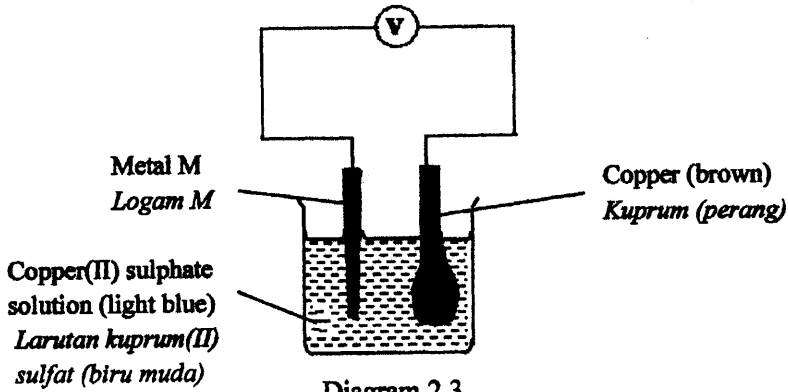


Diagram 2.3  
Rajah 2.3

Based on Diagram 2.1 and 2.3, state three observations.

Berdasarkan Rajah 2.1 dan 2.3, nyatakan tiga pemerhatian.

1. ....
2. ....
3. ....

[3 marks]

2(d)

3
---

Way to store metals in the laboratory partly depends on their reactivity with oxygen. The reactivity of the metals is compared by observing how fast or how vigorous they react. Generally, the more vigorous a metal burns in oxygen, the more reactive the metal is.

*Cara untuk menyimpan logam di dalam makmal bergantung kepada kereaktifan sesuatu logam terhadap oksigen. Kereaktifan logam dibandingkan dengan memerhatikan kepantasan atau kecergasan tindak balas sesuatu logam. Umumnya, semakin cergas suatu logam terbakar dalam oksigen, semakin reaktif logam itu.*

Based on this idea, plan a laboratory experiment to investigate the reactivity of magnesium, copper, zinc and lead with oxygen. Use solid potassium manganate(VII) as a source of oxygen.

*Berdasarkan idea ini, rancang satu eksperimen makmal untuk mengkaji kereaktifan magnesium, kuprum, zink dan plumbum terhadap oksigen. Guna pepejal kalium manganat(VII) sebagai sumber oksigen.*

Your planning should include the following aspects:

*Perancangan anda hendaklah mengandungi aspek-aspek berikut:*

- (a) Aim of the experiment  
*Tujuan eksperimen*
- (b) All the variables  
*Semua pembolehubah*
- (c) Statement of the hypothesis  
*Pernyataan hipotesis*
- (d) List of substances and apparatus  
*Senarai bahan dan radas*
- (e) Procedure for the experiment  
*Prosedur eksperimen*
- (f) Tabulation of data  
*Penjadualan data*

[17 marks]

**END OF QUESTION PAPER**  
**KERTAS SOALAN TAMAT**

SULIT  
4541/1  
Chemistry  
Paper 1  
September  
2012

4541/1



MAJLIS PENGETUA SEKOLAH MALAYSIA  
CAWANGAN MELAKA

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PEPERIKSAAN PERCUBAAN TINGKATN LIMA  
TAHUN 2012

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CHEMISTRY

Mark Scheme

Paper 1

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Skema Pemarkahan ini mengandungi 2 halaman bercetak.

### Answers for Chemistry Paper 1

1	C	2	B	3	D	4	C	5	A
6	B	7	D	8	D	9	D	10	A
11	B	12	B	13	C	14	B	15	A
16	C	17	D	18	A	19	B	20	A
21	B	22	A	23	C	24	C	25	D
26	C	27	D	28	A	29	C	30	D
31	A	32	A	33	B	34	B	35	D
36	C	37	B	38	D	39	A	40	C
41	D	42	A	43	A	44	C	45	C
46	B	47	D	48	C	49	D	50	B

SULIT  
4541/2  
Chemistry  
Paper 2  
September  
2012



MAJLIS PENGETUA SEKOLAH MALAYSIA  
CAWANGAN MELAKA

PEPERIKSAAN PERCUBAAN TINGKATAN LIMA

TAHUN 2012

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CHEMISTRY

Mark Scheme

Paper 2

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Skema Pemarkahan ini mengandungi 9 halaman bercetak

