



**MODUL PENINGKATAN PRESTASI TINGKATAN 5
TAHUN 2015
MAJLIS PENGETUA SEKOLAH MALAYSIA (KEDAH)**

**MODUL 2 2015
CHEMISTRY**

4541/1

Kertas 1

Mei / Jun

1 1/4 jam

JANGAN BUKA MODUL INI SEHINGGA DIBERITAHU

- 1. Kertas soalan ini adalah dalam dwibahasa.*
- 2. Soalan dalam bahasa Inggeris mendahului soalan yang sepadan dalam bahasa Melayu.*
- 3. Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini.*
- 4. Pilih jawapan yang terbaik dan hitamkan jawapan anda di atas kertas jawapan objektif yang disertakan.*

- 1 Which of the following substance is made up of ions?
Antara bahan berikut, yang manakah terdiri daripada ion ?
- A Sulphur
Sulfur
 - B Naphthalene
Naftalena
 - C Silicon dioxide
Silikon dioksida
 - D Rubidium chloride
Rubidium klorida
- 2 The relative atomic mass of an element is defined as the number of times one atom of the element is heavier than $\frac{1}{12}$ of the mass of an atom of element Q. What is element Q?
Jisim atom relatif bagi suatu unsur ditakrifkan sebagai bilangan kali satu atom unsur itu lebih berat daripada $\frac{1}{12}$ jisim satu atom bagi unsur Q. Apakah unsur Q ?
- A Helium-4
Helium -4
 - B Carbon-12
Karbon-12
 - C Oxygen-16
Oksigen-16
 - D Hydrogen-1
Hidrogen-1
- 3 The following statement is about the arrangement of the elements in the Periodic Table.
Pernyataan berikut adalah mengenai susunan unsur-unsur dalam Jadual Berkala.

Elements are arranged in increasing order of atomic mass in the Periodic Table.
Unsur-unsur disusun mengikut pertambahan jisim atom menaik dalam Jadual Berkala.

Which of the following scientists made the above statement?
Antara saintis berikut, siapakah yang membuat pernyataan di atas?

- A Meyer
- B Newlands
- C Mendeleev
- D Dobereiner

- 4 Which of the following substance conducts electricity in molten state?
Antara bahan berikut, yang manakah mengkonduksikan elektrik dalam keadaan leburan?

- A Tetrachloromethane
Tetraklorometana
 B Magnesium oxide
Magnesium oksida
 C Naphthalene
Naftalena
 D Sulphur
Sulfur

- 5 Table shows the pH value of four acidic solution with the same concentration.
Jadual menunjukkan nilai pH bagi empat larutan asid dengan kepekatan yang sama

Solution <i>Larutan</i>	pH value <i>Nilai pH</i>
P	1.0
Q	3.0
R	5.0
S	6.0

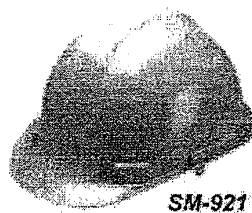
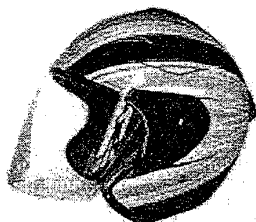
Which of the solution has the highest degree of dissociation?

Larutan yang manakah mempunyai darjah penceraian yang paling tinggi?

- A P
 B Q
 C R
 D S
- 6 Which of the following salt is soluble in water?
Antara yang berikut, garam yang manakah larut di dalam air?
- A Barium sulphate
Barium sulfat
 B Lead(II) iodide
Plumbum(II) iodida
 C Sodium carbonate
Natrium karbonat
 D Silver chloride
Argentum klorida

7 Which composite material is used to make the things below?

Apakah bahan komposit yang digunakan untuk membuat barangan di bawah ?



- A Fibre glass
Gentian kaca
- B Fibre optics
Gentian optik
- C Superconductor
Superkonduktor
- D Photochromic glass
Kaca fotokromik

8 Which of the following process has the highest rate of reaction?

Antara yang berikut, proses yang manakah mempunyai kadar tindak balas yang paling tinggi?

- A Rusting
Pengaratatan
- B Respiration
Pernafasan
- C Combustion
Pembakaran
- D Photosynthesis
Fotosintesis

9 Propene undergo complete combustion in excess air. Which of the following are the products formed?

Propena mengalami pembakaran lengkap dalam udara berlebihan. Antara yang berikut, yang manakah adalah hasil yang terbentuk?

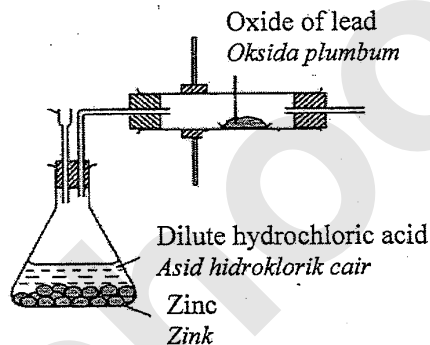
- A Water and carbon monoxide
Air dan karbon monoksida
- B Hydrogen and carbon dioxide
Hidrogen dan karbon dioksida
- C Hydrogen and carbon monoxide
Hidrogen dan karbon monoksida
- D Water and carbon dioxide
Air dan karbon dioksida

- 10 Which of the following statement is about oxidation reaction?
 Yang manakah antara pernyataan berikut, adalah berkaitan proses pengoksidaan?

- A Decrease in oxidation number
 Pengurangan nombor pengoksidaan
- B Loss of electrons
 Kehilangan electron
- C Gain of hydrogen
 Menerima hidrogen
- D Loss of oxygen
 Kehilangan oksigen

- 11 Diagram shows the set-up of apparatus to determine the empirical formula of an oxide of lead.

Rajah menunjukkan susunan radas untuk menentukan formula empirik bagi suatu oksida plumbum.



- Which of the following are correct in the apparatus set-up for this experiment?
 Antara yang berikut, yang manakah adalah betul tentang susunan radas eksperimen itu?

- I No Bunsen burner
 Tiada penunu Bunsen
- II The using of oxide of lead
 Penggunaan oksida plumbum
- III Fixing of the combustion tube
 Pemasangan tabung pembakaran
- IV Position of the thistle funnel
 Kedudukan corong tisel

- A I and II only
- B II and III only
- C III and IV only
- D I, II and III only

- 12 Table shows the proton number of elements W, X, Y and Z.

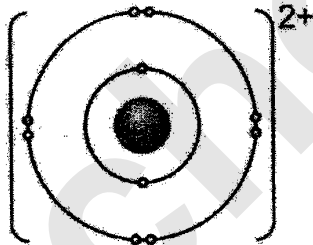
Jadual menunjukkan nombor proton bagi unsur-unsur W, X, Y dan Z.

Element <i>Unsur</i>	W	X	Y	Z
Proton number <i>Nombor proton</i>	9	11	14	17

Arrange the elements based on the increasing of atomic radius.

Susun unsur-unsur itu berdasarkan pertambahan jejari atom.

- A W, X, Y, Z
 B Z, Y, X, W
 C Z, W, Y, X
 D W, Z, Y, X
- 13 Diagram shows the electron arrangement of the Y ion.
Rajah menunjukkan susunan elektron bagi ion Y.



What is the number of valence electrons in a Y atom?

Berapakah bilangan elektron valens bagi satu atom Y?

- A 2
 B 6
 C 8
 D 10

- 14 Table below shows the results of an experiment for three simple voltaic cells using metal P, Q, R and S.

Jadual di bawah menunjukkan keputusan bagi satu eksperimen untuk tiga sel voltan ringkas menggunakan logam W, X, Y dan Z.

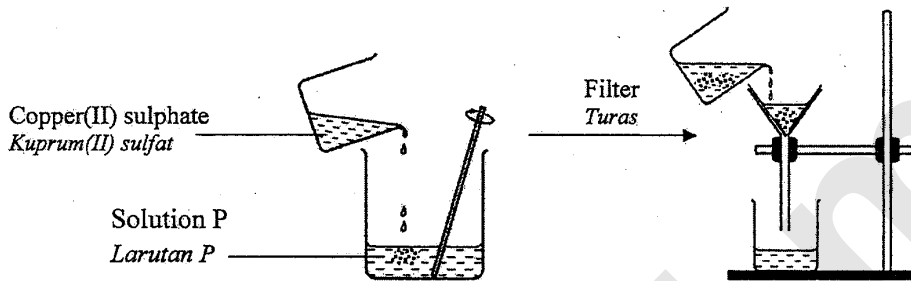
Voltaic cell <i>Sel voltan</i>	Negative terminal <i>Terminal negatif</i>	Positive terminal <i>Terminal positif</i>	Potential difference(V) <i>Beza keupayaan(V)</i>
1	P	Q	0.3
2	R	Q	0.8
3	Q	S	1.9

The arrangement of the metals in the electrochemical series in descending order of electropositivity is

Susunan logam-logam dalam siri elektrokimia mengikut keelektropositifan menurun adalah...

