

Pentaksiran Sumatif 3

SIJIL PELAJARAN MALAYSIA 2013

KIMIA

Kertas 1

Ogos/Sept

1 ¼ jam

4541/1

Satu jam lima belas minit

JANGAN BUKA KERTAS SOALANINI SEHINGGA DIBERITAHU

1. *Kertas ini adalah dalam dwibahasa.*
2. *Soalan dalam bahasa Inggeris mendahului soalan dalam bahasa Melayu.*
3. *Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini.*

Kertas soalan ini mengandungi 30 halaman bercetak.

TERENGGANU NEGERI ANJUNG ILMU

Dibiayai oleh:

Kerajaan Negeri Terengganu

Dicetak Oleh:

Percetakan Yayasan Islam Terengganu Sdn. Bhd.

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- 1 Diagram 1 shows an arrangement of particles.

Rajah 1 menunjukkan satu susunan zarah-zarah.

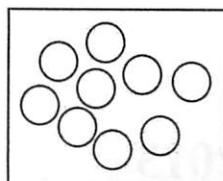


Diagram / Rajah 1

Which of the following substances consist of arrangement of particles as in Diagram 1?

Antara yang berikut, yang manakah mempunyai susunan zarah seperti di dalam Rajah 1?

- A Ice
Air batu
- B Water
Air
- C Steam
Wap
- D Argon
Argon

- 2 Diagram 2 shows the set-up of the apparatus to determine the empirical formula of a metal oxide.

Rajah 2 menunjukkan susunan radas untuk menentukan formula empirik suatu oksida logam.

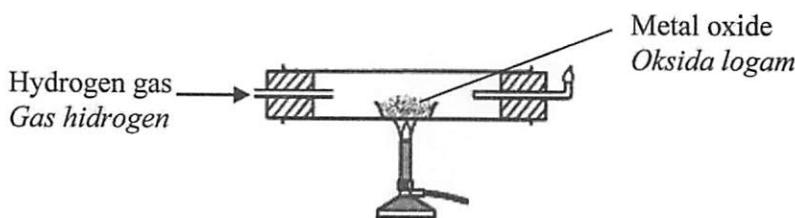


Diagram / Rajah 2

Which of the following metal oxides is suitable to be used in Diagram 2?

Antara oksida logam yang berikut, yang manakah sesuai digunakan dalam Rajah 2?

- A Zinc oxide
Zink oksida
- B Copper(II) oxide
Kuprum(II) oksida
- C Magnesium oxide
Magnesium oksida
- D Aluminium oxide
Aluminium oksida

- 3 Z is not the actual symbol of the element have electrons arrangement 2.8.4.

Where is the element Z placed in the Periodic Table of Elements?

Z bukan simbol sebenar suatu unsur yang mempunyai susunan elektron 2.8.4.

Dimanakah kedudukan unsur Z dalam Jadual Berkala Unsur?

	Group <i>Kumpulan</i>	Period <i>Kala</i>
A	3	14
B	14	3
C	4	3
D	3	4

- 4 Which substance is a covalent compound?

Bahan manakah merupakan suatu sebatian kovalen?

- A Ethanol, $\text{C}_2\text{H}_5\text{OH}$
Etanol, $\text{C}_2\text{H}_5\text{OH}$
- B Magnesium oxide, MgO
Magnesium oksida, MgO
- C Sodium chloride, NaCl
Natrium klorida, NaCl
- D Calcium carbonate, CaCO_3
Kalsium karbonat, CaCO_3

- 5 Which of the following is an electrolyte?

Antara berikut yang manakah elektrolit?

- A Aluminium
Aluminium
- B Glucose
Glukosa
- C Acetamide
Asetamida
- D Lead(II) bromide
Plumbum(II) bromida

- 6 Which of the following is true about an alkali?

Antara pernyataan berikut yang manakah benar tentang alkali?

- A An alkali is not corrosive
Alkali tidak mengakas
- B A strong alkali has a low pH value
Alkali kuat mempunyai nilai pH yang rendah
- C An alkali is a base that is soluble in water
Alkali ialah basa yang larut dalam air
- D A weak alkali has a high degree of ionization
Alkali lemah mempunyai darjah pengionan yang tinggi

- 7 Which of the following substances is an insoluble salt?

Antara bahan berikut, yang manakah garam tak terlarutkan?

- A Ammonium carbonate
Ammonium karbonat
- B Sodium carbonate
Natrium karbonat
- C Potassium carbonate
Kalium karbonat
- D Calcium carbonate
Kalsium karbonat

- 8 Which acid produces the highest rate of reaction when reacts with 1 g of zinc powder?

Asid manakah menghasilkan kadar tindak balas yang paling tinggi apabila bertindak balas dengan 1 g serbuk zink?

- A 50 cm^3 of 1.0 mol dm^{-3} nitric acid
 50 cm^3 asid nitrik 1.0 mol dm^{-3}
- B 50 cm^3 of 1.0 mol dm^{-3} sulphuric acid
 50 cm^3 asid sulfurik 1.0 mol dm^{-3}
- C 50 cm^3 of 1.0 mol dm^{-3} ethanoic acid
 50 cm^3 asid etanoik 1.0 mol dm^{-3}
- D 50 cm^3 of 1.0 mol dm^{-3} hydrochloric acid
 50 cm^3 asid hidroklorik 1.0 mol dm^{-3}

9 Diagram 3 shows the stages in the production of sulphuric acid using the Contact Process.

Rajah 3 menunjukkan peringkat-peringkat dalam pembuatan asid sulfurik menggunakan Proses Sentuh.

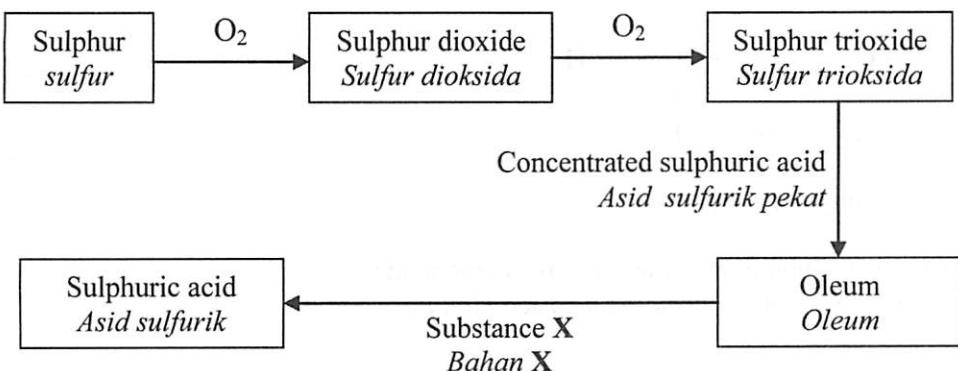


Diagram / Rajah 3

What is substance X?

Apakah bahan X?

- A Water
Air
- B Sulphur
Sulfur
- C Oxygen
Oksigen
- D Sulphur dioxide
Sulfur dioksida

- 10** Diagram 4 shows an organic compound.

Rajah 4 menunjukkan satu sebatian organik.

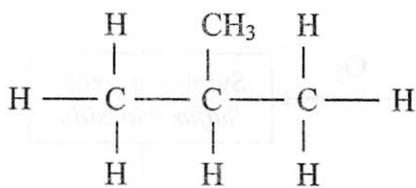


Diagram / Rajah 4

Which of the following is the homologous series of the compound?

Di antara yang berikut, manakah siri homolog bagi sebatian ini?

- A** Alkane
Alkana
- B** Alkene
Alkena
- C** Alcohol
Alkohol
- D** Carboxylic acid
Asid karboksilik

- 11** Which of the following equation is an oxidation reaction?

Antara persamaan berikut, yang manakah merupakan tindak balas pengoksidaan?

- I** $\text{Na} \rightarrow \text{Na}^+ + \text{e}$
- II** $2\text{Cl}^- \rightarrow \text{Cl}_2 + 2\text{e}$
- III** $2\text{H}^+ + 2\text{e} \rightarrow \text{H}_2$
- IV** $\text{Cu} \rightarrow \text{Cu}^{2+} + 2\text{e}$

- A** I and II
I dan II
- B** II and III
II dan III
- C** I, II and IV
I, II dan IV
- D** I, III and IV
I, III dan IV

- 12 The following thermochemical equation shows a displacement reaction.
Persamaan termokimia berikut menunjukkan suatu tindak balas penyesaran.



Which of the following shows that the reaction is an exothermic reaction?

Antara berikut, yang manakah menunjukkan bahawa tindak balas itu adalah tindak balas eksotermik?

- A Copper metal is displaced
Logam kuprum di sesarkan
- B The reaction needs 210 kJ of heat energy to displace 1 mol of copper
Tindak balas itu memerlukan 210 kJ tenaga haba untuk menyesarkan 1 mol kuprum
- C The total energy absorbed to break the bonds is more than the total energy released during the displacement of copper metal
Jumlah tenaga yang diserap untuk memecahkan ikatan melebihi jumlah tenaga yang dibebaskan semasa penyesaran logam kuprum.
- D The energy contained in the reactants is higher than the energy contained in the products
Kandungan tenaga dalam bahan tindak balas adalah lebih tinggi daripada kandungan tenaga dalam hasil tindak balas.

- 13 Diagram 5 shows the symbol of element Y.
Rajah 5 menunjukkan simbol bagi unsur Y.

24

Y

12

Diagram / Rajah 5

Which of the following is true about Y?

Antara yang berikut, manakah benar tentang Y?

	Proton number <i>Nombor proton</i>	Nucleon number <i>Nombor proton</i>	Electron arrangement <i>Susunan elektron</i>
A	12	24	2.8.2
B	12	24	2.8.8.4
C	24	12	2.8.2
D	24	12	2.8.8.4

- 14** The equation below shows the reaction between magnesium and hydrochloric acid,
Persamaan di bawah menunjukkan tindak balas antara magnesium dan asid hidroklorik.



Which of the following statements is true?

Antara pernyataan berikut, yang manakah benar?

[Relative atomic mass of H = 1; Mg = 24; Cl = 35.5]

[Jisim atom relatif : H = 1; Mg = 24; Cl = 35.5]

- A** 1 g of magnesium react with 2 g of hydrochloric acid to produce 1 g of magnesium chloride and 1 g of hydrogen gas
1 g magnesium bertindak balas dengan 2 g asid hidroklorik menghasilkan 1 g magnesium klorida dan 1 g gas hidrogen
- B** 24 g of magnesium react with 36.5 g of hydrochloric acid to produce 95 g of magnesium chloride and 2 g of hydrogen gas
24 g magnesium bertindak balas dengan 36.5 g asid hidroklorik menghasilkan 95 g magnesium klorida dan 2 g gas hidrogen
- C** 1 mol of magnesium react with 2 mol of hydrochloric acid to produce 1 mol of magnesium chloride and 1 mol of hydrogen gas
1 mol magnesium bertindak balas dengan 2 mol asid hidroklorik menghasilkan 1 mol magnesium klorida dan 1 mol gas hidrogen
- D** 1 atom of magnesium react with 2 molecules of hydrochloric acid to produce 1 molecule of magnesium chloride and 1 molecule of hydrogen gas
1 atom magnesium bertindak balas dengan 2 molekul asid hidroklorik menghasilkan 1 molekul magnesium klorida dan 1 molekul gas hidrogen

- 15** Element X is located in group 18 in The Periodic Table. X is not the actual symbol of the element. Gas X is used in the advertising light.
 What is X?

Unsur X berada dalam kumpulan 18 dalam Jadual Berkala. X bukan simbol sebenar unsur tersebut.
Gas X digunakan dalam lampu iklan.

Apakah X?

- A** Helium
- B** Neon
- C** Argon
- D** Krypton

- 16 The electron arrangement of atom M is 2.8.1 and the electron arrangement of atom X is 2.8.7. Elements M and X react to form a compound. Which of the following is true about the reaction?

*Susunan elektron atom M ialah 2.8.1 dan susunan elektron atom X ialah 2.8.7.
Unsur M dan unsur X bertindak balas membentuk satu sebatian.
Antara berikut, yang manakah benar tentang tindak balas tersebut?*

- A Atom X donates 1 electron
Atom X menderma 1 elektron
- B Atom M receives 1 electron
Atom M menerima 1 elektron
- C An ionic compound is formed
Suatu sebatian ion terhasil
- D An atom M share a pair of electrons with an atom X
Satu atom M berkongsi sepasang elektron dengan satu atom X

- 17 Which particles are produced when an electrolyte dissolves in water?
Zarah manakah yang terhasil apabila elektrolit melerut dalam air?

- A Ions
Ion
- B Atoms
Atom
- C Electrons
Elektron
- D Protons
Proton

- 18 Which of the following oxide metals can react with both acids and alkalis?
Antara oksida logam berikut yang manakah boleh bertindakbalas dengan asid dan alkali?

- A Sodium oxide
Natrium oksida
- B Phosphorus(V) oxide
Fosforus(V) oksida
- C Aluminium oxide
Aluminium oksida
- D Magnesium oxide
Magnesium oksida

- 19 The reaction between solution A and sodium chloride solution will produce lead (II) chloride precipitate and sodium nitrate solution.

Tindak balas antara larutan A dan larutan natrium klorida akan menghasilkan mendakan plumbum(II) klorida dan larutan natrium nitrat.



Which of the following is solution A?

Antara berikut, yang manakah larutan A?

- A Lead(II) chloride
Plumbum(II) klorida
- B Lead(II) nitrate
Plumbum(II) nitrat
- C Lead(II) carbonate
Plumbum(II) karbonat
- D Lead(II) sulphate
Plumbum(II) sulfat

- 20 Which alloy is correctly matched to its uses?

Aloi manakah yang dipadankan betul dengan kegunaannya?

	Alloy <i>Aloi</i>	Uses <i>Kegunaan</i>
A	Brass <i>Loyang</i>	Building of monument <i>Pembinaan tugu</i>
B	Bronze <i>Gangsa</i>	Making of surgical instrument <i>Pembuatan alatan pembedahan</i>
C	Stainless steel <i>Keluli nirkarat</i>	Making of medals <i>Pembuatan pingat</i>
D	Duralumin <i>Duralumin</i>	Making of the body of aeroplanes <i>Pembuatan badan kapal terbang</i>

- 21 The reaction between hydrochloric acid and zinc produced hydrogen gas. The reaction completed within 50 second and the maximum volume of gas is 25 cm^3 . What is the average rate of the reaction?

Tindak balas antara asid hidroklorik dengan zink menghasilkan gas hidrogen. Tindak balas lengkap dalam masa 50 saat dan isipadu maksimum gas ialah 25 cm^3 . Berapakah kadar purata tindak balas tersebut?

A $0.5\text{ cm}^3\text{ s}^{-1}$

B $1.0\text{ cm}^3\text{ s}^{-1}$

C $2.0\text{ cm}^3\text{ s}^{-1}$

D $4.0\text{ cm}^3\text{ s}^{-1}$

- 22 Compound X has the following properties.
Sebatian X mempunyai sifat-sifat berikut.

- Soluble in water
Larut dalam air
- Has a boiling point of $78\text{ }^\circ\text{C}$
Mempunyai takat didih $78\text{ }^\circ\text{C}$

What is compound X?
Apakah sebatian X?