	Answer	Marks															
1(a)	Melting	1															
(b)	The particles move faster	1															
(c)	Temperature at which solid turn into liquid	1															
(d)(i)	Functional apparatus Labeled diagram	1 1															
(e)(i)	Correct axis with labels Transfer all the points correctly Correct shape of the graph	1 1 1															
(ii)	At 80°C	1															
(iii)	Heat absorbed is used to overcome the forces between the particles.	1															
		.....10															
2(a)	To remove the oxide layer	1															
(b)	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Element <i>Unsur</i></th> <th style="text-align: center;">Mg</th> <th style="text-align: center;">O</th> </tr> </thead> <tbody> <tr> <td>Mass (g) <i>Jisim</i></td> <td style="text-align: center;">2.4</td> <td style="text-align: center;">1.6</td> </tr> <tr> <td>Number of moles <i>Bilangan mol</i></td> <td style="text-align: center;">0.1</td> <td style="text-align: center;">0.1</td> </tr> <tr> <td>Simplest ratio of moles <i>Nisbah ringkas bilangan mol</i></td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> </tr> <tr> <td>Empirical formula <i>Formula empiric</i></td> <td colspan="2" style="text-align: center;">MgO</td> </tr> </tbody> </table>	Element <i>Unsur</i>	Mg	O	Mass (g) <i>Jisim</i>	2.4	1.6	Number of moles <i>Bilangan mol</i>	0.1	0.1	Simplest ratio of moles <i>Nisbah ringkas bilangan mol</i>	1	1	Empirical formula <i>Formula empiric</i>	MgO		1 1 1 1 1
Element <i>Unsur</i>	Mg	O															
Mass (g) <i>Jisim</i>	2.4	1.6															
Number of moles <i>Bilangan mol</i>	0.1	0.1															
Simplest ratio of moles <i>Nisbah ringkas bilangan mol</i>	1	1															
Empirical formula <i>Formula empiric</i>	MgO																
(c)	Repeat the heating, cooling and weighing process until a constant weight is obtained	1															
(d)	$2\text{Mg} + \text{O}_2 \longrightarrow 2\text{MgO}$ Correct Reactants and products -----1mark Balanced equation -----1mark	2															
(e)	No, because copper is unreactive metal // does not react easily with oxygen	2															
		.....10															
3 (a)	Chloride ion and hydroxide ion	1															
(b)	(i) Anode : Greenish yellow bubbles released Cathode : Colourless gas bubbles released	1 1															
	(ii) Hydrogen ions are selectively discharged at cathode, Chloride ions are selectively discharged at anode	1 1															
(c)	(i) Copper	1															









(ii)	$0.92 / 46 = 0.02 \text{ mol}$	1
(c)	$26880 / 0.02$ $= 1344000 \text{ J} // 1344 \text{ kJ}$	1+1
(d)	$\text{C}_2\text{H}_5\text{OH} + 3\text{O}_2 \longrightarrow 2\text{CO}_2 + 3\text{H}_2\text{O}$  Correct formulae of reactants and products Balance chemical reaction	1 1
(e)		1+1  .....10

7	(a)(i)	Haber Process	1
	(ii)	$\text{N}_2 + 3\text{H}_2 \longrightarrow 2\text{NH}_3$ Correct formulae of reactants and products Balance chemical equation	1 1.....2
	(b)	Temperature $450^\circ - 550^\circ \text{C}$ Pressure 60 atm Catalyst iron powder	1 1 1.....3
	(c)	1. Measure $[20-100\text{cm}^3]$ $1 \text{ mol dm}^{-3}$ ammonia solution and pour into a conical flask 2. Add a few drops of phenolphthalein. 3. Add $[20-100 \text{ cm}^3]$ $1 \text{ mol dm}^{-3}$ nitric acid solution from burette into the conical flask. 4. Until pink colour change to colourless 5. Record the volume of acid. 6. repeat the experiment without using phenolphthalein. 7. the mixture is then heated until saturated 8. and being cooled to obtain crystals	1 1 1 1 1 1 1 1 1.....8 Max 7