- A P, S, Q, R
 B R, P, Q, S
 C R, P, S, Q
 D S, Q, R, P
- 15 Which of the following statements is true about a strong acid?
Antara pernyataan berikut, yang manakah benar tentang suatu asid kuat?
- I Has a high pH value
Mempunyai nilai pH yang tinggi
- II Ionizes completely in water
Mengion dengan lengkap dalam air
- III Has a high concentration of hydrogen ions
Mempunyai kepekatan ion hidrogen yang tinggi
- IV Exist as molecules in water
Wujud sebagai molekul dalam air
- A I and II only
I dan II sahaja
- B II and III only
II dan III sahaja
- C I and IV only
I dan IV sahaja
- D III and IV only
III dan IV sahaja

- 16 Diagram shows the apparatus set-up of an experiment to prepare salt.
Rajah menunjukkan susunan radas bagi satu eksperimen untuk menyediakan garam.

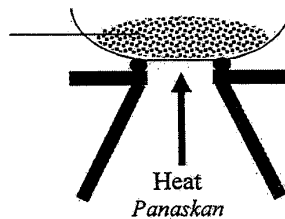


Based on the above experiment, which of the following is solution P?
Berdasarkan eksperimen di atas, yang manakah antara berikut adalah larutan P?

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

- 17 Diagram shows the set-up of apparatus for the reaction between carbon and metal oxide T.
Rajah menunjukkan susunan radas bagi tindak balas antara karbon dan oksida logam T.

Mixture of carbon powder
 and metal oxide T
*Campuran serbuk karbon dan oksida
 logam T*



When the mixture is heated strongly, a flame spreads to the whole mixture. What is metal T?

Apabila campuran itu dipanaskan, nyalaan tersebar ke seluruh campuran. Apakah logam T?

- A Aluminium
Aluminium
- B Copper
Kuprum
- C Magnesium
Magnesium
- D Kalsium
Calcium
- 18 The following statements are true about exothermic reactions except
Pernyataan-pernyataan berikut adalah benar mengenai tindak balas eksotermik kecuali
- A the reaction release heat to the surrounding
tindak balas membebaskan haba ke persekitaran
- B the formation of bond releases less energy than is required in the bond breaking
pembentukan ikatan membebaskan kurang tenaga berbanding pemecahan ikatan
- C the formation of bond releases more energy than is required in the bond breaking
pembentukan ikatan membebaskan lebih banyak tenaga berbanding pemecahan ikatan
- D the energy content of the products is lower than that of the reactants.
*kandungan tenaga hasil tindak balas lebih rendah daripada kandungan tenaga bahan tindak
 balas*

19 Which polymers are correctly matched to its monomer ?

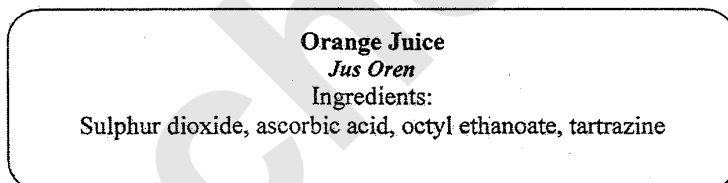
Polimer yang manakah dipadankan dengan betul dengan monomernya?

	Polymer <i>Polimer</i>	Monomer <i>Monomer</i>
I	Natural rubber <i>Getah asli</i>	Neoprene <i>Neoprene</i>
II	Polyvinyl chloride <i>Polivinil klorida</i>	Chloroethylene <i>Kloroetena</i>
III	Polypropene <i>Polipropena</i>	Propene <i>Propena</i>
IV	Polystyrene <i>Polystyrene</i>	Methymetacrylate <i>Metil metakrilat</i>

- A I and III
- B I and IV
- C II and III
- D II and IV

20 Diagram shows a label on a bottle of orange juice.

Rajah menunjukkan label bagi sebotol jus oren.

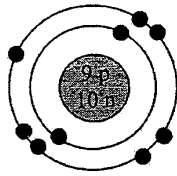


Which of the following is used as a colouring?

Antara berikut, yang manakah digunakan sebagai pewarna?

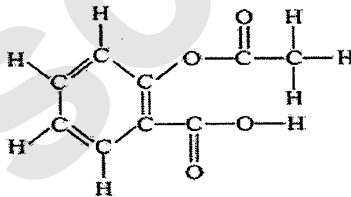
- A Sulphur dioxide
Sulfur dioksida
- B Ascorbic acid
Asid askorbik
- C Octyl ethanoate
Oktil etanoat
- D Tartrazine
Tartrazin

- 21 Figure bellow shows the electron arrangement of atom X,
Rajah menunjukkan susunan elektron bagi atom X,



Which of the following statement is true about atom X?
Manakah antara pernyataan berikut adalah benar tentang atom X?

- A Form X^+ ion
Membentuk ion X^+
- B Exist as monoatomic element
Wujud sebagai unsur monoatom
- C Donate one electron to form positive ion
Menderma satu elektron untuk membentuk ion positif
- D An element of Period 3, Group 17 of the Periodic Table of Element
Merupakan unsur Kala 3, Kumpulan 17 dalam Jadual Berkala Unsur
- 22 Diagram below shows the structure of aspirin.
Rajah di bawah menunjukkan struktur aspirin.



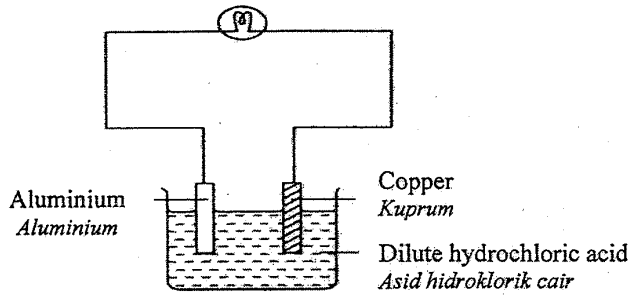
What is the molecular formula of aspirin?
Apakah formula molekul bagi aspirin?

- A CHO
- B C_9HO
- C C_9H_2O
- D $C_9H_8O_4$

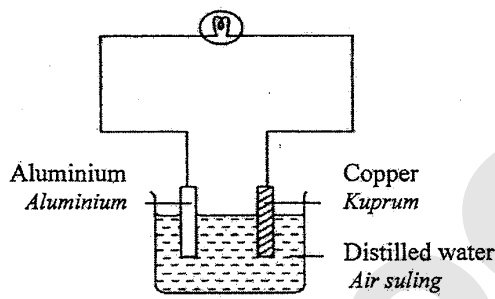
- 23 Element P and element Q have proton number of 19 and 8 respectively.
What is the relative molecular mass of a compound formed between P and Q?
[Relative atomic mass : P = 39, Q = 16]
*Unsur P dan unsur Q masing-masing mempunyai nombor proton 19 dan 8.
Berapakah jisim molekul relatif bagi sebatian yang terbentuk antara P dan Q?
[Jisim atom relatif : P = 39, Q = 16]*
- A 35
B 46
C 71
D 94
- 24 Which of the following substances are the most suitable for the preparation of lead(II) sulphate salt?
Antara berikut, yang manakah bahan-bahan paling sesuai digunakan bagi penyediaan garam plumbum(II) sulfat?
- A Lead(II) nitrate solution and potassium sulphate solution
Larutan plumbum(II) nitrat dan larutan kalium sulfat
- B Solid lead(II) carbonate and potassium sulphate
Pepejal plumbum (II) karbonat dan kalium sulfat
- C Solid lead(II) nitrate and calcium sulphate
Pepejal plumbum(II) nitrat dan kalsium sulfat
- D Solid lead(II) oxide and sodium sulphate
Pepejal plumbum(II) oksida dan natrium sulfat

25 In which apparatus set-up does the bulb shine **most** brightly?
Dalam susunan radas manakah nyalaan mentol adalah paling terang?

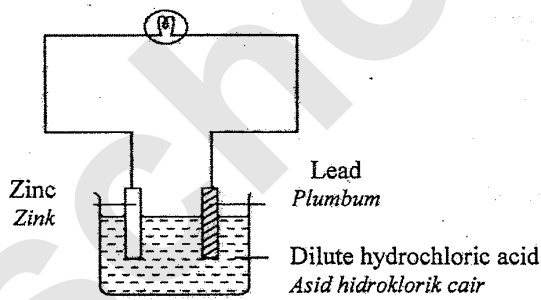
A



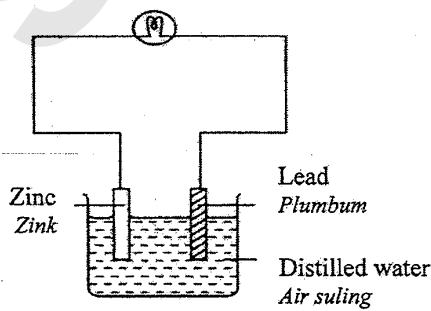
B



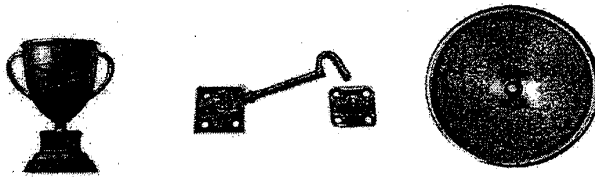
C



D

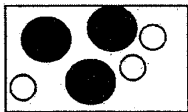


- 26 Diagram below shows the products made up of bronze.
Rajah di bawah menunjukkan barangan yang diperbuat daripada gangsa.