- A Ethane
Etana
- B Ethanol
Etanol
- C Ethanoic acid
Asid etanoik
- D Ethyl ethanoate
Etil etanoat

- 23 The reaction between iodide ion solution and chlorine gas can be presented by this equation:
Tindak balas antara larutan ion iodida dan gas klorin diwakili oleh persamaan berikut:



Which of the following statement is true?

Yang manakah antara pernyataan berikut yang benar?

- A I⁻ ion as a reducing agent
ion I⁻ bertindak sebagai agen penurunan
- B I⁻ ion is reduced to iodine
ion I⁻ diturunkan kepada iodine
- C I⁻ ion oxidised chlorine
ion I⁻ mengoksidakan klorin
- D I⁻ ion is a stronger oxidising agent than chlorine
ion I⁻ adalah agen pengoksidaan yang lebih kuat daripada klorin

- 24 Diagram 6 shows an energy level diagram for the precipitation reaction of silver chloride.
Rajah 6 menunjukkan gambarajah aras tenaga untuk tindak balas pemendakan argentum klorida.

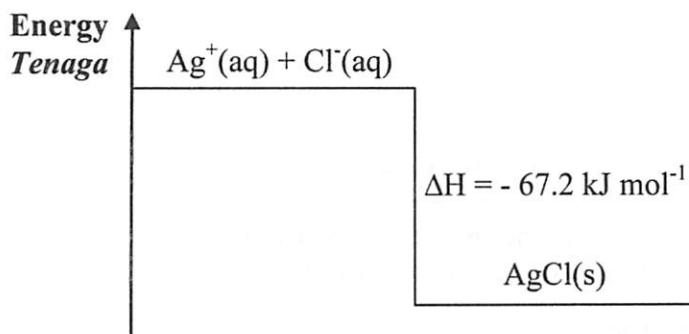


Diagram / Rajah 6

Which of the following statements is true about the chemical reactions?
Antara pernyataan berikut yang manakah benar mengenai tindak balas kimia?

- I The temperature of the mixture is higher than the initial temperature
Suhu campuran adalah lebih tinggi daripada suhu awal campuran
 - II The reaction is exothermic
Tindak balas adalah eksotermik
 - III The activation energy is 67.2 kJ
Tenaga pengaktifan adalah 67.2 kJ
 - IV The total energy of the reactants is lower than the total energy of the products
Jumlah tenaga bahan tindak balas adalah lebih rendah daripada jumlah tenaga hasil tindak balas
- A I and II
I dan II
- B III and IV
III dan IV
- C I, II and III
I, II dan III
- D I, II and IV
I, II dan IV

- 25** The following statements are about diffusion.

Pernyataan berikut adalah berkaitan dengan resapan.

- The tiny particles are tiny and discrete
Zarah-zarah halus dan diskret
- The tiny particles move randomly by themselves
Zarah-zarah halus bergerak secara rawak dengan sendiri

Which of the following situation are explained by the statements above?

Antara berikut, yang manakah diterangkan oleh pernyataan di atas?

- A** Bromine gas mixing with air
Gas bromin bercampur dengan udara
- B** Melting of naphthalene
Peleburan naftalena
- C** Combustion of magnesium in air
Pembakaran magnesium dalam udara
- D** Reduction of copper(II) oxide by hydrogen
Penurunan kuprum(II) oksida oleh hidrogen

- 26** Diagram 7 shows two balloons filled with helium gas and hydrogen gas.

Rajah 7 menunjukkan dua belon berisi gas helium dan gas hidrogen.

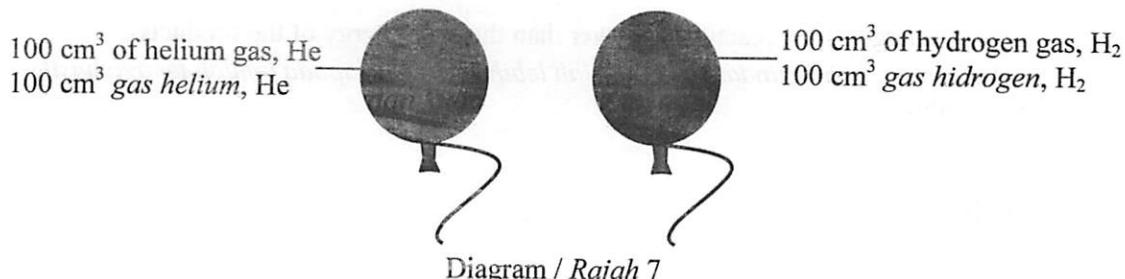


Diagram / Rajah 7

Which of the following statements are true about the gases?

Antara pernyataan berikut, yang manakah benar tentang gas-gas tersebut?

- A** The number of moles of hydrogen gas is greater than helium gas
Bilangan mol gas hidrogen lebih besar daripada gas helium
- B** The number of helium atom is greater than hydrogen atom
Bilangan atom helium lebih besar daripada atom hidrogen
- C** The number of moles of hydrogen gas and helium gas is equal
Bilangan mol gas hidrogen sama dengan bilangan mol gas helium
- D** The number of hydrogen gas molecules is greater than helium gas molecule
Bilangan molekul gas hidrogen lebih besar daripada bilangan molekul gas helium

- 27 Which statement does not explain why the reactivity of Group 17 elements decreases when going down the group?

Pernyataan manakah yang tidak menerangkan mengapa kereaktifan unsur Kumpulan 17 menurun apabila menuruni kumpulan itu?

- A The atomic size of elements in Group 17 increases down the group
Saiz atom unsur Kumpulan 17 meningkat apabila menuruni kumpulan
- B The electron in the outermost shell becomes further from nucleus
Elektron di petala paling luar semakin jauh daripada nukleus
- C The nuclei attraction force becomes weaker
Daya tarikan nukleus semakin lemah
- D Force of attraction between molecules becomes stronger
Daya tarikan antara molekul semakin kuat

- 28 Element M and element L are located in Group 16 and Group 17 in the Periodic Table respectively.

Elements M react with element L to form a compound.

What is the chemical formula of the compound?

*Unsur M dan unsur L masing-masing terletak dalam Kumpulan 16 dan Kumpulan 17 dalam Jadual Berkala. Unsur M bertindak balas dengan unsur L untuk membentuk suatu sebatian.
Apakah formula kimia bagi sebatian itu?*

- A ML
- B ML₂
- C M₂L
- D 2LM

- 29 Table 1 shows information about three voltaic cells.
Jadual 1 menunjukkan maklumat tentang tiga sel voltan.

Pair of metals <i>Pasangan logam</i>	Potential difference (V) <i>Beza keupayaan (V)</i>	Positive terminal <i>Terminal positif</i>
R, S	2.7	S
S, T	1.5	S
U, T	0.6	U

Table / Jadual 1

What is a potential difference of the voltaic cell when metal U is paired with metal R?
Berapakah beza keupayaan bagi sel voltan itu apabila pasangan logam U dan logam R digunakan?

- A 0.9 V
- B 1.2 V
- C 1.8 V
- D 3.3 V

- 30 The following equation represents the neutralisation reaction between barium hydroxide, $\text{Ba}(\text{OH})_2$ and nitric acid, HNO_3

Persamaan berikut mewakili tindak balas peneutralan antara barium hidroksida, $\text{Ba}(\text{OH})_2$ dengan asid nitrik, HNO_3 .



What is the volume of 0.5 mol dm^{-3} nitric acid needed to neutralise 25 cm^3 of 0.1 mol dm^{-3} barium hydroxide?

Berapakah isipadu asid nitrik 0.5 mol dm^{-3} yang diperlukan untuk meneutralkan 25 cm^3 barium hidroksida 0.1 mol dm^{-3} ?

- A 2.5 cm^3
- B 5.0 cm^3
- C 10.0 cm^3
- D 12.5 cm^3

- 31 Which of the following salts **cannot** be prepared with the reaction between metal and acid?

Antara garam berikut, yang manakah tidak boleh disediakan melalui tindak balas antara logam dengan asid?

- A Iron (III) chloride
Ferum (III) klorida
- B Copper (II) chloride
Kuprum (II) klorida
- C Magnesium sulphate
Magnesium sulfat
- D Zinc sulphate
Zink sulfat

- 32 Which substances is a composite material?
Bahan manakah adalah bahan komposit?

- A Bronze
Gangsa
- B Photochromic glass
Kaca fotokromik
- C Bricks
Batu-bata
- D Fibre glass
Gentian kaca

- 33 Curve X in Diagram 8 was obtained when 2.0 g magnesium strips reacts with excess nitric acid at 40 °C.

Lengkung X dalam Rajah 8 diperolehi apabila 2.0 g kepingan magnesium bertindak balas dengan asid nitrik berlebihan pada suhu 40 °C.

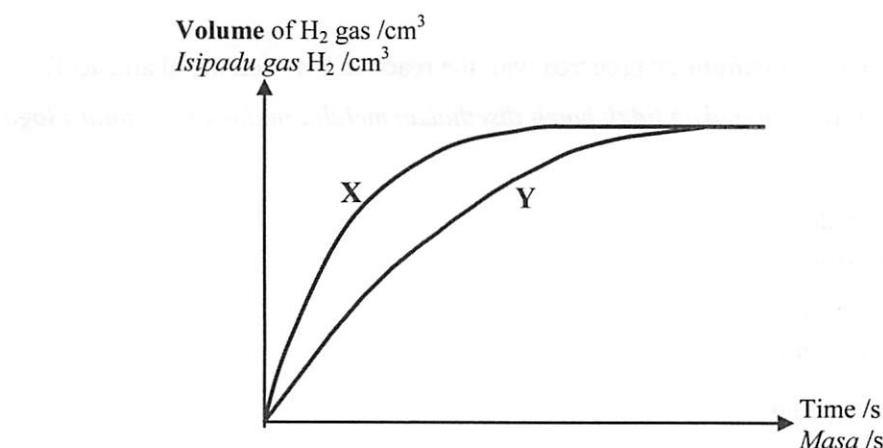


Diagram / Rajah 8

Which of the following will produce curve Y?

Antara berikut yang manakah boleh menghasilkan lengkung Y?

- A Using 2.0 g of magnesium powder
Menggunakan 2.0 g serbuk magnesium
- B Raising the temperature of nitric acid to 50 °C
Meningkatkan suhu asid kepada 50 °C
- C Adding distilled water to nitric acid
Menambahkan air suling ke dalam asid nitrik
- D Using 1.0 g of magnesium strip
Menggunakan 1.0 g kepingan magnesium

- 34 Diagram 9 shows a structural formula which represents a food flavouring substance.
Rajah 9 menunjukkan formula struktur yang mewakili satu bahan perisa makanan.

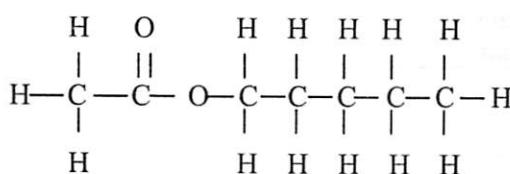


Diagram / Rajah 9

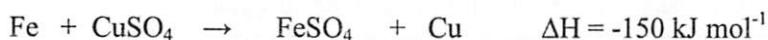
Which of the following can be used to make the flavouring?

Antara yang berikut, yang manakah boleh digunakan untuk membuat perisa itu?

- A Ethanol and propanoic acid
Etanol dan asid propanoik
- B Propanol and butanoic acid
Propanol dan asid butanoik
- C Butanol and ethanoic acid
Butanol dan asid etanoik
- D Pentanol and ethanoic acid
Pentanol dan asid etanoik

- 35 The following is a thermochemical equation.

Berikut ialah suatu persamaan termokimia.



What is the heat change when 3.2 g copper is formed in this reaction?

[Relative atomic mass: Cu = 64]

Berapakah perubahan haba apabila 3.2 g kuprum terbentuk dalam tindak balas ini?

[Jisim atom relatif: Cu = 64]

- A 1.37 kJ
- B 7.50 kJ
- C 46.90 kJ
- D 480.00 kJ

- 43 The aqueous solution of salt S gives the following observations when added with sodium hydroxide solution and barium chloride solution.

Larutan berair bagi satu garam S memberikan pemerhatian-pemerhatian berikut apabila ditambah dengan larutan natrium hidroksida dan barium klorida larutan.

Reagent <i>Reagen</i>	Observation <i>Pemerhatian</i>
Sodium hydroxide <i>Natrium hidroksida</i>	Brown precipitate formed <i>Mendakan perang terbentuk</i>
Barium chloride <i>Barium klorida</i>	White precipitate formed <i>Mendakan putih terbentuk</i>

Which of the following maybe salt S?

Antara garam berikut, yang manakah mungkin garam S?

- A Iron(II) chloride
Ferum(II) klorida
- B Iron(II) carbonate
Ferum(II) karbonat
- C Iron(III) sulphate
Ferum(III) sulfat
- D Iron(III) nitrate
Ferum(III) nitrat

- 44 Which of the following medicines is an antibiotic?

Antara ubat berikut, yang manakah suatu antibiotik?

- A Insulin
insulin
- B Codeine
kodeine
- C Streptomycin
streptomisin
- D Paracetamol
Parasetamol

- 34 Diagram 9 shows a structural formula which represents a food flavouring substance.
Rajah 9 menunjukkan formula struktur yang mewakili satu bahan perisa makanan.

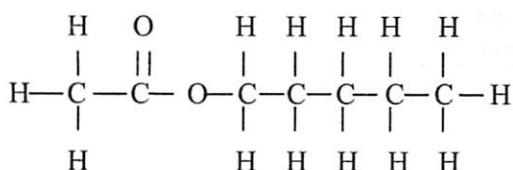
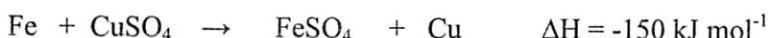


Diagram / *Rajah 9*

Which of the following can be used to make the flavouring?
Antara yang berikut, yang manakah boleh digunakan untuk membuat perisa itu?

- A Ethanol and propanoic acid
Etanol dan asid propanoik
- B Propanol and butanoic acid
Propanol dan asid butanoik
- C Butanol and ethanoic acid
Butanol dan asid etanoik
- D Pentanol and ethanoic acid
Pentanol dan asid etanoik

- 35 The following is a thermochemical equation.
Berikut ialah suatu persamaan termokimia.



What is the heat change when 3.2 g copper is formed in this reaction?

[Relative atomic mass: Cu = 64]

Berapakah perubahan haba apabila 3.2 g kuprum terbentuk dalam tindak balas ini?

[Jisim atom relatif: Cu = 64]

- A 1.37 kJ
- B 7.50 kJ
- C 46.90 kJ
- D 480.00 kJ

- 36** Table 2 shows the chemical changes happen in four reactions.

Jadual 2 menunjukkan perubahan kimia yang berlaku dalam empat tindak balas.

Reactions <i>Tindak balas</i>	Chemical changes <i>Perubahan kimia</i>
W	Zinc atom becomes zinc ion <i>Atom zink menjadi ion zink</i>
X	MnO ₄ ⁻ ion becomes Mn ²⁺ ion <i>Ion MnO₄⁻ menjadi ion Mn²⁺</i>
Y	Iodide ion becomes iodine atom <i>Ion iodida menjadi atom iodin</i>
Z	Chlorine molecule becomes chloride ion <i>Molekul klorin menjadi ion klorida</i>

Table / Jadual 2

Which of the chemical changes above involving losing of electron?