9	(a)	<table border="1"> <tr> <td>Carbon</td> <td>Hydrogen</td> <td>Oxygen</td> </tr> <tr> <td>60/ 12</td> <td>13.33/1</td> <td>26.67/16</td> </tr> <tr> <td>3</td> <td>8</td> <td>1</td> </tr> </table>	Carbon	Hydrogen	Oxygen	60/ 12	13.33/1	26.67/16	3	8	1	1
		Carbon	Hydrogen	Oxygen								
60/ 12	13.33/1	26.67/16										
3	8	1										
		<p><math>C_3H_8O</math> // <math>C_3H_7OH</math></p>	1									
		<p>Molecular formula = <math>[C_3H_8O]n</math></p> <p>60 = 60 n</p> <p>n = 1</p>	1									
		<p>molecular formula = <math>C_3H_8O</math> // <math>C_3H_7OH</math></p>	1									
		<p>name: propanol // propan-1-ol // propan-2-ol</p>	1									
		<p>correct structural formula</p>	1									
			.....6									
	(b)	(ii)										
		<table border="1"> <thead> <tr> <th>Hexene <math>C_6H_{12}</math></th> <th>Hexane <math>C_6H_{14}</math></th> </tr> </thead> <tbody> <tr> <td>Produce more soot</td> <td>Produce less soot</td> </tr> <tr> <td>% of carbon is higher</td> <td>% of carbon is lower</td> </tr> <tr> <td><math>\frac{12 \times 6}{84} \times 100 \%</math></td> <td><math>\frac{12 \times 6}{86} \times 100</math></td> </tr> <tr> <td>=85.71 %</td> <td>= 83 %</td> </tr> </tbody> </table>	Hexene $C_6H_{12}$	Hexane $C_6H_{14}$	Produce more soot	Produce less soot	% of carbon is higher	% of carbon is lower	$\frac{12 \times 6}{84} \times 100 \%$	$\frac{12 \times 6}{86} \times 100$	=85.71 %	= 83 %
Hexene $C_6H_{12}$	Hexane $C_6H_{14}$											
Produce more soot	Produce less soot											
% of carbon is higher	% of carbon is lower											
$\frac{12 \times 6}{84} \times 100 \%$	$\frac{12 \times 6}{86} \times 100$											
=85.71 %	= 83 %											
			1									
			1+1									
			.....4									



	(c)	Diagram :	1					
		Functional apparatus: two rubber strips with weight is hang over retort stand, metre rule		1				
		Label diagram: label as vulcanised and unvulcanised rubber, weight			1			
		Procedure :				1		
		1. hang both rubber strip using bulldog clips					1	
		2. measure the initial length of both rubber stripe						1
		3. hang a 10 g weight to the end of rubber stripe						
4. remove the weight	1							
5. Measure the length of both rubber stripe		1						
6. repeat steps 2-5 using different mass of weight.			1					
Result of the experiment:				1				
The length of vulcanised rubber remain the same after the weight is removed, but the length of unvulcanised rubber become longer then it's initial length.					1			
.....10								
<b>Total</b>						<b>20</b>		

10	(a)(i)	<b>Experiment</b>	<b>Explanation</b>	<b>Equation</b>	
		Chlorine and potasssium bromide	Displacement of bromine occurs because chlorine is more reactive than bromine	<del>KBr + Cl<sub>2</sub> → KCl + Br<sub>2</sub></del>	1+1
		Bromine and potassium iodide	Displacement of iodine occurs because bromine is more reactive than iodine	<del>KI + Br<sub>2</sub> → KBr + I<sub>2</sub></del>	1+1
		Iodine and potassium chloride	No displacement of Chlorine because iodine is less reactive than chlorine	(No reaction, hence no equation)	1+1 .....6
	(a)(ii)	halogen in the descending order of strength as the oxidising agent : Chlorine, Bromine, Iodine			1
		halide ions in the descending order of strength as the reducing agent : Iodide ions, bromide ions, chloride ions			1
	(b)	the names of the suitable substances to be used as the oxidising agent : eg. acidified potassium manganate (VII) solution//other suitable examples reducing agent : eg. potassium iodide solution // other suitable examples			1+1