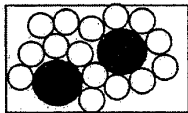


Which of the following shows the arrangement of particles of the product ?
Antara berikut, yang manakah menunjukkan susunan zarah dalam barangan tersebut ?

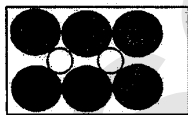
A



B



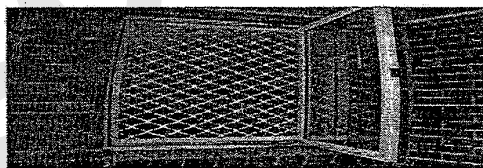
C



D



- 27 Which of the following is the characteristic of catalyst?
Antara yang berikut yang manakah adalah sifat mangkin?
- A Catalyst used only in solid form.
Mangkin digunakan hanya dalam bentuk pepejal.
 - B Catalyst increases the quantity of product.
Mangkin meningkatkan kuantiti hasil tindak balas.
 - C Physical state of catalyst is unchanged during reaction.
Keadaan fizikal mangkin tidak berubah semasa tindak balas.
 - D The quantity of catalyst remains the same after the reaction.
Kuantiti mangkin tetap sama selepas tindak balas.
- 28 Which of the following compound is a hydrocarbon?
Antara berikut, sebatian yang manakah hidrokarbon?
- A 2-methylbut-1,3-diene
2-metilbut-1,3-diena
 - B Ethanoic Acid
Asid etanoik
 - C Ethyl ethanoate
Etil etanoat
 - D Propan-2-ol
Propan-2-ol
- 29 Diagram shows an aluminium window grill. Which of the following explains why does the window do not corrode rapidly.
Rajah menunjukkan satu grill tingkap aluminium. Antara berikut yang manakah menerangkan mengapa tingkap ini tidak mengkakis dengan cepat.



- A Aluminium is a light metal.
Aluminium adalah logam ringan.
- B Aluminium is a good conductor of heat.
Aluminium adalah pengalir haba yang baik.
- C Aluminium reacts with air in the presence of water.
Aluminium bertindak balas dengan udara dengan kehadiran air.
- D Aluminium is protected by a layer of aluminium oxide on its surface.
Aluminium dilindungi oleh satu lapisan aluminium oksida pada permukaannya.

30 Sodium chloride is added to fish to produce salted fish.

Which of the following is the main function of sodium chloride?

Natrium klorida ditambah kepada ikan untuk menghasilkan ikan masin.

Antara berikut, yang manakah fungsi utama natrium klorida?

- A It gives a better taste
Menjadikan lebih sedap
- B It improves the texture
Memperbaiki tekstur
- C Prevent oxidation
Menghalang pengoksidaan
- D Retard the growth of microorganisms
Merencatkan pertumbuhan mikroorganisma

31 Which of the following pairs of ion has the same of number of electrons?

Antara pasangan ion yang berikut, yang manakah mempunyai bilangan elektron yang sama?

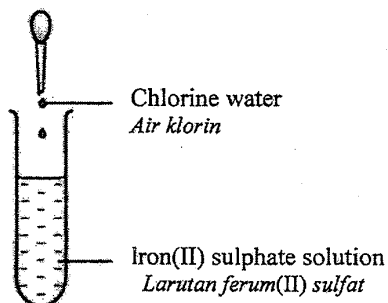
[Proton number :

Nombor proton: Li = 3, O = 8, F = 9, Na = 11, Mg = 12, Cl = 17, Ca = 20]

- A Cl^- and F^-
 Cl^- dan F^-
- B Na^+ and Li^+
 Na^+ dan Li^+
- C Mg^{2+} and O^{2-}
 Mg^{2+} dan O^{2-}
- D Ca^{2+} and Mg^{2+}
 Ca^{2+} dan Mg^{2+}

- 32 Diagram shows the apparatus set-up to investigate the change of iron(II) ions to iron(III) ions using chlorine water.

Rajah menunjukkan susunan radas untuk mengkaji perubahan ion ferum(II) kepada ion ferum(III) dengan menggunakan air klorin.

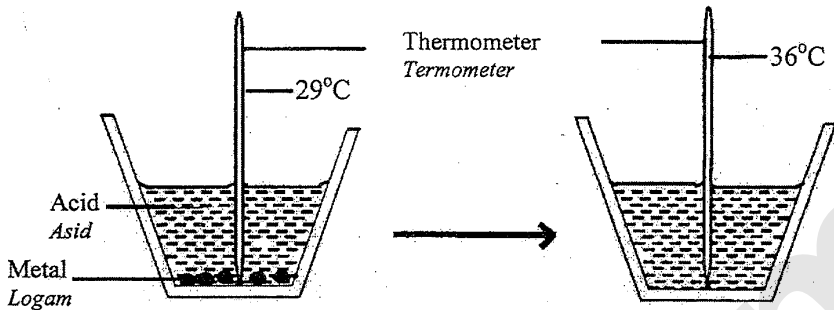


Which of the following is **true** regarding the reaction?

Antara yang berikut, yang manakah **benar** tentang tindak balas tersebut?

- A Iron(II) ions are reduced.
Ion ferum(II) diturunkan.
- B Chlorine water is oxidised.
Air klorin dioksidakan.
- C Iron(II) ions gain electrons.
Ion ferum(II) menerima elektron.
- D Green solution turns brown.
Larutan hijau bertukar menjadi perang.

- 33 Diagram shows the apparatus set-up to determine the heat of reaction.
Rajah menunjukkan susunan radas untuk menentukan haba tindak balas.

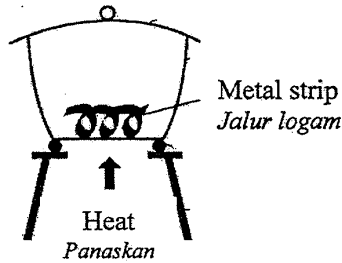


Based on the diagram which of the following statement is true?

Berdasarkan rajah di atas, yang manakah di antara pernyataan berikut adalah benar?

- I Bond formation occurs.
Pembentukan ikatan berlaku.
 - II The temperature increases during the reaction.
Suhu meningkat semasa tindak balas berlaku.
 - III The value of ΔH for the reaction is positive.
Nilai ΔH dalam tindak balas ini adalah positif.
 - IV The energy content of the products is lower than the energy content of the reactants.
Kandungan tenaga hasil tindak balas lebih rendah daripada kandungan tenaga bahan tindak balas
- A I and II only
I dan II sahaja
 - B II and III only
II dan III sahaja
 - C II and IV only
II dan IV sahaja
 - D III and IV only
III dan IV sahaja

- 34 Diagram shows the apparatus set-up to determine the empirical formula of a metal oxide.
Rajah menunjukkan susunan radas untuk menentukan formula empirik bagi suatu oksida logam.

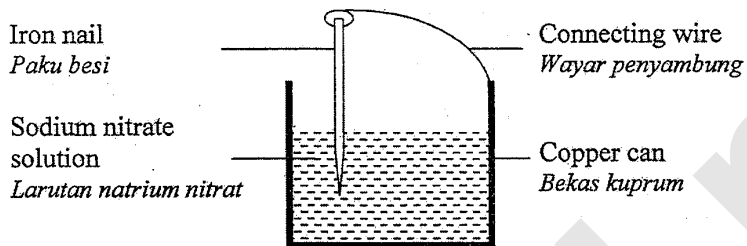


Which of the following metal oxide can be determine by using the above apparatus set-up?
Antara oksida logam berikut, yang manakah dapat ditentukan menggunakan susunan radas di atas?

- | | |
|-----|--------------------------|
| I | ZnO |
| II | CuO |
| III | MgO |
| IV | Ag ₂ O |
| | |
| A | I and III
I dan III |
| B | II and III
II dan III |
| C | I and IV
I dan IV |
| D | II and IV
II dan IV |

- 35 Diagram shows an iron nail that is connected to a copper can using wire. The copper can is filled with sodium nitrate solution. Iron nail corrodes after one hour.

Rajah menunjukkan satu paku besi yang disambungkan kepada bekas kuprum menggunakan wayar. Bekas kuprum diisi dengan larutan natrium nitrat. Paku besi berkarat selepas satu jam.



Which of the following is correct?

Manakah antara yang berikut adalah betul?