Antara perubahan kimia di atas yang manakah melibatkan kehilangan elektron?

- A** W and X
W dan X
- B** W and Y
W dan Y
- C** X and Y
X dan Y
- D** Y and Z
Y dan Z

- 37 Diagram 10 shows the heating curve of solid Z.

Rajah 10 menunjukkan lengkung pemanasan bagi pepejal Z.

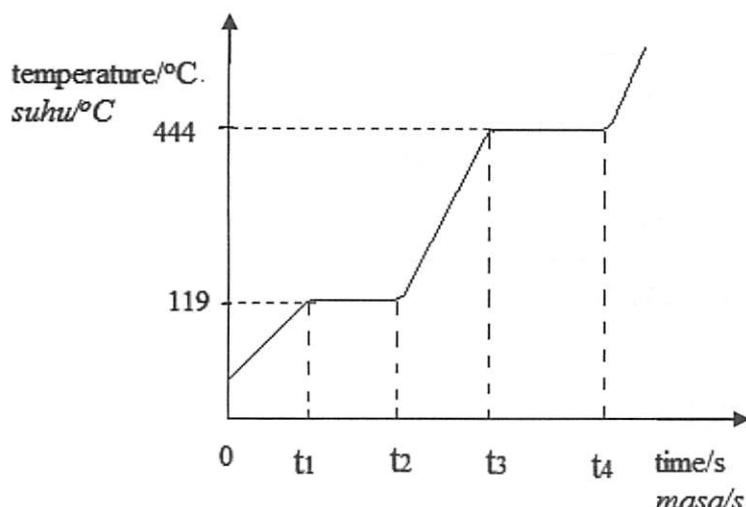


Diagram / Rajah 10

Which statement can be deduced from Diagram 10?

Pernyataan manakah boleh disimpulkan daripada Rajah 10?

- A The boiling point of substance Z is $119\text{ }^{\circ}\text{C}$
Takat didih bahan Z adalah $119\text{ }^{\circ}\text{C}$
- B All the substance Z is in liquid state at t_3
Semua bahan Z adalah dalam keadaan cecair pada t_3
- C The kinetic energy of particles in substance Z decreases from t_3 to t_4
Tenaga kinetik zarah-zarah dalam bahan Z berkurangan dari t_3 kepada t_4
- D Heat is absorbed to overcome the intermolecular force from t_1 to t_2
Haba diserap untuk mengatasi daya tarikan antara molekul dari t_1 kepada t_2

- 38 Which of the chemicals equation represent the reactions between hot iron wool and chlorine gas?

Persamaan kimia manakah yang mewakili tindak balas antara wul besi panas dan gas klorin?

- A $\text{Fe} + \text{Cl}_2 \rightarrow \text{FeCl}_2$
- B $2\text{Fe} + \text{Cl}_2 \rightarrow 2\text{FeCl}_2$
- C $\text{Fe} + \text{Cl}_2 \rightarrow \text{FeCl}_3$
- D $2\text{Fe} + 3\text{Cl}_2 \rightarrow 2\text{FeCl}_3$

- 39** Table 3 shows the mass of elements X and O in an oxide; and the relative atomic mass of elements X and O.

Jadual 3 menunjukkan jisim bagi unsur X dan O dalam sebatian oksidanya; dan jisim atom relativ bagi unsur X dan O.

Element Unsur	X	O
Mass /g Jisim /g	4.6	1.6
Relative atomic mass Jisim atom relativ	23	16

Table / Jadual 3

The empirical formula for X oxide is
Formula empirik bagi oksida X ialah

- A X_2O_3
- B X_2O
- C XO_2
- D XO

- 40** Table 4 shows the melting point and boiling point of four substances.

Jadual 4 menunjukkan takat lebur dan takat didih bagi empat bahan.

Substance Bahan	Melting point ($^{\circ}\text{C}$) Takat lebur ($^{\circ}\text{C}$)	Boiling point ($^{\circ}\text{C}$) Takat didih ($^{\circ}\text{C}$)
W	-157	-9
X	-13	55
Y	80	196
Z	256	300

Table / Jadual 4

Which substance is a gas at room temperature?

Bahan manakah merupakan gas pada suhu bilik ?

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

- 41 Diagram 11 shows the electrolysis of concentrated sodium chloride solution using carbon electrodes.

Rajah 11 menunjukkan elektrolisis larutan natrium klorida pekat menggunakan elektrod karbon.

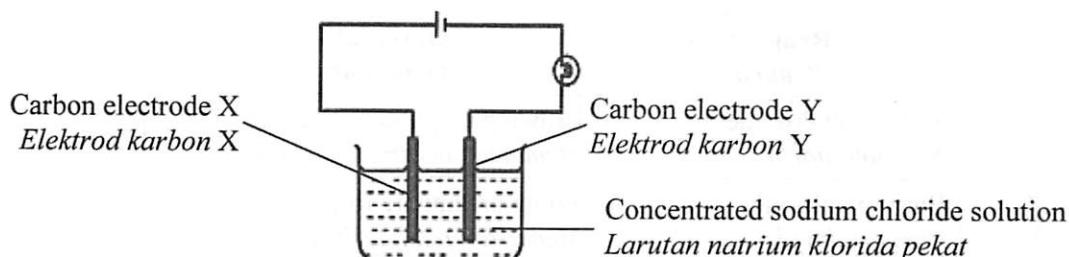


Diagram / Rajah 11

Which are the half equations that represent the reactions at the electrode X and electrode Y?
Persamaan setengah manakah yang mewakili tindak balas di elektrod X dan elektrod Y?

	X	Y
A	$2\text{Cl}^- \rightarrow \text{Cl}_2 + 2\text{e}$	$4\text{OH}^- \rightarrow 2\text{H}_2\text{O} + \text{O}_2 + 4\text{e}$
B	$\text{Na}^+ + \text{e} \rightarrow \text{Na}$	$\text{Na}^+ + \text{e} \rightarrow \text{Na}$
C	$2\text{Cl}^- \rightarrow \text{Cl}_2 + 2\text{e}$	$4\text{OH}^- \rightarrow 2\text{H}_2\text{O} + \text{O}_2 + 4\text{e}$
D	$2\text{H}^+ + 2\text{e} \rightarrow \text{H}_2$	$2\text{H}^+ + 2\text{e} \rightarrow \text{H}_2$

- 42 The pH value of 1.0 mol dm^{-3} of alkali M is 14.
Which statement is true about alkali M?

Nilai pH bagi alkali M 1.0 mol dm^{-3} adalah 14.
Pernyataan manakah yang benar tentang alkali M?

- A Slightly soluble in water
Larut sedikit dalam air
- B Reacts only with the weak acid
Hanya bertindak balas dengan asid lemah
- C The degree of ionisation in water is high
Darjah pengionan dalam air adalah tinggi
- D Has a low concentration of hydroxide ion
Mempunyai kepekatan ion hidroksida yang rendah

- 43 The aqueous solution of salt S gives the following observations when added with sodium hydroxide solution and barium chloride solution.

Larutan berair bagi satu garam S memberikan pemerhatian-pemerhatian berikut apabila ditambah dengan larutan natrium hidroksida dan barium klorida larutan.

Reagent <i>Reagen</i>	Observation <i>Pemerhatian</i>
Sodium hydroxide <i>Natrium hidroksida</i>	Brown precipitate formed <i>Mendakan perang terbentuk</i>
Barium chloride <i>Barium klorida</i>	White precipitate formed <i>Mendakan putih terbentuk</i>

Which of the following maybe salt S?

Antara garam berikut, yang manakah mungkin garam S?

- A Iron(II) chloride
Ferum(II) klorida
- B Iron(II) carbonate
Ferum(II) karbonat
- C Iron(III) sulphate
Ferum(III) sulfat
- D Iron(III) nitrate
Ferum(III) nitrat

- 44 Which of the following medicines is an antibiotic?

Antara ubat berikut, yang manakah suatu antibiotik?

- A Insulin
insulin
- B Codeine
kodeine
- C Streptomycin
streptomisin
- D Paracetamol
Parasetamol

- 45 Diagram 12 shows the graph of volume of oxygen gas against time for Experiment I and II obtained from the decomposition of hydrogen peroxide, H_2O_2 .
Rajah 12 menunjukkan graf isi padu gas oksigen melawan masa bagi Eksperimen I dan II yang diperolehi daripada penguraian hidrogen peroksida, H_2O_2 .

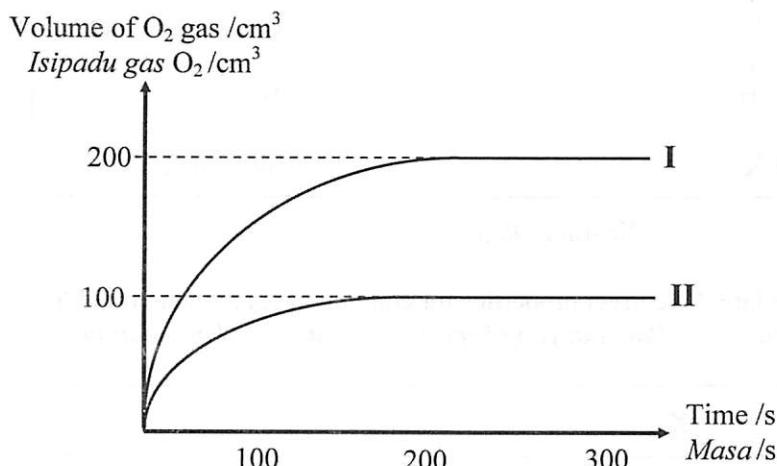


Diagram / Rajah 12

Which of the following give results as shown in the graph?

Antara berikut, yang manakah dapat memberikan keputusan seperti yang ditunjukkan oleh graf?

	Experiment I <i>Eksperimen I</i>	Experiment II <i>Eksperimen II</i>
A	25 cm^3 of 1.0 mol dm^{-3} H_2O_2 is used 25 cm^3 H_2O_2 1.0 mol dm^{-3} digunakan	25 cm^3 of 0.5 mol dm^{-3} H_2O_2 is used 25 cm^3 H_2O_2 0.5 mol dm^{-3} digunakan
B	1.5 catalyst mangan(IV) oxide is used 1.5 g mangkin mangan(IV) oksida digunakan	0.75 g catalyst mangan (IV) oxide is used 0.75 g mangkin mangan(IV) oksida digunakan
C	Reaction happen at 50 °C <i>Tindak balas berlaku pada 50 °C</i>	Reaction happen at 25 °C <i>Tindakbalas berlaku pada 25 °C</i>
D	50 cm^3 of 0.5 mol dm^{-3} H_2O_2 is used 50 cm^3 H_2O_2 0.5 mol dm^{-3} digunakan	25 cm^3 of 0.5 mol dm^{-3} H_2O_2 is used 25 cm^3 H_2O_2 0.5 mol dm^{-3} digunakan

- 46** Diagram 13 shows the structural formulae of compound X and compound Y.
Rajah 13 menunjukkan formula struktur bagi sebatian X dan sebatian Y.

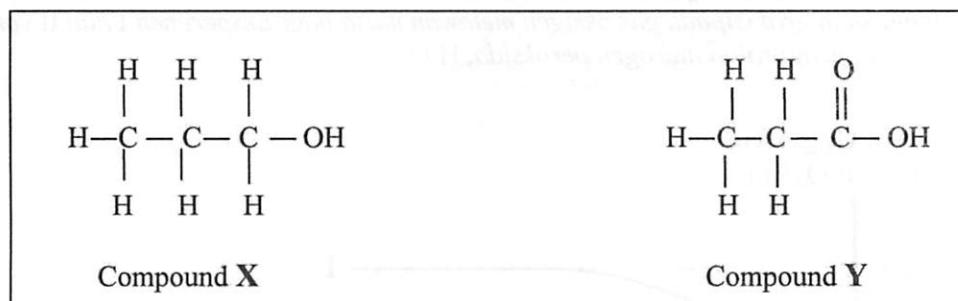


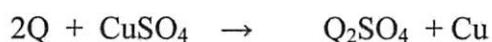
Diagram / Rajah 13

Which of the following are the correct properties for compound X and compound Y?
Antara berikut, yang manakah sifat-sifat yang betul bagi sebatian X dan sebatian Y?

	X	Y
A	Insoluble in water <i>Tidak larut dalam air</i>	Soluble in water <i>Larut dalam air</i>
B	Do not react with acidified potassium manganate(VII) <i>Tidak bertindak balas dengan kalium manganat (VII)</i>	Reacts with acidified potassium manganate(VII) <i>Bertindak balas dengan kalium manganat (VII)</i>
C	Do not burn in air <i>Tidak terbakar dalam udara</i>	Burns in the air <i>Terbakar dalam udara</i>
D	Reacts with Y to form ester <i>Bertindak balas dengan Y menghasilkan ester</i>	Reacts with X to form ester <i>Bertindak balas dengan X menghasilkan ester</i>

47 Equation below show the displacement reaction of metal.

Persamaan di bawah menunjukkan suatu tindak balas penyesaran logam



Base on the equation above, what is the volume of 1.0 mol dm^{-3} copper(II) sulphate solution that reacted completely with 0.92 g of metal Q?

[Relative atomic mass of Q = 23]

Berdasarkan persamaan di atas, berapakah isi padu larutan kuprum(II) sulfat 1.0 mol dm^{-3} yang bertindak balas lengkap dengan 0.92 g logam Q?

[Jisim atom relatif Q = 23]

- A 15 cm^3
- B 20 cm^3
- C 30 cm^3
- D 60 cm^3

- 48 The following information shows the results of an experiment to determine the heat change for the combustion of propanol, C_3H_7OH .

Maklumat berikut menunjukkan keputusan bagi satu eksperimen untuk menentukan perubahan haba bagi pembakaran propanol, C_3H_7OH .

Volume of water in the copper container

Isipadu air dalam bekas kuprum

$$= 300 \text{ cm}^3$$

Initial temperature of water in the copper container

Suhu awal air dalam bekas kuprum

$$= 27.5 \text{ }^\circ\text{C}$$

The highest temperature of water in the copper container

Suhu tertinggi air dalam bekas kuprum

$$= 68.5 \text{ }^\circ\text{C}$$

What is the heat released by the combustion of propanol, C_3H_7OH ?

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

Berapakah haba yang dibebaskan oleh pembakaran propanol, C_3H_7OH ?

[Muatan haba tentu air = $4.2 \text{ J g}^{-1} \text{ }^\circ\text{C}^{-1}$; Ketumpatan air = 1 g cm^{-3}]

A 34.65 kJ

B 51.66 kJ

C 86.31 kJ

D 120.96 kJ

- 49** Diagram 14 shows the apparatus set-up for the neutralisation reaction between acid and alkali.
Rajah 14 menunjukkan susunan radas bagi tindak balas peneutralan antara asid dan alkali.