SULIT  
4541/3  
Chemistry 3  
September  
2012



MAJLIS PENGETUA SEKOLAH MALAYSIA  
CAWANGAN MELAKA

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PEPERIKSAAN PERCUBAAN TINGKATAN LIMA  
TAHUN 2012

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CHEMISTRY 3

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PERATURAN PEMARKAHAN

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Skema Pemarkahan ini mengandungi ~~12~~ halaman bercetak

7



Question	Details	Score																				
1.	<p>(a) Able to construct a table to record the ammeter reading for compounds Q, R, S and T that contain:</p> <ol style="list-style-type: none"> <li>1. Correct titles</li> <li>2. Readings and unit</li> </ol> <p><u>Sample answer:</u></p> <table border="1" data-bbox="444 465 1068 696"> <thead> <tr> <th>Compound</th> <th>Ammeter reading / A</th> </tr> </thead> <tbody> <tr> <td>Q</td> <td>0.2</td> </tr> <tr> <td>R</td> <td>0.0</td> </tr> <tr> <td>S</td> <td>0.0</td> </tr> <tr> <td>T</td> <td>0.4</td> </tr> </tbody> </table>	Compound	Ammeter reading / A	Q	0.2	R	0.0	S	0.0	T	0.4	3										
Compound	Ammeter reading / A																					
Q	0.2																					
R	0.0																					
S	0.0																					
T	0.4																					
	<p>Able to construct a less accurate table that contains the following:</p> <ol style="list-style-type: none"> <li>1. Titles</li> <li>2. readings</li> </ol> <p><u>Sample answers:</u></p> <table border="1" data-bbox="444 992 1068 1223"> <thead> <tr> <th>Compound</th> <th>Ammeter reading</th> </tr> </thead> <tbody> <tr> <td>Q</td> <td>0.2</td> </tr> <tr> <td>R</td> <td>0.0</td> </tr> <tr> <td>S</td> <td>0.0</td> </tr> <tr> <td>T</td> <td>0.4</td> </tr> </tbody> </table> <p>Or</p> <table border="1" data-bbox="444 1330 1068 1559"> <thead> <tr> <th>Compound</th> <th>Ammeter reading</th> </tr> </thead> <tbody> <tr> <td>Q</td> <td>0.2</td> </tr> <tr> <td>R</td> <td>0</td> </tr> <tr> <td>S</td> <td>0</td> </tr> <tr> <td>T</td> <td>0.4</td> </tr> </tbody> </table>	Compound	Ammeter reading	Q	0.2	R	0.0	S	0.0	T	0.4	Compound	Ammeter reading	Q	0.2	R	0	S	0	T	0.4	2
Compound	Ammeter reading																					
Q	0.2																					
R	0.0																					
S	0.0																					
T	0.4																					
Compound	Ammeter reading																					
Q	0.2																					
R	0																					
S	0																					
T	0.4																					
	<p>Able to construct a table without title:</p> <p><u>Answer:</u></p> <table border="1" data-bbox="444 1704 1068 1861"> <tbody> <tr> <td>Q</td> <td>0.2</td> </tr> <tr> <td>R</td> <td>0</td> </tr> <tr> <td>S</td> <td>0</td> </tr> <tr> <td>T</td> <td>0.4</td> </tr> </tbody> </table>	Q	0.2	R	0	S	0	T	0.4	1												
Q	0.2																					
R	0																					
S	0																					
T	0.4																					
	No response or wrong response	0																				

Question		Details	Score
1	(b)	<p><b>Able to state the inference correctly</b></p> <p><u>Sample answer:</u></p> <p>Molten Q and T can conduct electricity while molten R and S cannot conduct electricity.</p>	3
		<p><b>Able to state the inference less correctly.</b></p> <p><u>Sample answer:</u></p> <p>Molten Q and T can conduct electricity. // Molten R and S cannot conduct electricity.</p>	2
		<p><b>Able to give an idea of the inference.</b></p> <p><u>Sample answers:</u></p> <p>Q / T can conduct electricity. // R / S cannot conduct electricity</p>	1
		<b>No response or wrong response</b>	0