- A Iron is an oxidizing agent.
Besi adalah agen pengoksidaan.
- B Hydrogen ions are reduced.
Ion hidrogen diturunkan.
- C Oxidation number of copper changes from 0 to +2.
Nombor pengoksidaan kuprum berubah dari 0 ke +2.
- D Oxygen in water receives electrons to form hydroxide ions.
Oksigen dalam air menerima electron membentuk ion hidroksida.

- 36 Table shows the proton numbers of elements V and W.
Jadual menunjukkan nombor proton bagi unsur V dan W.

Element <i>Unsur</i>	Proton number <i>Nombor Proton</i>
V	9
W	17

Which of the given statements are true?

Antara pernyataan yang berikut yang manakah benar?

- I** W is more reactive than V.
W lebih reaktif daripada V.
- II** The atomic size of W is bigger than V.
Saiz atom W lebih besar daripada atom V.
- III** Both V and W can conduct electricity.
Kedua-dua V dan W boleh mengalirkan arus elektrik.
- IV** V and W are diatomic molecule.
V dan W ialah molekul dwiatom.
- A** I and II
I dan II
- B** I and III
I dan III
- C** II and IV
II dan IV
- D** III and IV
III dan IV

- 37 Element M is in Group 2 in the Periodic Table. Element M reacts with chlorine gas to form a compound with the formula MCl_2 .

What is the formula of the oxide of element M?

[Proton number: O = 8]

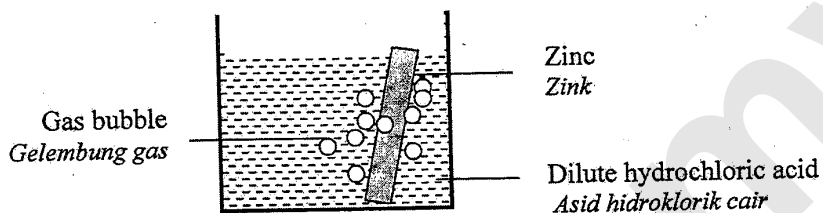
Unsur M berada dalam Kumpulan 2 dalam Jadual Berkala. Unsur M bertindak balas dengan gas klorin untuk membentuk satu sebatian yang mempunyai formula MCl_2 .

Apakah formula bagi oksida unsur M?

[Nombor proton : O = 8]

- A** MO
- B** MO_2
- C** M_2O
- D** M_2O_2

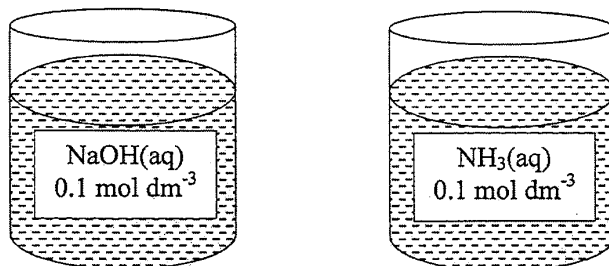
- 38 Diagram shows zinc rod dipped in dilute hydrochloric acid.
Rajah menunjukkan rod zink yang dicelupkan ke dalam asid hidroklorik.



Which of the following equations shows the production of the gas bubbles?
Antara persamaan berikut yang manakah menunjukkan penghasilan gelembung gas?

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

- 39 Diagram shows two beakers filled with aqueous solutions.
Rajah menunjukkan dua bikar berisi larutan akueus.



Which of the following is true for both solutions?
Antara berikut, yang manakah benar bagi kedua-dua larutan?

- A Both are strong alkali.
Kedua-duanya alkali kuat.
- B Both have the same pH value.
Kedua-dua mempunyai nilai pH yang sama.
- C Both are electrolytes.
Kedua-dua adalah elektrolit.
- D Both can change blue litmus paper to red.
Kedua-dua menukarkan kertas litmus biru ke merah.

- 40 Diagram below shows a cold pack manufactured in industry.
Rajah di bawah menunjukkan pek sejuk yang di hasilkan dalam industri.



The main compound used to produce the material in cold pack is manufactured by
Sebatian utama yang digunakan untuk menghasilkan bahan dalam pek sejuk diperbuat melalui

- A Haber Process
Proses Haber
- B Contact Process
Proses Sentuh
- C Alloying
Pengaloiian
- D Polymerisation
Pempolimeran
- 41 During the experiment to determine the heat of precipitation, silver nitrate solution is added to zinc chloride solution. The accuracy of the results is increased by ...
Semasa menjalankan eksperimen untuk menentukan haba pemendakan, larutan argentum nitrat ditambahkan dengan larutan zink klorida. Ketepatan keputusan boleh dipertingkatkan dengan ...
- A conducting the experiment next to an open window.
menjalankan eksperimen berdekatan dengan tingkap terbuka.
- B using a ceramic cup instead of a polystyrene cup.
menggunakan cawan seramik bagi menggantikan cawan polisterena.
- C wrapping the polystyrene cup with aluminium foil.
membalut cawan polistirena dengan lingkran aluminium.
- D wrapping the polystyrene cup with cotton.
membalut cawan polistirena dengan kapas.

42 Which of the following pairs of additive in detergent and its function is correct?

Antara pasangan bahan tambah detergen dan fungsinya yang berikut, yang manakah adalah betul?

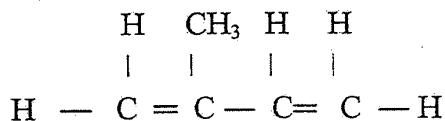
	Additives in detergent <i>Bahan tambah detergen</i>	Function <i>Fungsi</i>
A	Sodium perborate <i>Natrium perborat</i>	To convert stains into colourless substances <i>Menukarkan kotoran kepada bahan tidak berwarna</i>
B	Sodium silicate <i>Natrium silikat</i>	To remove protein stain <i>Menanggalkan kotoran berprotein</i>
C	Sodium sulphate <i>Natrium sulfat</i>	To soften the water <i>Melembutkan air</i>
D	Sodium tripoliphosphate <i>Natrium tripolifosfat</i>	To enable detergent to be poured easily <i>Memudahkan detergen dituang dengan mudah</i>

43 Chicken cooked in a pressure cooker cooks faster. Which of the following explains the situation?

Ayam yang dimasak dengan periuk tekanan lebih cepat masak. Antara berikut, yang manakah menghuraikan situasi tersebut?

- A The activation energy decreases
Tenaga pengaktifan berkurangan
- B The kinetic energy decreases
Tenaga kinetik berkurang
- C The total surface area exposed to reaction increases
Jumlah luas permukaan yang terdedah kepada tindak balas bertambah
- D The frequency of effective collision increases
Frekuensi pelanggaran berkesan bertambah

- 44 Diagram shows a structural formula of a compound
Rajah menunjukkan formula struktur bagi satu sebatian



What is the name of the compound based on IUPAC system?
Apakah nama sebatian itu berdasarkan sistem IUPAC?

- A 3-methylbutene
3-metilbutena
- B 2-methylpentene
2-methylpentena
- C 3-methylbut-1,3-diene
3-metilbut-1,3-diena
- D 2-methylbut-1,3-diene
2-metilbut-1,3-diena
- 45 Which of the following quantities of substances contain 6.02×10^{22} molecules?
[Relative atomic mass: H=1, N=14, O=16; Avogadro constant = 6.02×10^{23}]
Antara kuantiti bahan yang berikut, manakah mempunyai 6.02×10^{22} molekul?
[Jisim atom relatif: H=1, N=14, O=16; Pemalar Avogadro = 6.02×10^{23}]
- I 1.7 g of ammonia, NH₃
1.7 g ammonia, NH₃
- II 3.2 g of oxygen gas, O₂
3.2 g gas oksigen, O₂
- III 0.2 g of hydrogen gas, H₂
0.2 g gas hidrogen, H₂
- IV 0.46 g of nitrogen dioxide gas, NO₂
0.46 g gas nitrogen dioksida, NO₂
- A I, II and III only
- B I, II and IV only
- C I, III and IV only
- D II, III and IV only

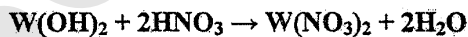
- 46 Table shows the electrical conductivity of four substances P, Q and R.
Jadual menunjukkan kekonduksian elektrik untuk empat sebatian P, Q dan R.

Substance <i>Sebatian</i>	Electrical conductivity <i>Kekonduksian elektrik</i>	
	Solid state <i>Keadaan pepejal</i>	Molten state <i>Keadaan lebur</i>
P	x	x
Q	x	√
R	√	√

- Which of the following is most likely to be P, Q and R substances?
Antara yang berikut, yang manakah paling sesuai sebagai sebatian P, Q dan R?

	Tetrachloromethane <i>Tetraklorometana</i>	Magnesium <i>Magnesium</i>	Lead(II) bromide <i>Plumbum(II) bromida</i>
A	P	R	Q
B	P	Q	R
C	R	P	Q
D	R	Q	P

- 47 The following equation shows the reaction between hydroxide of W solution and nitric acid.
Persamaan berikut menunjukkan tindak balas antara larutan W hidroksida dengan asid nitrik.