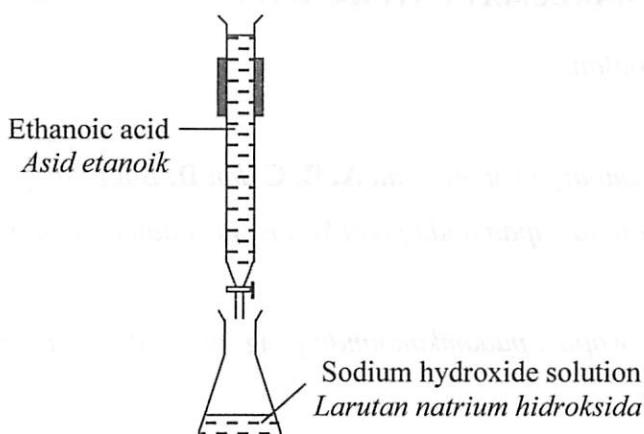


Diagram / Rajah 14

50 cm³ of 0.1 mol dm⁻³ of ethanoic acid, CH₃COOH neutralises completely with x g of sodium hydroxide, NaOH that is dissolved in 100 cm³ of water.

Calculate the value of x .

[Given that the molar mass of sodium hydroxide, NaOH is 40]

50 cm³ of 0.1 mol dm⁻³ asid etanoik, CH₃COOH meneutralkan dengan lengkap x g larutan natrium hidroksida, NaOH yang dilarutkan dalam 100 cm³ air.

[Diberi jisim molar natrium hidroksida ialah 40]

- A 0.005 g
- B 0.2 g
- C 2 g
- D 40 g

- 50** Which substance contains the same number of atom as in 12 g of carbon?

[Relative atomic mass: He=2, C=12, O=16, Ca=40, N=14, S=32]

Bahan manakah yang mengandungi bilangan atom yang sama dengan 12 g karbon?

[Jisim atom relatif: He=2, C=12, O=16, Ca=40, N=14, S=32]

- A 2 g of Helium
2 g Helium
- B 20 g of calcium
20 g kalsium
- C 46 g of nitrogen dioxide
46 g nitrogen dioksida
- D 16 g of sulphur
16 g sulfur

**END OF QUESTION
SOALAN TAMAT**

**INFORMATION FOR CANDIDATES
MAKLUMAT UNTUK CALON**

1. Kertas ini mengandungi **50** soalan.
2. Jawab semua soalan.
3. Tiap-tiap soalan diikuti oleh empat jawapan, iaitu **A, B, C** dan **D**. Bagi setiap soalan, pilih satu jawapan sahaja. Hitamkan jawapan anda pada kertas jawapan objektif yang disediakan.
4. Jika anda hendak menukar jawapan, padamkan tanda yang telah dibuat. Kemudian hitamkan jawapan yang baru.
5. Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.
6. Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.

NAMA :

TINGKATAN :

ANGKA GILIRAN :

4541/2

KIMIA
Kertas 2
Ogos/Sept
2 $\frac{1}{2}$ jam

Pentaksiran Sumatif 3

SIJIL PELAJARAN MALAYSIA 2013

Dua jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. Tulis **nama** dan **tingkatan** anda pada ruangan yang disediakan di atas.
2. Kertas soalan ini adalah dalam **dwibahasa**.
3. Soalan dalam Bahasa Inggeris mendahului soalan yang sepadan dalam Bahasa Melayu.
4. Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam **Bahasa Inggeris** atau **Bahasa Melayu**.
5. Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini

<i>Untuk Kegunaan Pemeriksa</i>		
Bahagian	Soalan	Markah diperoleh
A	1	
	2	
	3	
	4	
	5	
	6	
B	7	
	8	
C	9	
	10	
JUMLAH		

Kertas soalan ini mengandungi 23 halaman bercetak.

TERENGGANU NEGERI ANJUNG ILMU

Dibiayai oleh:

Kerajaan Negeri Terengganu

Dicetak Oleh:

Percetakan Yayasan Islam Terengganu Sdn. Bhd.

Tel: 609-666 8611/6652/8601 Faks: 609-666 0611/0063

Section A
[60 marks]

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

- 1 (a) Diagram 1 shows an experiment to determine the empirical formula of X oxide.
Rajah 1 menunjukkan satu eksperimen untuk menentukan formula empirik oksida X.

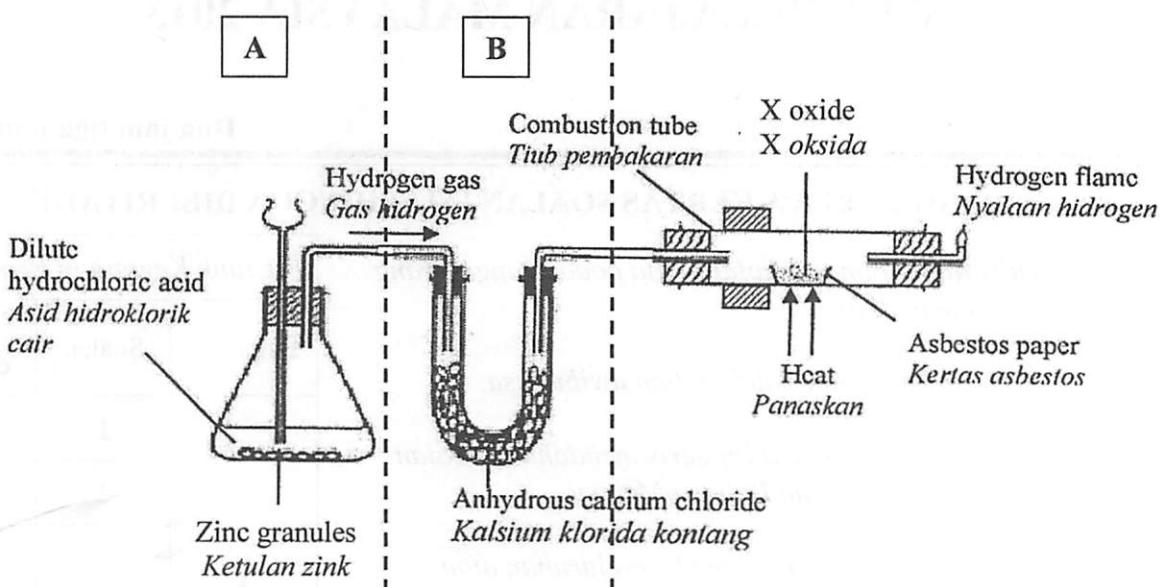


Diagram / Rajah 1

- (i) State the function of part B in the Diagram 1 above.
Nyatakan fungsi bahagian B dalam Rajah 1 di atas.

.....
[1 mark]

- (ii) Write the chemical equation for the reaction in part A.
Tuliskan persamaan kimia bagi tindak balas di bahagian A.

.....
[2 marks]

- (iii) State the suitable of X oxide in the experiment.
Nyatakan oksida X yang sesuai dalam eksperimen ini.

.....
[1 mark]

- (iv) State **one** precaution step should be taken before heating the X oxide.
Nyatakan satu langkah berjaga-jaga yang perlu dilakukan sebelum memanaskan oksida X.

.....
[1 mark]

- (b) Table below shows the result obtained from the experiment:
Jadual di bawah menunjukkan keputusan yang diperolehi daripada eksperimen tersebut:

Mass of combustion tube + asbestos paper <i>Jisim tiub pembakaran + kertas asbestos</i>	=	58.36 g
Mass of combustion tube + asbestos paper + Metal X oxide <i>Jisim tiub pembakaran + kertas asbestos + oksida logam X</i>	=	91.96 g
Mass of combustion tube + asbestos paper + Metal X <i>Jisim tiub pembakaran + kertas asbestos + logam X</i>	=	85.24 g

- (i) Calculate the mass of X and the mass of oxygen that has reacted.
Hitungkan jisim X dan jisim oksigen yang bertindak balas.

[1 mark]

- (ii) Determine the empirical formula of X oxide.
[Relative atomic mass; O=16 ; X=64]
Tentukan formula empirik bagi oksida X.
[Jisim atom relatif; O=16 ; X=64]

[2 marks]

- (c) State how to determine that the reaction between X oxide with hydrogen has completed.
Nyatakan bagaimana untuk menentukan bahawa tindak balas yang berlaku antara oksida X dengan hydrogen telah lengkap.

.....
[1 mark]

- 2 Table 2 shows type of chemical bond of two compounds.
Jadual 2 menunjukkan jenis ikatan kimia bagi dua sebatian.

Compound <i>Sebatian</i>	Type of chemical bond <i>Jenis ikatan kimia</i>
Sodium chloride, NaCl <i>Natrium klorida, NaCl</i>	Ionic <i>Ion</i>
Carbon dioxide, CO ₂ <i>Karbon dioksida, CO₂</i>

Table / Jadual 2

- (a) State the colour of sodium chloride.
Nyatakan warna natrium klorida.

..... [1 mark]

- (b) (i) State the type of chemical bond in carbon dioxide.
Nyatakan jenis ikatan kimia dalam karbon dioksida.

..... [1 mark]

- (ii) State the name for another compound that has the same type of chemical bond with carbon dioxide.

Nyatakan nama sebatian lain yang mempunyai jenis ikatan yang sama dengan karbon dioksida.

..... [1 mark]

- (c) Proton numbers of carbon atom and oxygen atom are 6 and 8.
Nombor proton bagi atom karbon dan oksigen ialah 6 dan 8.

- (i) Write the electron arrangement of oxygen atom.
Tulis susunan elektron bagi atom oksigen.

..... [1 mark]

- (ii) Draw the diagram of electron arrangement of carbon dioxide.
Lukiskan gambar rajah susunan elektron bagi karbon dioksida.

.....

[2 marks]

- (d) (i) Between sodium chloride and carbon dioxide, which compound has a lower melting point?

Antara natrium klorida dan karbon dioksida, yang manakah sebatian, yang mempunyai takat lebur yang lebih rendah?

.....

[1 mark]

- (ii) Explain your answer in (d) (i).
Terangkan jawapan anda dalam (d) (i).

.....

[2 marks]

- 3 Table 3.1 shows the information about four solutions; P, Q, R and S.
P, Q, R and S may be acid or alkali.

*Jadual 3.1 menunjukkan maklumat tentang empat larutan P, Q, R dan S.
Larutan P, Q, R dan S mungkin asid atau alkali.*

Solution <i>Larutan</i>	Information <i>Maklumat</i>	pH value <i>Nilai pH</i>
P	Ionised completely in water <i>Mengion lengkap dalam air</i>	2
Q	Ionised partially in water <i>Mengion separa lengkap dalam air</i>	6
R	<i>Ionised completely in water</i> <i>Mengion lengkap dalam air</i>	13
S	Ionised partially in water <i>Mengion separa lengkap dalam air</i>	8

Table / Jadual 3.1

- (a) State the meaning of alkali.
Nyatakan maksud alkali.

.....
.....

[1 mark]

- (b) Based on Table 3.1, state the
Berdasarkan Jadual 3.1, nyatakan

- (i) strong alkali / *alkali kuat* :
- (ii) weak acid / *asid lemah* :

[2 marks]

- (c) You are given a bottle of solution X as Diagram 3.2
Anda diberikan satu botol larutan X seperti Rajah 3.2



Diagram / Rajah 3.2

Describe a chemical test to prove the solution X is an acid.
Huraikan satu ujian kimia untuk membuktikan larutan X ialah suatu asid.

.....

[3 marks]

- (d) (i) Diagram 3.3 shows two volumetric flasks; A and B containing sodium hydroxide solution.
Rajah 3.3 menunjukkan dua kelalang volumetrik; A dan B yang mengandungi larutan natrium hidroksida.

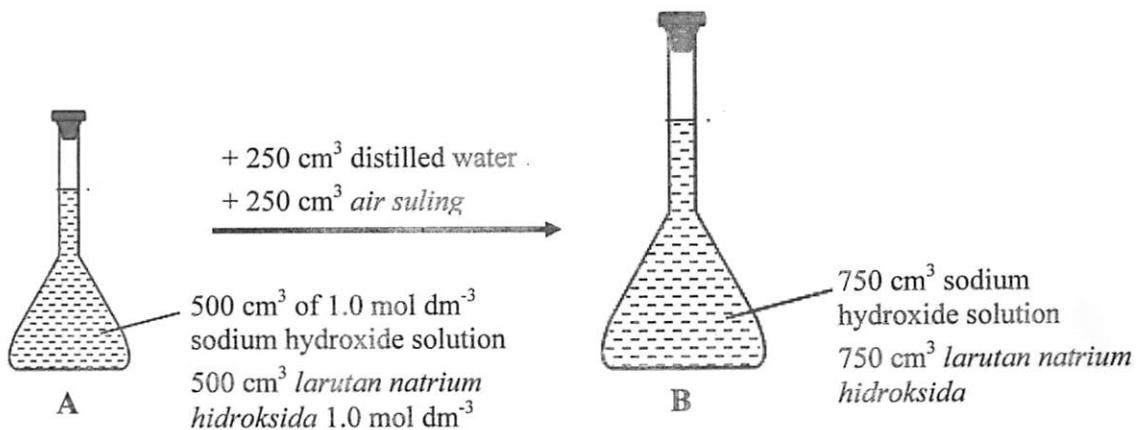


Diagram / Rajah 3.3

Calculate the concentration of sodium hydroxide solution in volumetric flask B in mol dm⁻³.

Hitung kepekatan larutan natrium hidroksida dalam kelalang volumetrik B dalam mol dm⁻³.

[2 marks]

- (ii) Write a chemical equation for the reaction between sodium hydroxide and sulphuric acid.

Tulis persamaan tindak balas bagi tindak balas antara natrium hidroksida dan asid sulfurik.

[3 marks]

- 4 Table 4 shows apparatus set-up of two experiments to investigate the rate of reaction between zinc and sulphuric acid.

Jadual 4 menunjukkan susunan radas bagi dua eksperimen untuk kadar tindak balas antara zink dan asid sulfurik.

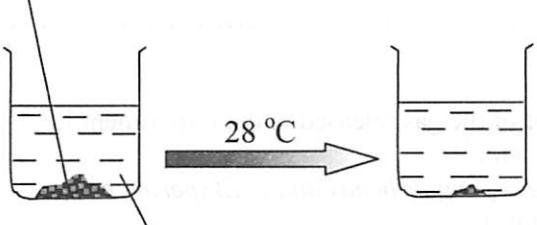
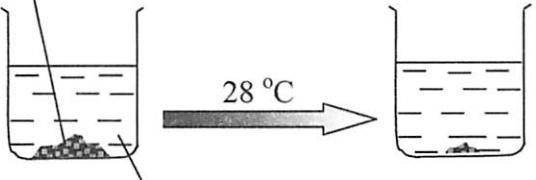
Experiment <i>Eksperimen</i>	Time taken for complete reaction <i>Masa yang diambil untuk tindak balas lengkap</i>
Eksperiment I <u>Eksperimen I</u> <p>Zinc powder <i>Serbuk zink</i></p>  <p>28 °C</p> <p>100 cm³ sulphuric acid 0.5 mol dm⁻³ 100 cm³ asid sulfurik 0.5 mol dm⁻³</p>	60 s
Eksperiment II <u>Eksperimen II</u> <p>Zinc powder <i>Serbuk zink</i></p>  <p>28 °C</p> <p>100 cm³ sulphuric acid 0.5 mol dm⁻³ + Copper(II) sulphate solution 100 cm³ asid sulfurik 0.5 mol dm⁻³ + Larutan kuprum(II) sulfat</p>	40 s

Table / Jadual 4

- (a) State the function of copper(II) sulphate solution in Experiment II.
Nyatakan fungsi larutan kuprum(II) sulfat dalam Eksperimen II.

..... [1 mark]

- (b) State another factor that can affect the rate of reaction in the experiment.
Nyatakan faktor lain yang mempengaruhi kadar tindak balas dalam eksperimen ini.