1	(c)	<p><b>Able to classify all compounds correctly.</b></p> <p><u>Sample answer:</u></p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Ionic compound</th> <th>Covalent compound</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Q</td> <td style="text-align: center;">R</td> </tr> <tr> <td style="text-align: center;">T</td> <td style="text-align: center;">S</td> </tr> </tbody> </table>	Ionic compound	Covalent compound	Q	R	T	S	3
Ionic compound	Covalent compound								
Q	R								
T	S								
		<b>Able to classify at least three compounds correctly.</b>	2						
		<b>Able to classify at least one compound correctly.</b>	1						
		<b>No response or wrong response</b>	0						



1	(d)	Able to predict the two compounds correctly.  <u>Sample answer:</u>  Q and T	3
1	(d)	Able to predict one compound correctly.  <u>Sample answer:</u>  Q / T	2
		Able to give an idea of prediction.  <u>Sample answer:</u>  Ionic compound	1
		No response or wrong response	0

1	(e)	Able to state the three variables correctly.  <u>Sample answer</u>  <b><u>Manipulated variable</u></b> Type of compound // Q, R, S, T // Ionic and covalent compounds  <b><u>Responding variable</u></b> Electrical conductivity // ammeter reading  <b><u>Constant variable</u></b> Carbon electrodes // quantity of compound	3
		Able to state any two variables	2
		Able to state any one variable	1
		No response or wrong response	0

1	(f)	<b>Able to state the relationship between the manipulated variable and the responding variable and state the direction.</b>  <u>Sample answer</u>  Molten ionic compound can conduct electricity while molten covalent compound cannot conduct electricity.	3
		<b>Able to state the relationship between the manipulated variable and the responding variable but less accurate.</b>  <u>Sample answer</u>  Ionic compound can conduct electricity but covalent compound cannot conduct electricity.	2
		<b>Able to state the idea of hypothesis.</b>  <u>Sample answers</u>  T / Q is an electrolyte. // R / S is non-electrolyte	1
		<b>No response or wrong response</b>	0

1	(g)	<b>Able to give the operational definition accurately.</b>  <u>Answer</u>  Molten compound that cause ammeter needle to deflect when carbon electrodes are dipped into it.	3
		<b>Able to give the operational definition correctly.</b>  <u>Answer</u>  Molten compound that cause ammeter needle to deflect.	2
		<b>Able to give an idea of the operational definition.</b>  <u>Answer</u>  Compound that can conduct electricity.	1
		<b>No response or wrong response</b>	0

2	(a)	Able to record all the voltmeter readings accurately.  <u>Answer</u> Voltmeter A = 1.00 Voltmeter B = 1.60 Voltmeter C = 0.40	3
		Able to record all the voltmeter readings correctly.  <u>Answer</u> Voltmeter A = 1.0 Voltmeter B = 1.6 Voltmeter C = 0.4	2
		Able to record <u>one</u> voltmeter readings correctly.	1
		No response or wrong response	0

2	(b)	Able to arrange all four metals in ascending order correctly.  <u>Sample answers</u>  L, Cu, M, K //  L, Copper, M, K	3
		Able to arrange three adjacent metals in ascending order correctly.  <u>Sample answers</u>  <u>Cu, M, K, L //</u>  <u>K, L, Cu, M</u>	2
		Able to arrange two adjacent metals in ascending order correctly.  <u>Sample answers</u>  <u>Cu, L, M, K //</u>  <u>L, Cu, K, M</u>	1
		No response or wrong response	0

3	(c)	<p><b>Able to state the relationship between manipulated variable and responding variable and the direction correctly.</b></p> <p><u>Sample answers</u></p> <p>The higher the position of metal in reactivity series, the brighter the flame or glow. //</p> <p>The higher the position of metal in reactivity series, the higher the reactivity of metal with oxygen</p>	3
		<p><b>Able to state the relationship between manipulated variable and responding variable and the direction less correctly.</b></p> <p><u>Sample answers</u></p> <p>The brighter the flame or glow, the higher the position of metal in reactivity series. //</p> <p>Position of metal in reactivity series change, reactivity of metal with oxygen change.</p>	2
		<p><b>Able to state idea of the hypothesis.</b></p> <p><u>Sample answer</u></p> <p>Position of metal affect reactivity.</p>	1
		<b>No response or wrong response</b>	0

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