What is the concentration of the 20 cm³ nitric acid needed to neutralize 20 cm³ of 0.5 mol dm⁻³ hydroxide solution of W?

Apakah kepekatan 20 cm³ asid nitrik yang diperlukan untuk meneutralkan 20 cm³ larutan W hidroksida 0.5 mol dm⁻³?

- A 0.25 mol dm⁻³
 B 0.50 mol dm⁻³
 C 1.00 mol dm⁻³
 D 2.00 mol dm⁻³

- 48 0.48 g of magnesium powder react with excess dilute hydrochloric acid. After 30 seconds, 0.12 g of magnesium remains as residue. What is the average rate of reaction?
0.48 g *serbuk magnesium bertindak balas dengan asid hidroklorik cair berlebihan. Selepas 30 saat, didapati 0.12 g magnesium tertinggal sebagai baki. Berapakah kadar purata bagi tindak balas itu*

- A $1.2 \times 10^{-2} \text{ g s}^{-1}$
- B $1.6 \times 10^{-2} \text{ g s}^{-1}$
- C $4.0 \times 10^{-3} \text{ g s}^{-1}$
- D $6.0 \times 10^{-3} \text{ g s}^{-1}$

- 49 What is the volume of oxygen gas used if 5.5 g of propane is completely burnt in air?
[Relative atomic mass; H =1; C=12; O= 16; Isi padu molar gas =24 dm³ mol⁻¹ at room temperature]
Berapakah isi padu gas oksigen yang digunakan jika 5.5 g propana terbakar lengkap di dalam udara? [Jisim atom relatif; H =1; C=12; O= 16; Isi padu molar gas = 24dm³mol⁻¹ pada keadaan bilik]

- A 3.0 dm³
- B 9.0 dm³
- C 15.0 dm³
- D 30.0 dm³

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

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

- Volume of water in the copper container = 200 cm^3
Isipadu air dalam bekas kuprum
- Initial temperature of water in the copper container = $28.5 \text{ }^\circ\text{C}$
Suhu awal air dalam bekas kuprum
- Highest temperature of water in the copper container = $59.5 \text{ }^\circ\text{C}$
Suhu tertinggi air dalam bekas kuprum

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

Berapakah perubahan haba oleh pembakaran 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}]

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

- A 21.09 kJ
- B 26.04 kJ
- C 52.08 kJ
- D 147.6 kJ

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

**MODUL 2 TG 5 KIMIA 1:
JAWAPAN**

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

18.	C
19.	C
20.	D
21.	A
22.	D
23.	D
24.	A
25.	A
26.	B
27.	D
28.	A
29.	D
30.	D
31.	C
32.	D
33.	C
34.	A

35.	B
36.	C
37.	A
38.	C
39.	C
40.	A
41.	D
42.	A
43.	D
44.	D
45.	A
46.	A
47.	C
48.	A
49.	C
50.	B

NAMA:

TINGKATAN:



**MODUL PENINGKATAN PRESTASI TINGKATAN 5
TAHUN 2015
MAJLIS PENGETUA SEKOLAH MALAYSIA (KEDAH)**

**MODUL 2 2015
CHEMISTRY 4541/2**

**Kertas 2
Ogos / Sept
2 ½ jam**

JANGAN BUKA MODUL INI SEHINGGA DIBERITAHU

1. *Tulis nombor kad pengenalan dan angka giliran anda pada petak yang disediakan.*
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			
Kod Pemeriksa:			
Bahagian	Soalan	Markah Penuh	Markah Diperoleh
A	1	9	
	2	9	
	3	10	
	4	10	
	5	11	
	6	11	
B	7	20	
	8	20	
C	9	20	
	10	20	
Jumlah			

Kertas modul ini mengandungi **29** halaman bercetak

[lihat muka sebelah

Section A

Bahagian A

[60 marks]

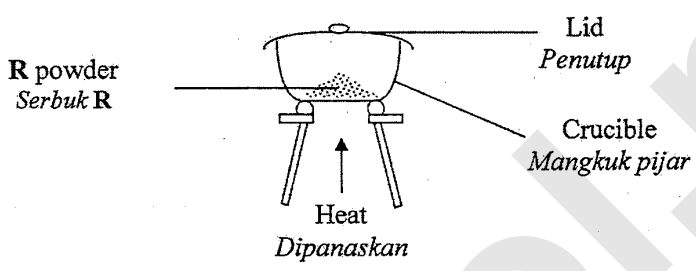
[60 markah]

Answer all questions in this section.

Jawab semua soalan dalam bahagian ini.

1 A student carry out an experiment to determine the empirical formula of metal R oxide. Diagram 1 shows the apparatus set-up of the experiment.

Seorang pelajar menjalankan satu eksperimen untuk menentukan formula empirik bagi oksida R. Rajah 1 menunjukkan susunan radas yang digunakan dalam eksperimen tersebut.



(a) State the meaning of empirical formula.
Nyatakan maksud bagi formula empirik.

_____ [1 mark]

(b) List two precaution steps that must be taken during the heating process.
Senaraikan dua langkah berjaga-jaga yang perlu dilakukan semasa proses pemanasan dijalankan.

_____ [2 marks]

- (c) Describe how to determine that the reaction is completed.
Terangkan bagaimana untuk memastikan bahawa tindak balas telah lengkap.

[1 mark]

- (d) Table 1 shows the results obtained from the experiment.
Jadual 1 menunjukkan keputusan yang diperolehi dari eksperiment tersebut.

Description <i>Penerangan</i>	Mass (g) <i>Jisim (g)</i>
Crucible + lid <i>Mangkuk pijar + penutup</i>	28.24
Crucible + lid + R powder <i>Mangkuk pijar + penutup + serbuk R</i>	30.64
Crucible + lid + R oxide <i>Mangkuk pijar + penutup + R oksida</i>	32.24

Table 1
Jadual 1

- (i) Calculate the number of mole R and oxygen used in the reaction.
Kirakan bilangan mol R dan oksigen yang digunakan dalam tindak balas tersebut.
 [Relative atomic mass: R = 24, O = 16]
 [Jisim atom relatif: R = 24, O = 16]

[2 marks]

- (ii) Determine the empirical formula of R oxide.
Tentukan formula empirik bagi oksida R.

[1 mark]

- (iii) Write the chemical equation of the reaction.
Tuliskan persamaan kimia bagi tindak balas tersebut.

[2 marks]

- 2 Diagram 2 shows the apparatus set-up to investigate the electrolysis of 0.5 mol dm^{-3} potassium chloride solution. Greenish yellow gas is collected at electrode X.
Rajah 2 menunjukkan susunan radas untuk mengkaji elektrolisis larutan kalium klorida 0.5 mol dm^{-3} . Gas kuning kehijauan terkumpul di elektrod X.

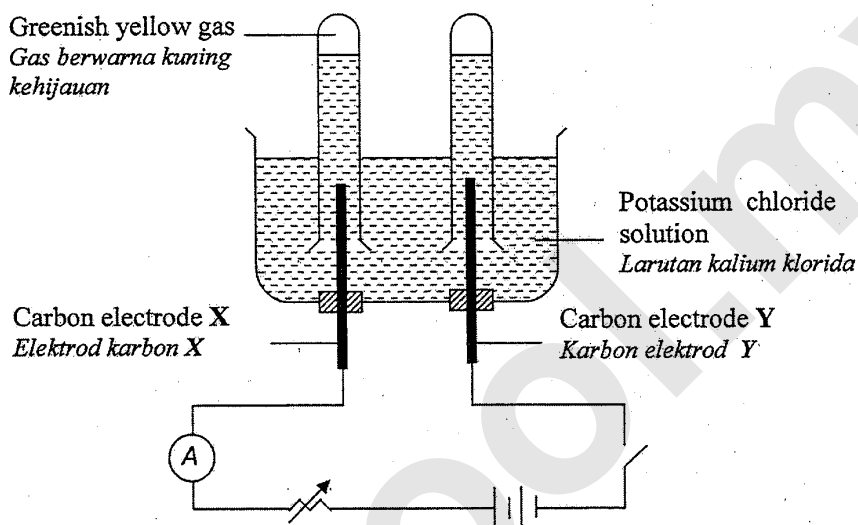


Diagram 2
Rajah 2

- (a) (i) What is meant by anion?
Apakah yang dimaksudkan dengan anion?

[1 mark]

- (ii) Write the formulae for all anions that are present in potassium chloride solution.
Tuliskan formula bagi semua anion yang hadir dalam larutan kalium klorida.

[1 mark]

(iii) The gas collected at electrode X decolourises a damp blue litmus paper.

Name the gas.

Gas yang terkumpul pada elektrod X melunturkan kertas litmus biru lembap.

Namakan gas tersebut.

[1 mark]

(b) (i) Which electrode is the cathode?

Elektrod yang manakah merupakan katod ?

[1 mark]

(ii) Write the half-equation for the reaction at the cathode.

Tuliskan persamaan setengah bagi tindak balas di katod.