..... [1 mark]

- 5 Diagram 5.1 shows the set-up of apparatus to determine the potential difference between two metals.

Rajah 5.1 menunjukkan susunan radas untuk menentukan beza keupayaan antara dua logam.

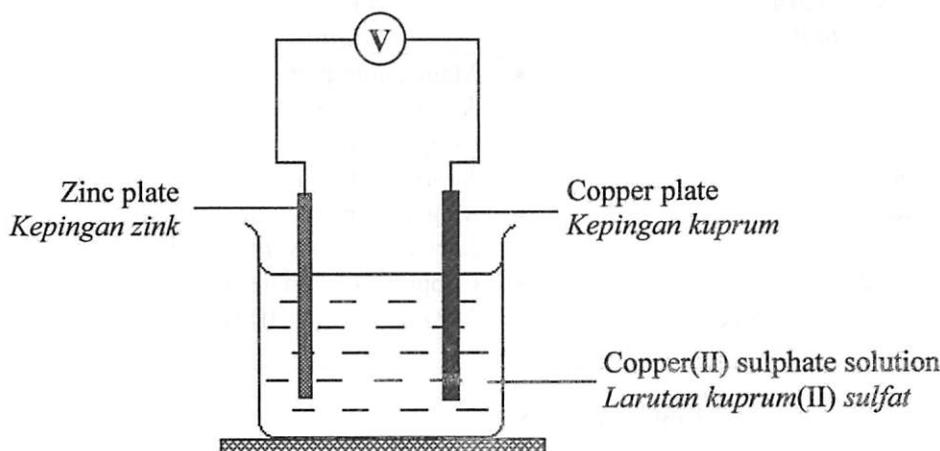


Diagram / Rajah 5.1

- (a) State the name of the apparatus set-up.
Nyatakan nama bagi susunan radas itu.

.....
[1 mark]

- (b) Which metal plate is the negative terminal? Give a reason.
Kepingan logam manakah merupakan terminal negatif? Berikan alasan anda.

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

- (c) Write the formula of all ions in copper(II) sulphate solution.
Tuliskan formula semua ion dalam larutan kuprum(II) sulfat.

.....
[1 mark]

- (d) Write the half equation for the reaction occur at the copper plate.
Tuliskan setengah persamaan bagi tindak balas yang berlaku pada kepingan kuprum.

.....
[2 marks]

- (e) What is the colour change of the copper(II) sulphate solution? Explain your answer.
Apakah perubahan warna larutan kuprum(II) sulfat? Jelaskan jawapan anda.

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

- (f) Table 5.2 shows a list of apparatus and materials.
Jadual 5.2 menunjukkan senarai radas dan bahan.

Apparatus Radas	Materials Bahan
• Porous pot <i>Pasu berliang</i>	• Magnesium plate <i>Kepingan magnesium</i>
• Voltmeter <i>Voltmeter</i>	• Copper plate <i>Kepingan kuprum</i>
• Beaker <i>Bikar</i>	• Magnesium sulphate solution <i>Larutan magnesium sulfat</i>
• Connecting wires <i>Wayar penyambung</i>	• Copper(II) sulphate solution <i>Larutan kuprum(II) sulfat.</i>

Table / Jadual 5.2

By using apparatus and materials in Table 5.2, draw the apparatus set-up to show the production of electricity from chemical reactions.
 Mark the direction of electron flow on the diagram.

*Dengan menggunakan radas dan bahan kimia dalam Jadual 5.2, lukiskan susunan radas untuk menunjukkan penghasilan elektrik daripada tindak balas kimia.
 Tandakan arah pengaliran elektron pada rajah tersebut.*



Diagram ini menunjukkan susunan radas yang boleh digunakan untuk menunjukkan penghasilan elektrik daripada tindak balas kimia.

Menurut Rajah diatas, lukiskan susunan radas yang betul dan tandakan arah pengaliran elektron pada rajah tersebut.
[3 marks]

- 6 Diagram 6 shows the set-up of the apparatus used to determine the value of heat of precipitation of magnesium carbonate.

Rajah 6 menunjukkan susunan alat radas yang digunakan untuk menentukan nilai haba pemendakan bagi magnesium karbonat.

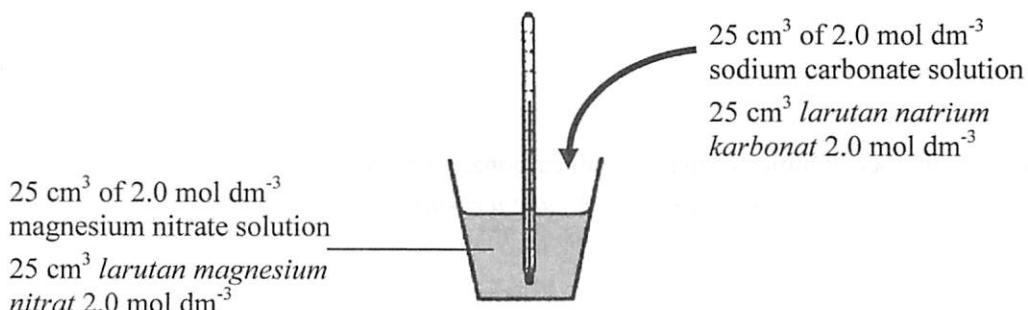


Diagram / Rajah 6

The following data was obtained.

Data berikut diperoleh.

Initial temperature of magnesium nitrate solution = 28.0 °C
Suhu awal larutan magnesium nitrat

The lowest temperature of the mixture of products = 22.5 °C
Suhu terendah campuran hasil tindak balas

- (a) Based on the experiment, what is meant by the heat of precipitation?

Berdasarkan eksperimen itu, apakah yang dimaksudkan dengan haba pemendakan?

.....
.....
.....

[1 mark]

- (b) Write the ionic equation for the reaction that occurred.

Tuliskan persamaan ion bagi tindak balas yang berlaku.

.....
.....

[1 mark]

- (c) Calculate

Hitungkan

- (i) the change of heat in the experiment.
perubahan haba dalam eksperimen itu.

[1 mark]

- (ii) the number of moles of magnesium ion and carbonate ion that reacted.
bilangan mol ion magnesium dan ion karbonat yang bertindak balas.

[1 mark]

- (iii) the number of moles of magnesium carbonate formed.
bilangan mol magnesium karbonat yang terbentuk.

[1 mark]

- (iv) the heat of precipitation of magnesium carbonate.
haba pemendakan bagi magnesium karbonat.

[2 marks]

- (d) Draw the energy level diagram for the reaction.
Lukiskan gambar rajah aras tenaga bagi tindak balas itu.

[3 marks]

- (e) If the sodium carbonate solution is replaced with potassium carbonate solution of the same concentration, the heat of precipitation is the same. Give a reason.
Jika larutan natrium karbonat digantikan dengan larutan kalium karbonat yang sama kepekatan, haba pemendakan adalah sama. Berikan sebab bagi jawapan anda.

.....
[1 mark]

Section B
[20 marks]

Answer any **one** question from this section.
Jawab mana-mana satu soalan daripada bahagian ini.

- 7 (a) Diagram 7.1 shows the reaction for the production of ammonia in industry.
Rajah 7.1 menunjukkan tindak balas penghasilan ammonia dalam industri.

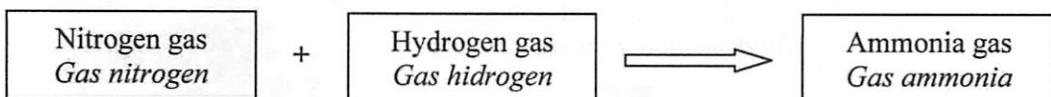


Diagram / Rajah 7.1

- (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]
- (iii) State three conditions needed for the reaction in (a) (ii) to occur.
Nyatakan tiga keadaan yang diperlukan untuk membolehkan tindak balas di (a) (ii) berlaku. [3 marks]
- (iv) Ammonia is used to prepare the following fertilizers:
 - Ammonium nitrate, NH_4NO_3
 - Urea, $\text{CO}(\text{NH}_2)_2$

Ammonia digunakan untuk menyediakan baja-baja berikut:

- *Ammonium nitrat, NH_4NO_3*
- *Urea, $\text{CO}(\text{NH}_2)_2$*

Compare the percentage of nitrogen by mass in both fertilizers.

Which fertilizer is better to increase the production of crops?

Give a reason to your answer.

[Relative atomic mass: H=1; C=12; N=14; O=16]

Baja manakah lebih sesuai diguna untuk meningkatkan hasil tanaman. Beri satu sebab kepada jawapan anda.

[Jisim atom relatif: H=1; C=12; N=14; O=16]

[4 marks]

- (b) Table 7.2 shows two different manufactured substances in industry, A and B and their uses.
Jadual 7.2 menunjukkan dua bahan buatan industri yang berbeza, A dan B dan kegunaannya.

Manufactured substances in industry Bahan buatan dalam industri	Uses Kegunaan
Alloy A <i>Aloi A</i>	To make medals and statues. <i>Untuk membuat pingat dan tugu.</i>  
Glass B <i>Kaca B</i>	To make laboratory glassware and glass cookware. <i>Untuk membuat radas kaca makmal dan alatan memasak.</i>  

Table / Jadual 7.2

- (i) Based on Table 7.2, state the name of Alloy A and type of Glass B.
 Give the specific properties of each substance to support your answer.

Berdasarkan Jadual 7.2, nyatakan nama bagi Aloi A dan jenis Kaca B.

Berikan sifat khusus bagi setiap bahan tersebut untuk menyokong jawapan anda.

[4 marks]

- (ii) Draw the arrangement of atom in pure copper and Alloy A.
 Compare the hardness of pure copper and Alloy A. Explain your answer in term of size and arrangement of atoms.

Lukis susunan atom dalam kuprum tulen dan Aloi A.

Bandingkan kekerasan antara kuprum tulen dan Aloi A. Terangkan jawapan anda dari segi saiz dan susunan atom-atom.

[6 marks]

- 8** Table 8.1 shows two sets of experiment to study redox reaction.

Jadual 8.1 menunjukkan dua set eksperimen untuk mengkaji tindak balas redoks.

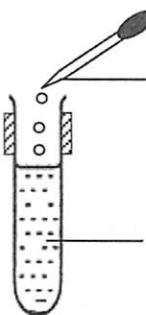
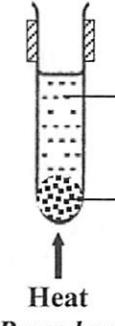
Experiment Eksperimen	Set-up of apparatus <i>Susunan Radas</i>	Observation <i>Pemerhatian</i>
I	 <p>Acidified potassium manganate(VII) solution <i>Larutan kalium manganat(VII) berasid</i></p> <p>Iron(II) sulphate solution <i>Larutan ferum(II) sulfat</i></p>	<p>The green colour of Iron(II) sulphate solution turns yellow. <i>Warna hijau larutan ferum(II) sulfat bertukar kuning.</i></p>
II	 <p>Iron(III) chloride solution <i>Larutan ferum(III) klorida</i></p> <p>Zinc powder <i>Serbuk zink</i></p> <p>Heat <i>Panaskan</i></p>	<p>The yellow colour of Iron(III) chloride solution turns green. <i>Warna kuning larutan ferum(II) sulfat bertukar hijau.</i></p>

Table / Jadual 8.1

- (a) Based on the Table 8.1,
Berdasarkan Jadual 8.1,

- (i) explain the observations

Terangkan pemerhatian-pemerhatian tersebut

[4 marks]

- (ii) state the substance that oxidised and reduced in Experiment I

nyatakan bahan yang dioksidakan dan diturunkan dalam Eksperimen I

[2 marks]

- (iii) write the half equation for oxidation and reduction in Experiment II

tuliskan persamaan setengah bagi pengoksidaan dan penurunan dalam Eksperimen II

[2 marks]

- (iv) state the oxidising agent and reducing agent in Experiment II

nyatakan agen pengoksidaan dan agen penurunan dalam Eksperimen II

[2 marks]

- (b) Calculate the oxidation number of manganese in potassium manganate(VII), KMnO_4 .

Hitung nombor pengoksidaan mangan dalam kalium manganat(VII), KMnO_4 .

[2 marks]

- (c) Suggest another substance that can replace the acidified potassium manganate(VII) solution in Experiment I and zinc in Experiment II.

Cadangkan bahan lain yang boleh menggantikan larutan Kalium manganat(VII) besid dalam Eksperimen I dan zink dalam Eksperimen II.

[2 marks]

- (d) An experiment is carried out to determine the position of metal P, Q and copper in Reactivity Series.

Table 8.2 shows the results of experiment when the mixture of powder and oxide powder is heated.

Satu eksperimen dijalankan untuk menentukan kedudukan logam P, Q dan kuprum dalam Siri Kereaktifan.

Jadual 8.2 menunjukkan keputusan eksperimen bila campuran serbuk logam dan oksida logam dipanaskan.

Experiment Eksperimen	I	II	III
Mixture Campuran	P + copper(II) oxide P + kuprum(II) oksida	Q + copper(II) oxide Q + kuprum(II) oksida	P + oxide Q P + oksida Q
Observation Pemerhatian	Black powder turn to brown <i>Serbuk hitam bertukar ke perang</i>	Black powder turn to brown <i>Serbuk hitam bertukar ke perang</i>	No changes <i>Tiada perubahan</i>

Table / Jadual 8.2

Based on the results in Table 8.2, arranged the metal P, Q and copper in order of increasing reactivity towards oxygen. Explain your answer.

Berdasarkan keputusan dalam Jadual 8.2, susun logam P, Q dan kuprum mengikut susunan kereaktifan menaik terhadap oksigen. Terangkan jawapan anda.

[6 marks]

Section C
[20 marks]

Answer any **one** question from this section.
Jawab mana-mana satu soalan daripada bahagian ini.

- 9 (a) Table 9.1 shows the molecular formula of two carbon compound.
Jadual 9.1 menunjukkan formula molekul bagi dua sebatian karbon.

Carbon compound <i>Sebatian karbon</i>	Molecular formula <i>Formula molekul</i>
A	C_4H_{10}
B	C_4H_8

Table / Jadual 9.1

- (i) Compare and explain the differences between carbon compound A and B in term of:
- saturated and unsaturated compound
 - observation when react with bromine water
 - sootiness of flame

Banding dan terangkan perbezaan antara sebatian karbon A dan B dari segi:

- sebatian tepu dan tidak tepu
- pemerhatian apabila bertindak balas dengan air bromin
- kejelagaan nyalaan

[6 marks]

- (ii) Draw the structural formula of carbon compound A and B.
State the name of the compounds using IUPAC nomenclature.
Lukiskan formula struktur bagi sebatian karbon A dan B.
Nnyatakan nama bagi sebatian-sebatian itu menggunakan penamaan IUPAC.

[4 marks]

- (b) Diagram 9.2 shows reaction scheme of alcohol J.
Rajah 9.2 menunjukkan skema tindak balas bagi alkohol J.

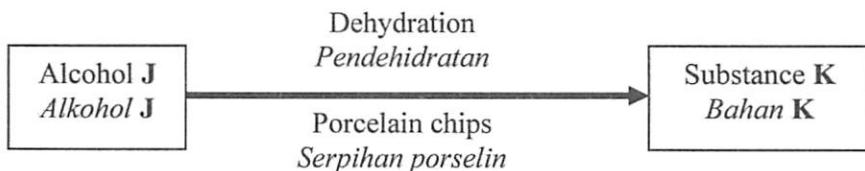


Diagram / Rajah 9.2

- (i) Suggest the name of alcohol J and substance K.
Cadangkan nama bagi alkohol J dan bahan K.
- (ii) By using the materials that have been named in (b) (i), describe an experiment to convert alcohol J to substance K.
Your answer should include a labelled diagram and chemical equation involved.
*Dengan menggunakan bahan yang telah dinamakan dalam (b) (i),uraikan satu eksperimen untuk menukar alkohol J kepada bahan K.
Jawapan anda mestilah mengandungi gambar rajah berlabel dan persamaan kimia yang terlibat.*

[10 marks]



- 10 (a) Table 10 shows the observations of two experiments.
Jadual 10 menunjukkan pemerhatian bagi dua eksperimen.

Experiment Eksperimen	Description Penerangan	Observation Pemerhatian
I	Substance V was heated strongly. Gas produced is flow through lime water. <i>Bahan V dipanaskan dengan kuat Gas terhasil dialirkan ke dalam air kapur.</i>	The colour of residue is black. Gas W turns lime water chalky. <i>Warna baki ialah hitam. Gas W menukarkan air kapur menjadi keruh.</i>
II	Substance X was heated strongly. <i>Bahan X dipanaskan dengan kuat.</i>	The colour of residue is black. Brown colour of gas Y and gas Z that rekindles glowing wooden splinter produced. <i>Warna baki ialah hitam. Gas perang Y dan gas Z yang menyalaikan kayu uji berbara dihasilkan.</i>

Table / Jadual 10

Based on Table 10, identify substance V, X, gas W, Y and Z.
Berdasarkan Jadual 10, kenal pasti bahan V, X, gas W, Y dan Z.

[5 marks]

- (b) You are given the following substances:
Anda diberikan bahan-bahan berikut:

- Dilute hydrochloric acid
Asid hidroklorik cair
- Solution of substance P
Larutan bahan P
- Zinc nitrate solution
Larutan zink nitrat

- (i) Substance P and zinc nitrate solution are used to prepare zinc carbonate.
Suggest substance P.

*Bahan P dan larutan zink nitrat digunakan untuk menyediakan zink karbonat.
 Cadangkan bahan P.*

[1 mark]

- (ii) Describe an experiment to prepare zinc chloride in the laboratory by using the substances above.

Huraikan satu eksperimen untuk menyediakan zink klorida dalam makmal dengan menggunakan bahan-bahan di atas.

[10 marks]

- (iii) Write **two** chemicals equation involved in (b) (ii).
Tuliskan dua persamaan kimia yang terlibat di (b) (ii).

[4 marks]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

THE PERIODIC TABLE OF ELEMENTS

1	H	Hydrogen	-1
---	----------	----------	----

Li	Lithium	7	Be	Beryllium	9
Na	Sodium	11	Mg	Magnesium	12

Proton number	Symbol	Name of element	Relative atomic mass
10	Ne	Neon	20

	Ce	Pr Praseo- dymium	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu Lutetium
58	Cerium	Neodymium	Promethium	Samarium	Europium	Gadolinium	Terbium	Dysprosium	Holmium	Erbium	Thulium	Ytterbium	173	175
90	Thorium	Proactinium	Uranium	Neptunium	Plutonium	Americium	Curium	Berkelium	Californium	Einsteinium	Fermium	Mendelevium	253	254
140		141	144	147	150	152	157	159	163	165	167	169	100	102
141													No	103
142													Lr	257
													Nobelium	254
													Lawrensiun	257

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 'answer sheet' provided by the invigilators.
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 yang dibekalkan oleh pengawas peperiksaan.
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. The diagrams in the questions are not drawn to scale unless stated.
Rajah yang mengiringi soalan tidak dilukiskan mengikut skala kecuali dinyatakan
5. Marks allocated for each question or sub-part of the question is shown in brackets.
Markah yang diperuntukkan bagi setiap soalan atau ceraian soalan ditunjukkan dalam kurungan.
6. Show your working. It may help you to get marks.
Tunjukkan kerja mengira. Ini membantu anda mendapatkan markah.
7. 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.
8. You may use a non-programmable scientific calculator.
Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogramkan.
9. You are advised to spend 90 minutes to answer questions in **Section A**, 30 minutes for **Section B** and 30 minutes for **Section C**.
Anda dicadangkan mengambil masa 90 minit untuk menjawab soalan dalam Bahagian A, 30 minit untuk Bahagian B dan 30 minit untuk Bahagian C.
10. Tie together your answer sheets at the end of the examination.
Ikat semua kertas jawapan anda di akhir peperiksaan.

NAMA :

TINGKATAN :

Pentaksiran Sumatif 3**4541/3****SIJIL PELAJARAN MALAYSIA 2013****CHEMISTRY****Kertas 3****September****1 ½ jam****Satu jam tiga puluh minit****JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU**

1. Tulis **nama** dan **tingkatan** anda pada ruangan yang disediakan di atas.
2. Kertas soalan ini adalah dalam dwibahasa.
3. Soalan dalam Bahasa Inggeris mendahului soalan yang sepadan dalam Bahasa Melayu.
4. Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam Bahasa Inggeris atau Bahasa Melayu.
5. Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini

Untuk Kegunaan Pemeriksa		
Soalan	Markah Penuh	Markah Diperoleh
1	18	
2	15	
3	17	
Jumlah	50	

Kertas soalan ini mengandungi 11 halaman bercetak.

TERENGGANU NEGERI ANJUNG ILMU*Dibiayai oleh:**Kerajaan Negeri Terengganu**Dicetak Oleh:**Percetakan Yayasan Islam Terengganu Sdn. Bhd.**Tel: 609-666 8611/6652/8601 Faks: 609-666 0611/0063*

Answer all question
Jawab semua soalan

- 1 Diagram 1 shows two electrolytic cells.
Rajah 1 menunjukkan dua sel elektrolisis.

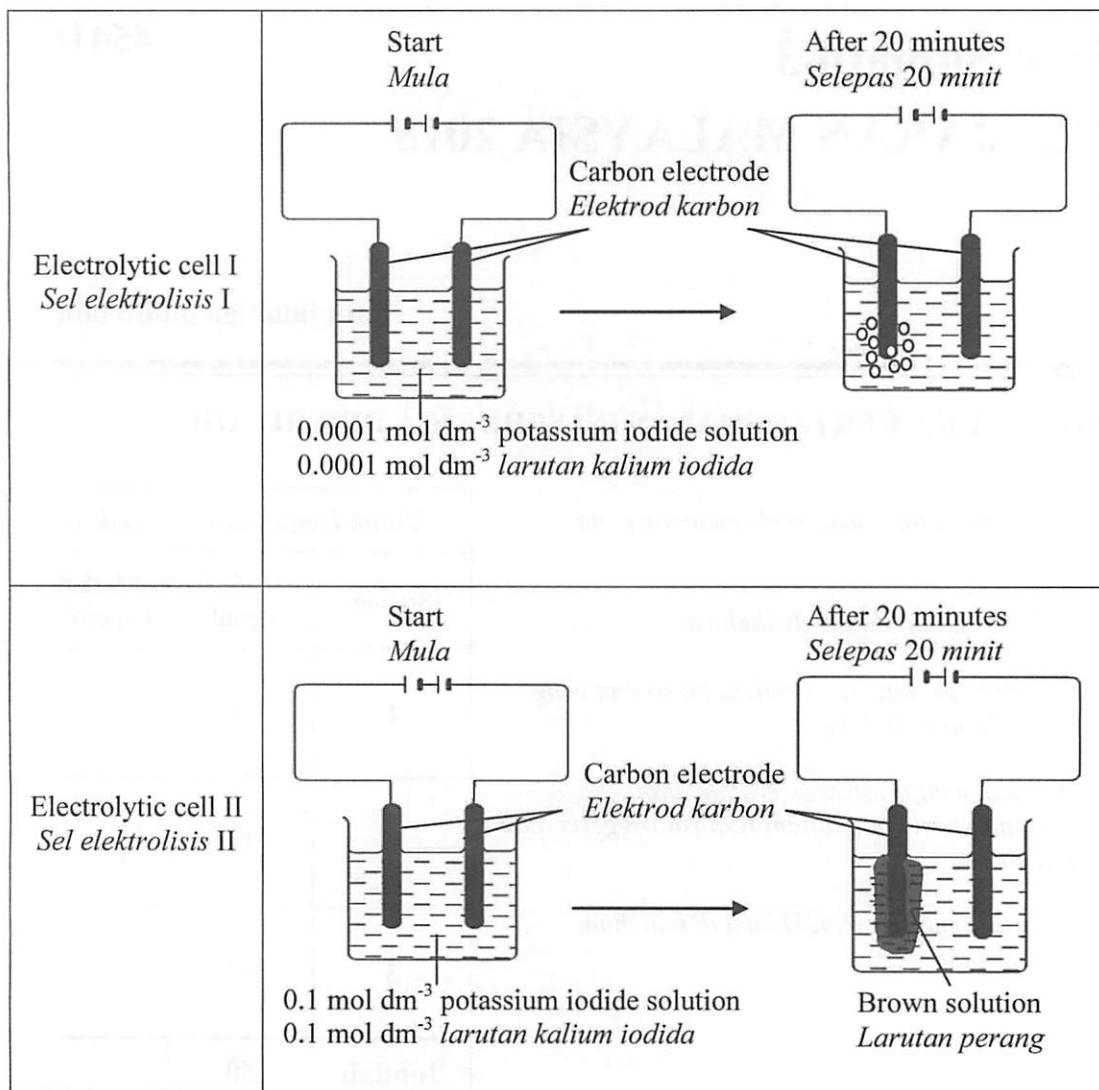


Diagram 1
Rajah 1

Electrolytic cell I uses $0.0001 \text{ mol dm}^{-3}$ potassium iodide solution and electrolytic cell II uses 0.1 mol dm^{-3} potassium iodide solution.

Sel elektrolysis I menggunakan $0.0001 \text{ mol dm}^{-3}$ larutan kalium iodida dan sel elektrolisis II menggunakan 0.1 mol dm^{-3} larutan kalium iodida.

For
examiner's
use

- (a) State observation at anode in Table 1.1.
Nyatakan pemerhatian di anod dalam Jadual 1.1.

Electrolytic cell <i>Sel elektrolisis</i>	Observation <i>Pemerhatian</i>
I	
II	

Table 1.1
Jadual 1.1

[3 marks]

1(a)

3

- (b) State **one** inference for any observation in 1 (a).
Nyatakan satu inferensi bagi mana-mana pemerhatian dalam 1 (a).

.....
.....

[3 marks]

1(b)

3

- (c) For this experiment, state :

Bagi eksperimen ini, nyatakan:

- (i) the manipulated variable.
pemboleh ubah yang dimanipulasikan.

.....

- (ii) the responding variable.
pemboleh ubah yang bergerak balas.

.....

- (iii) the constant variable.
pemboleh ubah yang ditetapkan.

.....

[3 marks]

1(c)

3

- (d) State the hypothesis for the experiment.
Nyatakan hipotesis bagi eksperimen ini.

.....
.....

[3 marks]

1(d)

3

For
examiner's
use

- (e) Predict the factor that affect the selected ion to be discharged at anode in Electrolytic cell II if 0.1 mol dm^{-3} potassium iodide solution is replaced by 0.1 mol dm^{-3} potassium nitrate solution.

Ramalkan faktor yang mempengaruhi pemilihan ion untuk dinyahcas pada anod dalam Sel elektrolisis II jika 0.1 mol dm^{-3} larutan kalium iodida digantikan oleh 0.1 mol dm^{-3} larutan kalium nitrat.

.....
.....

[3 marks]

1(e)

3

- (f) The following is some example of chemical substances.

Berikut adalah beberapa contoh bahan kimia.

Molten naphthalene <i>Leburan naftalena</i>	Sodium carbonate solution <i>Larutan natrium karbonat</i>	Ethanol <i>Etanol</i>
Glucose solution <i>Larutan glukosa</i>	Molten zinc chloride <i>Leburan zink klorida</i>	

Classify the chemical substances by completing Table 1.2.

Kelaskan bahan-bahan kimia dengan melengkapkan Jadual 1.2.

Electrolyte <i>Elektrolit</i>	Non-electrolyte <i>Bukan elektrolit</i>

Table 1.2
Jadual 1.2

[3 marks]

1(f)

3

Total 1

.....
.....

18

- 2 Diagram 2.1 and 2.2 shows the set-up of apparatus for Set I, Set II, Set III, Set IV and Set V for experiments to investigate the effect of temperature on the rate of reaction between sodium thiosulphate solution and sulphuric acid.

In each set of experiment, the size of conical flask used is 250 cm^3 .

Rajah 2.1 dan 2.2 menunjukkan susunan radas Set I, Set II, Set III, Set IV dan Set V bagi satu eksperimen untuk mengkaji kesan suhu ke atas kadar tindak balas antara larutan natrium tiosulfat dan asid sulfurik.

Bagi setiap set eksperimen itu, saiz kelalang kon yang digunakan ialah 250 cm^3 .

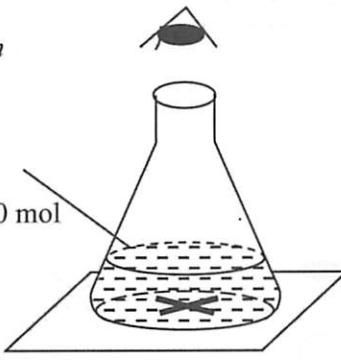
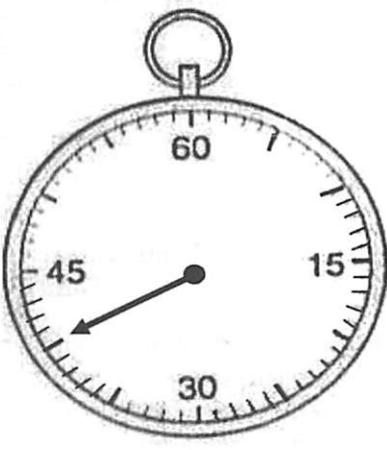
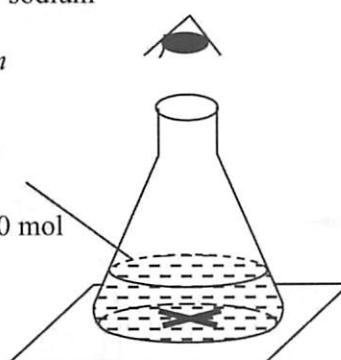
Set	Apparatus set-up Susunan radas	Time taken for 'X' mark disappear Masa untuk tanda 'X' hilang
I	<p>Temperature : 30°C Suhu : 30°C</p> <p>50 cm^3 of 0.2 mol dm^{-3} sodium thiosulphate solution 50 cm^3 larutan natrium tiosulfat 0.2 mol dm^{-3} + 10 cm^3 of 1.0 mol dm^{-3} sulphuric acid 10 cm^3 asid sulfurik 1.0 mol dm^{-3}</p> 	 <p>Time: Masa:</p>
II	<p>Temperature : 35°C Suhu : 35°C</p> <p>50 cm^3 of 0.2 mol dm^{-3} sodium thiosulphate solution 50 cm^3 larutan natrium tiosulfat 0.2 mol dm^{-3} + 10 cm^3 of 1.0 mol dm^{-3} sulphuric acid 10 cm^3 asid sulfurik 1.0 mol dm^{-3}</p> 	 <p>Time: Masa:</p>

Diagram 2.1
Rajah 2.1

Set	Apparatus set-up <i>Susunan radas</i>	Time taken for 'X' mark disappear <i>Masa untuk tanda 'X' hilang</i>
III	<p>Temperature : 40 °C Suhu : 40 °C</p> <p>50 cm³ of 0.2 mol dm⁻³ sodium thiosulphate solution</p> <p>50 cm³ larutan natrium tiosulfat 0.2 mol dm⁻³</p> <p>+ 10 cm³ of 1.0 mol dm⁻³ sulphuric acid</p> <p>10 cm³ asid sulfurik 1.0 mol dm⁻³</p>	<p>Time: Masa:</p>
IV	<p>Temperature : 45 °C Suhu : 45 °C</p> <p>50 cm³ of 0.2 mol dm⁻³ sodium thiosulphate solution</p> <p>50 cm³ larutan natrium tiosulfat 0.2 mol dm⁻³</p> <p>+ 10 cm³ of 1.0 mol dm⁻³ sulphuric acid</p> <p>10 cm³ asid sulfurik 1.0 mol dm⁻³</p>	<p>Time: Masa:</p>
V	<p>Temperature : 50 °C Suhu : 50 °C</p> <p>50 cm³ of 0.2 mol dm⁻³ sodium thiosulphate solution</p> <p>50 cm³ larutan natrium tiosulfat 0.2 mol dm⁻³</p> <p>+ 10 cm³ of 1.0 mol dm⁻³ sulphuric acid</p> <p>10 cm³ asid sulfurik 1.0 mol dm⁻³</p>	<p>Time: Masa:</p>

Diagram 2.2
Rajah 2.2

- (a) Record the stopwatch readings in the space provided in Diagram 2.1 and 2.2.