[2 marks]

(c) 0.1 mol of gas collected at the cathode.

Calculate the volume of the gas collected.

[1 mol of gas occupies a volume of 24.0 dm^3 at room condition]

0.1 mol gas terkumpul di katod.

Hitungkan isipadu gas yang terkumpul.

[1 mol gas memenuhi isipadu sebanyak 24.0 dm^3 pada keadaan bilik]

[1 mark]

- (d) The experiment is repeated by using $0.0001 \text{ mol dm}^{-3}$ potassium chloride solution.

Eksperimen ini diulangi dengan menggunakan larutan kalium klorida $0.0001 \text{ mol dm}^{-3}$.

- (i) State the ion that is selectively discharged at the anode.
Nyatakan ion yang didiscas secara pilihan di anod.

[1 mark]

- (ii) Give a reason for your answer in (c)(i)
Beri alasan bagi jawapan anda di (c)(i)

[1 mark]

- 3 Diagram 3 shows the flow chart of a series of reactions of copper(II) carbonate salt.
Rajah 3 menunjukkan carta alir bagi satu siri tindak balas bagi garam kuprum(II) karbonat.

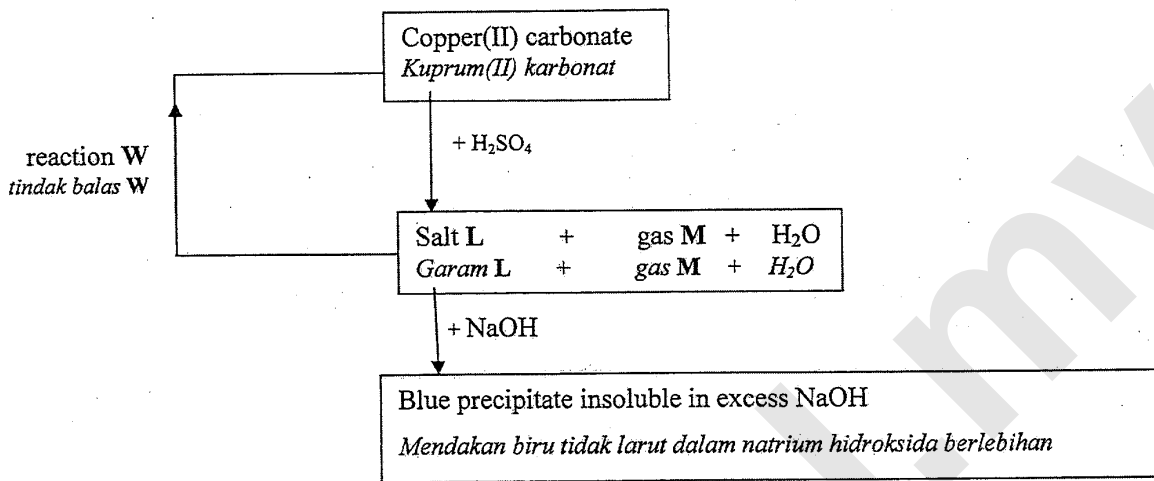


Diagram 3
Rajah 3

- (a) Copper(II) carbonate react with sulphuric acid to produced salt L, gas M and water.
 Gas M turns lime water chalky.
Kuprum(II) karbonat bertindak balas dengan asid sulfurik menghasilkan garam L, gas M dan air. Gas M menukarkan air kapur menjadi keruh.

- (i) Based on Diagram 3, identify salt L and gas M.
Berdasarkan rajah 3, kenalpasti, garam L dan gas M.

[2 marks]

- (ii) Write a chemical equation for the reaction.
Tuliskan persamaan kimia bagi tindak balas tersebut.

[1 mark]

- (b) When salt L solution is added with sodium hydroxide solution, a blue precipitate insoluble in excess NaOH formed. Write the formula of the blue precipitate.
Apabila larutan garam L ditambahkan dengan larutan natrium hidroksida, mendakan biru tidak larut dalam natrium hidroksida berlebihan terhasil. Tuliskan formula bagi mendakan biru tersebut.

[1 mark]

- (c) Salt L can be converted back to copper(II) carbonate through reaction W.
Garam L boleh ditukarkan semula kepada kuprum(II) karbonat melalui tindak balas W.

- (i) Suggest a suitable chemical substance that can be used in reaction W.
Cadangkan satu bahan kimia yang sesuai digunakan dalam tindak balas W.

[1 mark]

- (ii) State the name of reaction W.
Nyatakan nama tindak balas W.

[1 mark]

- (d) (i) Salt L is soluble in water. Briefly describe a method to obtain the crystal of salt L from its solution.
Garam L adalah larut dalam air. Terangkan dengan ringkas kaedah untuk mendapatkan hablur garam L daripada larutannya.

[3 marks]

- (ii) State the colour of copper(II) carbonate crystal formed.
Nyatakan warna bagi hablur kuprum(II) karbonat yang terbentuk.

[1 mark]

- 4 Table 4 shows the electron arrangement of three elements.
Jadual 4 menunjukkan susunan elektron bagi tiga unsur.

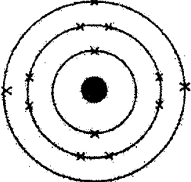
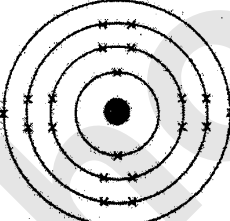
Element <i>Unsur</i>	Electron arrangement <i>Susunan elektron</i>	
W		2.8.3
X		2.8.7
Y		2.8.8.2

Table 4
Jadual 4

Based on Table 4:
Berdasarkan Jadual 4:

- (a) (i) Draw the electron arrangement of atom X in Table 4.
Lukis susunan elektron bagi atom X dalam Jadual 4.

[1 mark]

- (ii) Which of the elements is a non-metal element?
Unsur manakah yang merupakan unsur bukan logam?

[1 mark]

- (b) Complete the equation below to show the reaction between W and X.
Lengkapkan persamaan berikut untuk menunjukkan tindak balas antara W dan X.



[2 marks]

- (c) Atom X can react with atom Y to form a compound.
Atom X dapat bertindak balas dengan atom Y membentuk satu sebatian.

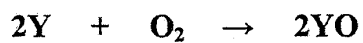
- (i) State a physical properties of the compound formed.
Nyatakan satu sifat fizik bagi sebatian yang terbentuk.

[1 mark]

- (ii) Draw the electron arrangement of the compound formed between atom Y and atom X.
Lukiskan susunan elektron bagi sebatian yang terbentuk antara atom Y dan atom X.

[2 marks]

- (d) 4 g of Y reacts completely with oxygen. The following equation represents the reaction.
4 g Y bertindak balas lengkap dengan oksigen. Persamaan berikut mewakili tindak balas tersebut.



Calculate the mass of the product formed in the reaction.

Hitung jisim bagi hasil yang terbentuk dalam tindak balas ini.

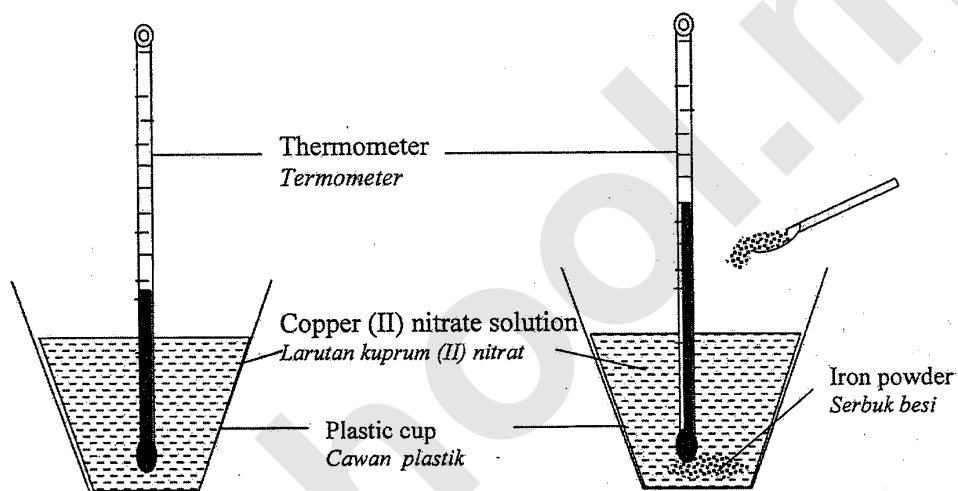
[Relative atomic mass: O = 16, Y = 40]

[Jisim atom relatif: O = 16, Y = 40]

[3 marks]

- 5 Diagram 5 shows an experiment conducted to determine the heat of displacement for reaction between copper(II) nitrate solution and iron powder. 50 cm^3 of 1.0 mol dm^{-3} copper(II) nitrate solution is poured into a plastic cup and the initial temperature is recorded. The excess iron powder is added to the same polystyrene cup. The mixture is stirred slowly and the highest temperature is recorded.