Catatkan bacaan jam randik pada ruang yang disediakan pada Rajah 2.1 dan 2.2.

[3 marks]

- (b) Construct a table to record the temperature, time and $\frac{1}{\text{time}}$ for each set of experiment.

Bina satu jadual untuk merekodkan suhu, masa dan $\frac{1}{\text{masa}}$ untuk setiap set eksperimen.

For
examiner's
use
1(a)

	3
--	---

- (c) Plot a graph of temperature against $\frac{1}{\text{time}}$.

Lukiskan graf suhu lawan. $\frac{1}{\text{masa}}$.

[3 marks]

	3
--	---

- (d) Based on the graph in 2 (c), state the relationship between the temperature of sodium thiosulphate solution with the rate of reaction.

Berdasarkan graf dalam 2 (c), nyatakan hubungan antara suhu larutan natrium tiosulfat dengan kadar tindak balas.

	3
--	---

[3 marks]

	3
--	---

[3 marks]

- (e) State the operational definition of the rate of reaction for the experiment.

Nyatakan definisi secara operasi bagi kadar tindak balas untuk eksperimen tersebut.

	3
--	---

	15
--	----

[3 marks]

Question 2 (c)

A large grid of squares, likely for drawing or plotting, consisting of 10 columns and 20 rows of small squares.

3

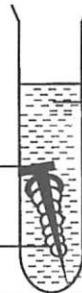
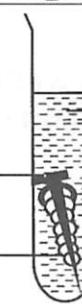
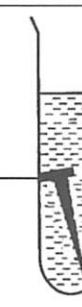
Test tube Tabung uji	Set-up of apparatus Susunan radas
I	 <p>Jelly solution + potassium hexacyanoferrate(III), $K_3Fe(CN)_6$ solution + phenolphthalein <i>Larutan agar-agar + larutan kalium heksasianoferat (III), $K_3Fe(CN)_6$ + fenolftalein</i></p>
II	 <p>Jelly solution + potassium hexacyanoferrate(III), $K_3Fe(CN)_6$ solution + phenolphthalein <i>Larutan agar-agar + larutan kalium heksasianoferat (III), $K_3Fe(CN)_6$ + fenolftalein</i></p>
III	 <p>Jelly solution + potassium hexacyanoferrate(III), $K_3Fe(CN)_6$ solution + phenolphthalein <i>Larutan agar-agar + larutan kalium heksasianoferat (III), $K_3Fe(CN)_6$ + fenolftalein</i></p>

Diagram 3
Rajah 3

Referring to Diagram 3, plan a laboratory experiment to investigate the effect of other metals on the rusting of iron.

Merujuk kepada Rajah 3, rancang satu eksperimen dalam makmal untuk mengkaji kesan logam-logam lain ke atas pengaratan besi.

Your planning must include the following items:

Perancangan anda hendaklah mengandungi perkara-perkara berikut:

- (a) Problem statement
Pernyataan masalah
- (b) All the variables
Semua pembolehubah
- (c) Hypothesis
Hipotesis
- (d) List of materials and apparatus
Senarai bahan dan radas

(e) Procedure
Prosedur

(f) Tabulation of data
Penjadualan data

[17 marks]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

INFORMATION FOR CANDIDATES
MAKLUMAT UNTUK CALON

1. This question paper consists of three sections: **Question 1, Question 2 and Question 3.**
Kertas soalan ini mengandung tiga soalan: Soalan 1, Soalan 2 dan Soalan 3.
2. Answer **all** questions. Write your answers for **Question 1** and **Question 2** in the spaces provided in the question paper.
Jawab semua soalan. Tuliskan jawapan bagi Soalan 1 dan Soalan 2 pada ruang yang disediakan dalam kertas soalan ini.
3. Write your answers for **Question 3** on the ‘helaian tambahan’ provided by the invigilators. You may use equations, diagrams, tables, graphs and other suitable methods to explain your answer.
Tulis jawapan anda bagi Soalan 3 dalam helaian tambahan yang dibekalkan oleh pengawas peperiksaan. Anda boleh menggunakan persamaan, gambar rajah, jadual, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda.
4. The diagrams in the questions are not drawn to scale unless stated.
Rajah yang mengiringi soalan tidak dilukiskan mengikut skala kecuali dinyatakan
5. Marks allocated for each question or sub-part of the question are shown in brackets.
Markah yang diperuntukkan bagi setiap soalan atau ceraian soalan ditunjukkan dalam kurungan.
6. Show your working. It may help you to get marks.
Tunjukkan kerja mengira. Ini membantu anda mendapatkan markah.
7. If you wish to change your answer, cross out the answer that you have done. Then write down the new answer.
Sekiranya anda hendak menukar jawapan, batalkan jawapan yang telah dibuat, kemudian tulis jawapan yang baru.
8. You may use a non-programmable scientific calculator.
Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogramkan.
9. Tie together your answer sheets with this question paper at the end of the examination.
Ikat semua kertas jawapan anda bersama-sama soalan ini di akhir peperiksaan.

**Mark Sheet Paper 1
Pentaksiran Sumatif 2013
SIJIL PELAJARAN MALAYSIA**

CHEMISTRY SPM 2013

Paper 1

1	B
2	B
3	B
4	A
5	D
6	C
7	D
8	B
9	A
10	A
11	C
12	D
13	A
14	C
15	B
16	C
17	A
18	C
19	B
20	D

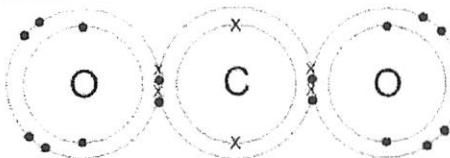
21	A
22	B
23	A
24	A
25	A
26	C
27	D
28	B
29	C
30	C
31	B
32	D
33	C
34	D
35	B
36	C
37	B
38	D
39	B
40	A



**Ujian Sumatif 3
Sijil Pelajaran Malaysia 2013
4541/2 KIMIA Kertas 2**

Section A

1	(a)	(i)	To dry hydrogen gas/to absorb water from hydrogen gas		1
		(ii)	$Zn + 2HCl \rightarrow ZnCl_2 + H_2$	1+1	...2
		(iii)	Copper(II) oxide / lead(II) oxide		1
		(iv)	Flow the hydrogen gas into combustion tube to remove the air in combustion tube.		1
	(b)	(i)	Mass of X = $85.24 - 58.36 //$ = 26.88 g Mass of oxygen = $91.96 - 85.24 //$ = 6.72 g		
		(ii)	Mol X = $\frac{26.88}{64} // 0.42$ Mol oxygen = $\frac{6.72}{16} // 0.42$ XO	1	
	(c)		The heating, cooling and weighing process are repeated until a constant weight is obtained.		1
				TOTAL	9

2	(a)		White		1
	(b)	(i)	Covalent		1
		(ii)	Water // [any covalent compound]		1
	(c)	(i)	2.6		1
		(ii)	 [Number of shells occupied with electron] [Number of atom and labelled]		
	(d)	(i)	Carbon dioxide		1
		(ii)	Attraction force between molecules / intermolecular forces are weak Less heat energy is needed to overcome the forces	1 1	...2
				TOTAL	9

3	(a)		Chemical substances that ionised in water to produce OH ⁻ ions		1
	(b)	(i)	R		1
		(ii)	Q		1
	(c)		Add [2 – 5] g magnesium / zinc into a test tube containing solution X Put a lighted splinter at the mouth of the test tube 'Pop' sound produce	1 1 1	...3
	(d)	(i)	$(1.0) \times (500) = (M_2) \times (750)$ $M_2 = \frac{(1.0) \times (500)}{750} // 0.667 \text{ mol dm}^{-3}$	1 1	...2
		(ii)	[Correct formula of reactants and products] [Balanced equation] $\text{H}_2\text{SO}_4 + 2\text{NaOH} \rightarrow \text{Na}_2\text{SO}_4 + 2\text{H}_2\text{O}$	1 1	...2
				TOTAL	10

4	(a)		Catalyst		1
	(b)		Concentration of sulphuric acid // Size of zinc		1
	(c)	(i)	Catalyst lowers the activation energy. More colliding particles can achieve the lower activation energy. Frequency of effective collision between zinc and hydrogen ion increase .	1 1 1	
	(d)	(i)	$\text{Zn} + \text{H}_2\text{SO}_4 \rightarrow \text{ZnSO}_4 + \text{H}_2$	1+1	2
		(ii)	$\text{Mol H}_2\text{SO}_4 = (0.5 \times 100) \div 1000 // 0.05$ 0.05 mol H ₂ SO ₄ produce 0.05 mol H ₂ $\text{Volume H}_2 = 0.05 \times 24 \text{ dm}^3 // 1.2 \text{ dm}^3$	1 1 1	...3
				TOTAL	10

5	(a)	Voltaic cell		1
	(b)	Zinc. Zinc is more electropositive than copper.	1 1	...2
	(c)	Cu^{2+} , SO_4^{2-} , H^+ , OH^-		1
	(d)	$\text{Cu}^{2+} + 2\text{e} \rightarrow \text{Cu}$		1
	(e)	The blue colour of copper(II) sulphate solution becomes paler / colourless. The concentration /the number of Cu^{2+} decreases.	1 1	...2
	(f)	<p>[Functional diagram] [Labelled] [Direction of electron flow]</p>		
				10

6	(a)	Heat change when 1 mol of magnesium carbonate formed from its ions/magnesium ion and carbonate ion.		1
	(b)	$Mg^{2+} + CO_3^{2-} \rightarrow MgCO_3$		1
	(c) (i)	Heat change = $50 \times 4.2 \times 5.5 // 1155\text{J}$		1
	(ii)	The number of moles of $Mg^{2+}/CO_3^{2-} = \frac{25 \times 2}{1000} // 0.05$		1
	(iii)	0.05 mol		1
	(iv)	Heat of precipitation = $\frac{50 \times 4.2 \times 5.5}{0.05} // 23100\text{ J}$ $\Delta H = + 23.1 \text{ kJ mol}^{-1}$	1	...2
	(d)		1+1+1	...3
	(e)	Sodium and potassium ions are not involved in the precipitation // Spectator ions.		1
				11

Section B

8	(a)	(i)	<u>Experiment I:</u> Fe ²⁺ turns to Fe ³⁺ Oxidation <u>Experiment II:</u> Fe ³⁺ turns to Fe ²⁺ Reduction	1 1 1 1	
		(ii)	<i>Oxidised:</i> Fe ²⁺ ion // iron(II) sulphate <i>Reduced:</i> Fe ³⁺ ion // iron(III) chloride	1 1	...2
		(iii)	Fe ³⁺ + e → Fe ²⁺ Zn → Zn ²⁺ + 2e	1 1	...2
		(iv)	<i>Oxidizing agent :</i> Fe ³⁺ ion // iron(III) chloride <i>Reducing agent:</i> Zn // Zinc	1 1	...2
	(b)		(+1) + x + 4(-2) = 0 x = +7	1 1	...2
	(c)		KMnO ₄ : Acidified potassium dichromate(VI) // Bromine water Zn : Mg / Al	1 1	...2
	(d)		<u>Arrangement in order of increasing reactivity towards oxygen:</u> Cu, P, Q <u>Experiment I</u> P is more reactive than Cu P can reduce copper(II) oxide to copper <u>Experiment II</u> Q is more reactive than copper Q can reduce copper(II) oxide to copper <u>Experiment III</u> P is less reactive than Q P cannot reduce Q oxide to Q	1 1 1 1 1 1 1 1 1 1 1 1 [Any 6]	...6
			TOTAL		20

Section C

9	(a)	(i)	Compound A	Compound B	Explanation	1 + 1 1 + 1 1 + 1 ...6
			Saturated compound	Unsaturated compound	A has single covalent between carbon atom // B has double covalent bond between carbon atom	
			Brown unchanged	Brown to colourless	A is saturated//not react with bromine // B is unsaturated // react with bromine	
		(ii)	Less soot	More soot	Percentage of carbon by mass in B is higher	
			<u>Sample Answer:</u>			
	(b)	(i)	Compound	Structural formula	Name	1 + 1 1 + 1 ...4
			A	<pre> H H H H H---C---C---C---C---H H H H H </pre>	Butane	
			B	<pre> H H H H H---C---C---C=C---H H H H </pre>	But-1-ene	
[Any structural formula of isomer A and B and their respective name]						
			Ethanol / [any suitable alcohol]			1
			Ethene / [any suitable alkene]			1

		(ii)	<p>Glass wool soaked in ethanol Unglazed porcelain chips Heat Ethene Water</p>	Diagram : Functional Labelled	1	1
			<u>Procedure:</u> <ol style="list-style-type: none"> 1. Place glass wool in a boiling tube. 2. Pour 2 cm³ of ethanol into the boiling tube. 3. Pack pieces of porcelain chips in the boiling. 4. Close the boiling tube with stopper with delivery tube. 5. Heat porcelain chips strongly. 6. Collect the gas produce using test tube. 	1 1 1 1 1 1		
			<u>Chemical equation:</u> $C_2H_5OH \rightarrow C_2H_4 + H_2O$			
			<i>[Correct chemical formula]</i> <i>[Balanced equation]</i>		1 1	.10
				TOTAL		20

10	(a)	V = Copper (II) carbonate X = Copper (II) nitrate Gas W = Carbon dioxide Gas Y = Nitrogen dioxide Gas Z = Oxygen	1 1 1 1 1	...5
	(b)	(i) Sodium carbonate // Potassium carbonate		1
		(ii)	1. Measure and pour [30-100] cm ³ of 1.0 mol dm ⁻³ zinc nitrate solution into a beaker. 2. Add [30-100] cm ³ of 1.0 mol dm ⁻³ potassium carbonate solution into the beaker. 3. Stir the mixture. 4. Filter the mixture. 5. Rinse the residue/salt with distilled water. 6. Add the residue a little at a time into hydrochloric acid until there is no more effervescence/no more residues dissolve. 7. Filter the mixture. 8. Heat the filtrate until saturated. 9. Cool the solution. 10. Filter and dry the crystals by pressing between/with filter paper.	1 1 1 1 1 1 1 1 1 1 1 1 1 1 .10
		(iii)	$Zn(NO_3)_2 + Na_2CO_3 \rightarrow ZnCO_3 + 2NaNO_3$ $ZnCO_3 + 2HCl \rightarrow ZnCl_2 + H_2O + CO_2$	1+1 1+1 ...4
			TOTAL	20

END OF MARK SCHEME

**MARKING SCHEME
PENTAKSIRAN SUMATIF 3 SPM 2013
4541/3 CHEMISTRY
*Paper 3***

Question	Rubric	Score						
1(a)	Able to state two observations correctly <u>Sample answer:</u> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="padding: 5px;">Electrolytic cell</td><td style="padding: 5px;">Observation</td></tr> <tr> <td style="padding: 5px;">I</td><td style="padding: 5px;">Bubbles of gas released // Effervescences</td></tr> <tr> <td style="padding: 5px;">II</td><td style="padding: 5px;">Brown solution formed.</td></tr> </table>	Electrolytic cell	Observation	I	Bubbles of gas released // Effervescences	II	Brown solution formed.	3
Electrolytic cell	Observation							
I	Bubbles of gas released // Effervescences							
II	Brown solution formed.							
	Able to state any one observation correctly	2						
	Able to state an idea of observation <u>Sample answer:</u> Gas released // Colour of solution changed	1						
	No response given / wrong response	0						

Question	Rubric	Score				
1(b)	Able to state any one related inference correctly <u>Sample answer:</u> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 45%; text-align: center;"><u>Observation</u> <i>Bubbles of gas released.</i></td><td style="width: 45%; text-align: center;"><u>Inference</u> <i>Oxygen gas released</i> //</td></tr> <tr> <td style="text-align: center;"><i>Brown solution formed.</i></td><td style="text-align: center;"><i>Iodine solution formed</i></td></tr> </table>	<u>Observation</u> <i>Bubbles of gas released.</i>	<u>Inference</u> <i>Oxygen gas released</i> //	<i>Brown solution formed.</i>	<i>Iodine solution formed</i>	3
<u>Observation</u> <i>Bubbles of gas released.</i>	<u>Inference</u> <i>Oxygen gas released</i> //					
<i>Brown solution formed.</i>	<i>Iodine solution formed</i>					
	Able to state inference less correctly <u>Sample answer:</u> Colourless gas released// Halogen solution	2				
	Able to state any idea of inference <u>Sample answer:</u> Gas produced	1				
	No response or wrong response	0				

Question	Rubric	Score
1(c)	Able to state All variables correctly <u>Sample answer :</u> Manipulated variable : Concentration of potassium iodide solution // $0.0001 \text{ mol dm}^{-3}$ potassium iodide solution and 0.1 mol dm^{-3} potassium iodide solution Responding variable : Product at anode // Product of electrolysis Constant variable : Carbon electrodes// Type of electrolyte // Potassium iodide solution	3
	Able to state any two variables correctly	2
	Able to state any one variable correctly	1
	No response or wrong response	0

Question	Rubric	Score
1(d)	Able to give the hypothesis correctly <u>Sample answer :</u> If concentration of potassium iodide solution is higher, product at anode is iodine solution // If concentration of potassium iodide solution is lower, product at anode is oxygen gas // Concentrated potassium iodide solution produces iodine solution at anode // Dilute potassium iodide solution produces oxygen gas at anode	3
	Able to give the hypothesis almost correct <u>Sample answer :</u> Oxygen gas released at anode when dilute potassium iodide solution is used // Iodine solution produced at anode when concentrated potassium iodide solution is used // Different concentration of electrolyte, different product formed at anode.	2
	Able to state an idea of the hypothesis <u>Sample answer :</u> Concentration of electrolyte affect product formed	1
	No response or wrong response	0

Question	Rubric	Score
1(e)	Able to predict the product formed at anode correctly <u>Sample answer:</u> Position of ions in electrochemical series	3
	Able to predict the product at anode less correctly <u>Sample answer:</u> Position of ions	2
	Able to state an idea of product at anode <u>Sample answer:</u> Hydroxide ion// OH	1
	No response given / wrong response	0

Question	Rubric	Score								
1(f)	Able to classify all the chemical substances correctly <u>Answer:</u> <table border="1"> <thead> <tr> <th>Electrolyte</th> <th>Non-electrolyte</th> </tr> </thead> <tbody> <tr> <td>Sodium carbonate solution</td> <td>Molten naphthalene</td> </tr> <tr> <td>Molten zinc chloride</td> <td>Glucose solution</td> </tr> <tr> <td></td> <td>Ethanol</td> </tr> </tbody> </table>	Electrolyte	Non-electrolyte	Sodium carbonate solution	Molten naphthalene	Molten zinc chloride	Glucose solution		Ethanol	3
Electrolyte	Non-electrolyte									
Sodium carbonate solution	Molten naphthalene									
Molten zinc chloride	Glucose solution									
	Ethanol									
Able to classify any three chemical substances correctly	2									
Able to classify any two chemical substances correctly or give opposite answers	1									
<u>Sample answer:</u> <table border="1"> <thead> <tr> <th>Electrolyte</th> <th>Non-electrolyte</th> </tr> </thead> <tbody> <tr> <td>Molten naphthalene</td> <td>Sodium carbonate solution</td> </tr> <tr> <td>Glucose solution</td> <td>Molten zinc chloride</td> </tr> <tr> <td>Ethanol</td> <td></td> </tr> </tbody> </table>	Electrolyte	Non-electrolyte	Molten naphthalene	Sodium carbonate solution	Glucose solution	Molten zinc chloride	Ethanol		0	
Electrolyte	Non-electrolyte									
Molten naphthalene	Sodium carbonate solution									
Glucose solution	Molten zinc chloride									
Ethanol										

Question	Rubric	Score										
2(a)	Able to record all readings accurately to one decimal point with unit <u>Sample answer:</u> <table> <tbody> <tr> <td><i>Experiment I(at 30°C)</i></td> <td>40.0 s</td> </tr> <tr> <td><i>Experiment II(at 35°C)</i></td> <td>25.0 s</td> </tr> <tr> <td><i>Experiment III(at 40°C)</i></td> <td>18.0 s</td> </tr> <tr> <td><i>Experiment IV(at 45°C)</i></td> <td>14.0 s</td> </tr> <tr> <td><i>Experiment V(at 50°C)</i></td> <td>12.0 s</td> </tr> </tbody> </table>	<i>Experiment I(at 30°C)</i>	40.0 s	<i>Experiment II(at 35°C)</i>	25.0 s	<i>Experiment III(at 40°C)</i>	18.0 s	<i>Experiment IV(at 45°C)</i>	14.0 s	<i>Experiment V(at 50°C)</i>	12.0 s	3
<i>Experiment I(at 30°C)</i>	40.0 s											
<i>Experiment II(at 35°C)</i>	25.0 s											
<i>Experiment III(at 40°C)</i>	18.0 s											
<i>Experiment IV(at 45°C)</i>	14.0 s											
<i>Experiment V(at 50°C)</i>	12.0 s											
Able to record any 4 readings accurately // all readings correctly but without decimal point /without unit	2											
Able to record any 3 readings correctly	1											
No response or wrong response	0											

Question	Rubric	Score																		
	Able to construct a table that contains the following information: 1. Heading in the table: temperature, time and $\frac{1}{\text{time}}$ with unit 2. Transfer all temperature readings from (a) correctly. 3. Value of $\frac{1}{\text{time}}$ is uniform/consistent																			
2(b)	<u>Sample answer:</u> <table border="1"> <thead> <tr> <th>Temperature/$^{\circ}\text{C}$ // Set</th> <th>Time / s</th> <th>$\frac{1}{\text{Time}} / \text{s}^{-1}$</th> </tr> </thead> <tbody> <tr> <td>30 // I</td> <td>40.0</td> <td>0.025</td> </tr> <tr> <td>35 // II</td> <td>25.0</td> <td>0.040</td> </tr> <tr> <td>40 // III</td> <td>18.0</td> <td>0.055</td> </tr> <tr> <td>45 // IV</td> <td>14.0</td> <td>0.070</td> </tr> <tr> <td>50 / IV</td> <td>12.0</td> <td>0.083</td> </tr> </tbody> </table>	Temperature/ $^{\circ}\text{C}$ // Set	Time / s	$\frac{1}{\text{Time}} / \text{s}^{-1}$	30 // I	40.0	0.025	35 // II	25.0	0.040	40 // III	18.0	0.055	45 // IV	14.0	0.070	50 / IV	12.0	0.083	3
Temperature/ $^{\circ}\text{C}$ // Set	Time / s	$\frac{1}{\text{Time}} / \text{s}^{-1}$																		
30 // I	40.0	0.025																		
35 // II	25.0	0.040																		
40 // III	18.0	0.055																		
45 // IV	14.0	0.070																		
50 / IV	12.0	0.083																		
	Able to construct a table that contains the following information 1. Heading in the table: temperature, time and $\frac{1}{\text{time}}$ without unit 2. Transfer all temperature reading from (a) correctly.	2																		
	Able to state an idea to construct a table	1																		
	No response or wrong response	0																		

Question	Rubric	Score
	Able to draw the graph correctly (i) Axis x : $1/\text{time} / \text{s}^{-1}$ and axis y : temperature/ $^{\circ}\text{C}$ (ii) Consistent scale and the graph half of graph paper (iii) All the points are transferred correctly (iv) Correct straight line and smooth	3
2(c)	Able to draw the graph incorrectly (i) Axes x : $1/\text{time}$ and axes y : temperature// Inverse axes (ii) Consistent scale (iii) About 3 points are transferred correctly (iv) Correct straight line and smooth	2
	Able to state an idea to draw the graph (i) Draw the axes x and axes y (ii) Correct straight line.	1
	No response or wrong response	0

Question	Rubric	Score
	Able to state the relationship between temperature and rate of reaction correctly <u>Sample answer:</u> When the temperature of sodium thiosulphate solution is higher, the rate of reaction is higher // vice versa	3
	Able to state the relationship between temperature and rate of reaction incorrectly <u>Sample answer:</u> Temperature is directly proportional with rate of reaction // Different temperature of sodium thiosulphate solution, different the rate of reaction// Rate of reaction is faster when temperature is higher	2
2(d)	Able to give an idea of the relationship between temperature and rate of reaction <u>Sample answer:</u> Temperature affect the rate of reaction	1
	No response or wrong response	0

Question	Rubric	Score
	Able to give the operational definition accurately. <u>Sample answer:</u> Time taken for the 'X' mark disappear from sight	3
2(e)	Able to state the operational definition almost correctly <u>Sample answer:</u> 'X' mark disappear// Time taken	2
	Able to state an idea about the rate of reaction <u>Sample answer:</u> Measure of how quickly a chemical reaction happens// The change/ increase/decrease in the amount of products/reactant per unit time //Formation of sulphur/ precipitate	1
	No response given or wrong response	0

Question	Rubric	Score
3(a)	Able to state the problem statement of the experiment correctly <u>Sample answer:</u> What is the effect on the rusting of iron, Fe when it is in contact with other metals?//How does different type of metals in contact with iron affect rusting?	3
	Able to state the problem statement of the experiment incorrectly <u>Sample answer:</u> To investigate the effect of other metals on the rusting of iron.	2
	Able to give an idea of the problem statement of the experiment <u>Sample answer:</u> More electropositive metal inhibit the rusting of iron or vice versa	1
	No response or wrong response	0

Question	Rubric	Score
3(b)	Able to state the three variables correctly <u>Sample answer:</u> Manipulated variable: Metals in contact with iron// Magnesium and copper Responding variable : Rusting of iron//Presence of blue colour Constant variable : Iron nails//temperature// Jelly solution with potassium hexacyanoferrate(III) and phenolphthalein	3
	Able to state any two variables correctly	2
	Able to state any one variable correctly	1
	No response or wrong response	0

Question	Rubric	Score
3(c)	Able to state the relationship between manipulated variable and responding variable correctly <u>Sample answer:</u> When a more/less electropositive metal in contact with iron, the metal inhibits/speeds up rusting.	3
	Able to state the relationship between manipulated variable and responding variable but in the opposite direction. <u>Sample answer:</u> The rusting of iron is inhibits/speeds up when a more/less electropositive metal in contact with iron.	2
	Able to state an idea of the hypothesis <u>Sample answer:</u> The electropositivity of metals affect the rusting of iron	1
	No response or wrong response	0

Question	Rubric	Score
	Able to give complete list of substances and apparatus <u>Sample answer:</u> <u>Substances</u> 1. Jelly solution with potassium hexacyanoferrate(III) and phenolphthalein 2. magnesium ribbon 3. copper strip 4. iron nail	
3(d)	<u>Apparatus</u> 1. Test tube 2. test tube rack 3. sand paper	3
	Able to give incomplete list of substances and apparatus <u>Substances</u> 1. Jelly solution with potassium hexacyanoferrate(III) and phenolphthalein 2. magnesium ribbon 3. copper strip 4. iron nail	
	<u>Apparatus</u> 1. Test tube 2. test tube rack	2
	Able to give at least one substance and at least one apparatus	1
	No response or wrong response	0

Question	Rubric	Score
	Able to list all the steps correctly <u>Sample answer:</u>	
3(e)	1. Clean the iron nails and metal strips with sand paper. 2. Wind/ Coil iron nails with magnesium ribbon and copper strip. 3. Put the iron nails into different test tube. 4. Pour the jelly solution containing potassium hexacyanoferrate(III) and phenolphthalein into the test tube. 5. Leave the test tube aside for one day. 6. Record the observation.	3
	Able to list down steps 2, 4, 6	2
	Able to list down steps 2, 4	1
	No response or wrong response	0

Question	Rubric	Score								
3(f)	Able to tabulate the data with the following aspects 1. Correct titles 2. Complete list of metals/ test tube <u>Sample answer:</u> <table border="1"> <thead> <tr> <th>Test tube // Metal</th><th>Observation</th></tr> </thead> <tbody> <tr> <td>I // Iron + Magnesium</td><td></td></tr> <tr> <td>II // Iron + Copper</td><td></td></tr> <tr> <td>III // Iron</td><td></td></tr> </tbody> </table>	Test tube // Metal	Observation	I // Iron + Magnesium		II // Iron + Copper		III // Iron		2
Test tube // Metal	Observation									
I // Iron + Magnesium										
II // Iron + Copper										
III // Iron										
Able to tabulate the data with but incomplete <u>Sample answer</u> <table border="1"> <thead> <tr> <th>Test tube</th><th>Observation</th></tr> </thead> <tbody> <tr> <td></td><td></td></tr> </tbody> </table>	Test tube	Observation			1					
Test tube	Observation									
No response or wrong response	0									

END OF MARKING SCHEME