Rajah 5 menunjukkan satu eksperimen yang dijalankan untuk menentukan haba penyesaran bagi tindak balas antara larutan kuprum(II) nitrat dengan serbuk ferum. 50 cm^3 larutan kuprum (II) nitrat 1.0 mol dm^{-3} dimasukkan ke dalam sebuah cawan plastik dan suhu awal larutan dicatat. Serbuk ferum berlebihan dicampurkan ke dalam cawan plastik yang sama. Campuran dikacau perlahan-lahan dan suhu tertinggi dicatatkan.



Initial temperature = 28.0°C
Suhu awal = 28.0°C

Highest temperature mixture = 32.0°C
Suhu tertinggi = 32.0°C

Diagram 5
Rajah 5

- (a) What is the meaning of heat of displacement of the experiment?
Apakah maksud haba penyesaran bagi eksperimen ini?

[1 mark]

- (b) Why does iron in the form of powder is used in this experiment?
Mengapakah ferum dalam bentuk serbuk digunakan dalam eksperimen ini?

[1 mark]

- (c) Write the ionic equation for the reaction in this experiment.
Tuliskan persamaan ion bagi tindak balas yang berlaku dalam eksperimen ini.

[2 marks]

- (d) Based on the experiment, calculate:
Berdasarkan eksperimen tersebut, hitungkan:
[Specific heat of the solution: $4.2 \text{ J g}^{-1} \text{ }^\circ\text{C}^{-1}$]
[Muatan haba tentu larutan: $4.2 \text{ J g}^{-1} \text{ }^\circ\text{C}^{-1}$]

- (i) total of the heat released.
jumlah haba yang dibebaskan.

[1 mark]

- (ii) number of mole of copper (II) nitrate that has reacted.
bilangan mol kuprum (II) nitrat yang bertindak balas.

[1 mark]

- (iii) heat of displacement in this reaction.
haba penyesaran dalam tindak balas ini.

[2 marks]

- (e) Draw an energy level diagram for the reaction.
Lukiskan rajah aras tenaga bagi tindak balas ini.

[2 marks]

- (f) What is the difference in the heat displacement, if the experiment is repeated using magnesium powder?
Apakah perbezaan haba penyesaran, jika eksperimen diulangi dengan menggunakan serbuk magnesium?

[1 mark]

- 6 Diagram 6.1 shows apparatus set-up of an experiment to prepare soap.
Rajah 6.1 menunjukkan susunan radas bagi eksperimen untuk menyediakan sabun.

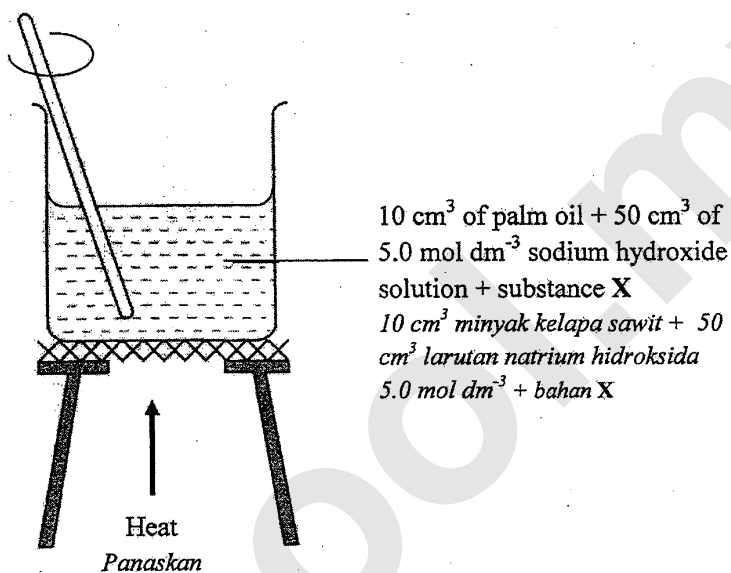


Diagram 6.1
 Rajah 6.1

- (a) State the name of the process to prepare soap.
Nyatakan nama proses untuk menyediakan sabun.

[1 mark]

- (b) The soap produced in the experiment is sodium palmitate.
 If a student intends to prepare potassium palmitate, what is the alkali should be used.

Sabun yang dihasilkan dalam eksperimen adalah natrium palmitat.

Jika seorang pelajar ingin menyediakan kalium palmitat, apakah alkali yang patut digunakannya?

[1 mark]

- (c) Substance X is a type of food additive used to enhance the taste of food. In this experiment substance X is added into the mixture. State the function of substance X.

Bahan X adalah sejenis bahan tambah makanan yang digunakan untuk meningkatkan rasa makanan.

Dalam eksperimen ini, bahan X ditambah ke dalam campuran. Nyatakan fungsi bahan X.

[1 mark]

- (d) Diagram 6.2 shows the result of using soap to remove grease stain on a piece of towel in two different type of water, P and Q.

Rajah 6.2 menunjukkan keputusan penggunaan sabun untuk mencuci kotoran bergris pada sehelai tuala menggunakan dua jenis air P dan Q, yang berbeza.

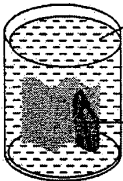
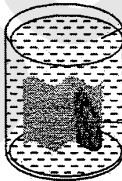
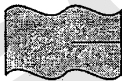

<p>Cleaning using soap <i>Pencucian menggunakan sabun</i></p>	 <p>500 cm³ of water type P + soap <i>Air jenis P + sabun</i></p> <p>Grease stain on towel <i>Kotoran bergris di atas tuala</i></p>	 <p>500cm³ of water type Q + soap <i>Air jenis Q + sabun</i></p> <p>Grease stain on towel <i>Kotoran bergris di atas tuala</i></p>
<p>Result <i>Keputusan</i></p>	 <p>Grease stain removed <i>Kotoran bergris ditanggalkan</i></p>	 <p>Grease stain remain <i>Kotoran bergris kekal</i></p>

Diagram 6.2

Rajah 6.2

- (i) Based on Diagram 6.2, suggest the type of water Q.
Berdasarkan Rajah 6.2, cadangkan jenis air Q.

[1 mark]

- (ii) Based on diagram 6.2, explain the difference in the results obtained using water type P and Q.

Berdasarkan rajah 6.2, terangkan perbezaan keputusan yang diperolehi apabila menggunakan air jenis P dan Q.

Water type P

Air jenis P

[2 marks]

Water type Q

Air jenis Q

[2 marks]

- (e) Soap and detergent are cleansing agents. Explain briefly how to compare the effectiveness of both cleansing agents by using water type Q.

Sabun dan detergen adalah agen pencuci. Terangkan secara ringkas bagaimana untuk membandingkan keberkesanan kedua-dua agen pencuci dengan menggunakan air jenis Q.

[3 marks]

Section B

Bahagian B

[20 marks]

[20 markah]

Answer any **one** question
Jawab mana-mana **satu** soalan

- 7 Table 7 shows the information on two types of acids.
Jadual 7 menunjukkan maklumat tentang dua jenis asid.

Acid <i>Asid</i>	Concentration / mol dm ⁻³ <i>Kepekatan / mol dm⁻³</i>	pH value <i>Nilai pH</i>
Acid X <i>Asid X</i>	1.0	1
Acid Y <i>Asid Y</i>	1.0	4

Table 7
Jadual 7

- a) Based on the table 7, explain why acid X and acid Y with the same concentration has different pH values.

Berdasarkan jadual 7, terangkan mengapa asid X dan asid Y dengan kepekatan yang sama tetapi mempunyai nilai pH yang berbeza.

[5 marks]

- b) Diagram 7 shows series of reactions to produce two type of fertilisers, Q and urea.
Rajah 7 menunjukkan siri tindak balas untuk menghasilkan dua jenis baja, Q dan urea.

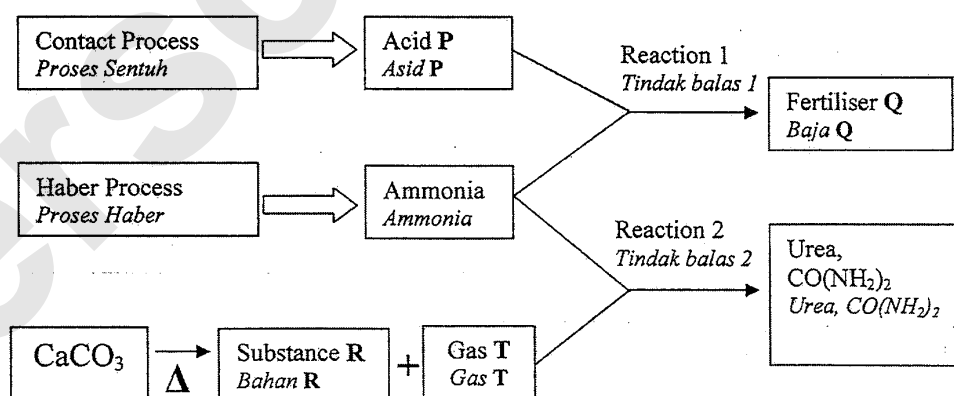


Diagram 7
Rajah 7

Based on diagram 7,
Berdasarkan rajah 7,

- (i) Determine acid P, fertiliser Q, substance R and gas T.
Tentukan asid P, baja Q, bahan R dan gas T.

[4 marks]

- (ii) Write balanced chemical equation for reaction 1 and reaction 2.
Tulis persamaan kimia yang seimbang bagi tindak balas 1 dan tindak balas 2.

[4 marks]

- (c) (i) Encik Ahmad, a farmer found that the soil in his farm becomes acidic, so he decided to use substance R to overcome the problem.
Explain how substance R can do so.

Encik Ahmad, seorang petani mendapati tanah di ladangnya menjadi berasid, maka beliau bercadang menggunakan bahan R untuk menyelesaikan masalah tersebut. Terangkan bagaimana bahan R boleh bertindak demikian.

[2 marks]

- (ii) Fertilisers are commonly used for growing crops. How can you help Encik Ahmad to determine the best fertiliser between fertiliser Q and urea?
Explain why?

Baja digunakan secara meluas untuk menyuburkan tanaman. Bagaimana anda boleh membantu Encik Ahmad untuk menentukan sama ada baja Q atau urea adalah yang terbaik?

Terangkan mengapa?

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

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

[5 marks]

- 8 Table 8.1 show few carbon compounds with their structural formula.
 Jadual 8.1 menunjukkan beberapa sebatian karbon dan formula struktur masing-masing.

Compound <i>Sebatian</i>	Structural formula <i>Formula struktur</i>
P	$ \begin{array}{ccccccc} & & \text{H} & \text{H} & \text{H} & & \\ & & & & & & \\ \text{H} & - & \text{C} & - & \text{C} & - & \text{C} & - & \text{H} \\ & & & & & & \\ & & \text{H} & \text{H} & \text{H} & & \end{array} $
Q	$ \begin{array}{ccccccc} & & \text{H} & \text{H} & \text{H} & & \\ & & & & & & \\ \text{H} & - & \text{C} & - & \text{C} & = & \text{C} & - & \text{H} \\ & & & & & & \\ & & \text{H} & & & & \end{array} $
R	$ \begin{array}{ccccccc} & & \text{H} & \text{H} & & & \\ & & & & & & \\ \text{H} & - & \text{C} & - & \text{C} & - & \text{OH} \\ & & & & & & \\ & & \text{H} & \text{H} & & & \end{array} $
S	$ \begin{array}{ccccccc} & & \text{H} & \text{H} & \text{H} & \text{O} & \\ & & & & & & \\ \text{H} & - & \text{C} & - & \text{C} & - & \text{C} & - & \text{C} & - & \text{O} & - & \text{H} \\ & & & & & & & & & & & & \\ & & \text{H} & \text{H} & \text{H} & & & & & & & & \end{array} $

Table 8.1
 Jadual 8.1

- (a) (i) Compare and contrast the sootiness of compound P and compound Q when burnt in excess of oxygen. Explain your answer.

Bandingkan dan bezakan kejelagaan sebatian P dan sebatian Q apabila terbakar dalam oksigen berlebihan. Terangkan jawapan anda.

[Relative atomic mass: C=12, H=1]

[Jisim atom relatif: C=12, H=1]

[4 marks]

- (ii) Table 8.2 shows the results of a test on compounds P and Q.

Jadual 8.2 menunjukkan keputusan bagi suatu ujian keatas sebatian P dan sebatian Q.

Test Ujian	Method Kaedah	Observation Pemerhatian
I	Compound P is shaken with bromine water in a test tube. <i>Sebatian P digoncang dengan air bromin dalam suatu tabung uji.</i>	Brown bromine water remain unchanged. <i>Warna perang air bromin tidak berubah.</i>
II	Compound Q is shaken with bromine water in a test tube. <i>Sebatian Q digoncang dengan air bromin dalam suatu tabung uji.</i>	Brown bromine water decolourised. <i>Warna perang air bromin dinyahwarnakan.</i>

Table 8.2

Jadual 8.2

Based on Table 8.2, explain the difference in the observation.

Berdasarkan Jadual 8.2, terangkan perbezaan dalam pemerhatian.

[4 marks]

- (b) 2.3 g of compound R is burnt completely in excess oxygen to produce carbon dioxide gas and water.

Write the chemical equation for the reaction and determine the volume of carbon dioxide gas produced.

2.3 g sebatian R terbakar dengan lengkap dalam oksigen berlebihan untuk menghasilkan gas karbon dioksida dan air.

Tuliskan persamaan kimia bagi tindak balas tersebut dan tentukan isipadu gas karbon dioksida yang terhasil.

[Molar mass of R=46, molar volume at room condition= $24 \text{ dm}^3 \text{ mol}^{-1}$]

[Jisim molar R =46, isipadu molar gas pada keadaan bilik = $24 \text{ dm}^3 \text{ mol}^{-1}$]

[5 marks]

- (c) Diagram 8 shows foods contain ester.

Rajah 8.1 menunjukkan makanan yang mengandungi ester.



Diagram 8

Rajah 8

- (i) State two compounds from Table 8.1 that react to produce ester. Name and draw the structural formula of the ester formed.
Nyatakan dua sebatian daripada Jadual 8.1 yang bertindak balas untuk menghasilkan ester. Namakan dan lukiskan formula struktur bagi ester yang terbentuk.

[4 marks]

- (ii) Acid T is used as catalyst during esterification reaction. When concentrated acid T spills on marble floor bubbles are formed. Name acid T and write the ionic equation for the reaction.
Asid T digunakan sebagai mangkin semasa tindak balas pengesteran. Apabila asid T yang pekat tumpah ke atas lantai marmar gelembung gas terbentuk. Namakan asid T dan tuliskan persamaan ion bagi tindak balas tersebut.

[3 marks]

Section C
Bahagian C
[20 marks]
[20 markah]

Answer any **one** question
Jawab mana-mana satu soalan

- 9 (a) Table 9.1 show the chemical equation of two reactions.
Jadual 9.1 menunjukkan persamaan kimia bagi dua tindak balas.

Reaction <i>Tindak balas</i>	Chemical equation <i>Persamaan kimia</i>
X	$\text{NaOH} + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O}$
Y	$\text{Zn} + \text{Cu}(\text{NO}_3)_2 \rightarrow \text{Zn}(\text{NO}_3)_2 + \text{Cu}$

Table 9.1
Jadual 9.1

Determine whether each of the reactions is a redox reaction or not a redox reaction.
Explain your answer in term of oxidation number.

Tentukan sama ada setiap tindak balas tersebut merupakan tindak balas redoks atau bukan tindak balas redoks. Terangkan jawapan anda dari segi nombor pengoksidaan.

[5 marks]

- (b) Table 9.2 shows the formulae for two chlorides of iron compounds.
Jadual 9.2 menunjukkan formula dua sebatian klorida bagi ferum.

Compound <i>Sebatian</i>	Formula
R	FeCl_2
S	FeCl_3

Table 9.2
Jadual 9.2

- (i) Determine the oxidation number of iron in both compounds and name the compounds based on IUPAC nomenclature.
Tentukan nombor pengoksidaan bagi ferum dalam kedua-dua sebatian dan namakan sebatian-sebatian tersebut berdasarkan penamaan IUPAC.

[4 marks]

- (ii) Compound **R** can be converted to compound **S** in the presence of an oxidising agent. Suggest the oxidising agent and state one observation for the reaction.

Sebatian R boleh ditukarkan kepada sebatian S dengan kehadiran satu agen pengoksidaan. Cadangkan agen pengoksidaan tersebut dan nyatakan satu pemerhatian bagi tindak balas yang berlaku.

[2 marks]

- (c) Table 9 shows a list of apparatus and materials.
Jadual 9 menunjukkan senarai radas dan bahan.

Apparatus and materials: <i>Radas dan bahan:</i>	
•	Carbon electrodes <i>Elektrod-elektrod karbon</i>
•	Connecting wires <i>Wayar penyambung</i>
•	Galvanometer <i>Galvanometer</i>
•	U-tube <i>Tiub- U</i>
•	Bromin water <i>Air bromin</i>
•	Dilute sulphuric acid <i>Asid sulfurik cair</i>
•	A reducing agent <i>Suatu agen penurunan</i>

Table 9
Jadual 9

Draw one labelled diagram to show the apparatus set-up to investigate electron transfer at a distance by using the apparatus and materials given in Table 9.

Name the reducing agent.

Describe the redox reaction in terms of the electron transfer at a distance.

Lukiskan satu rajah berlabel bagi menunjukkan susunan radas untuk menyiasat pemindahan elektron pada satu jarak dengan menggunakan radas dan bahan yang terdapat dalam Jadual 9.

Namakan agen penurunan tersebut.

Huraikan tindak balas redoks dari segi pemindahan elektron pada satu jarak.

[9 marks]

- 10 Table 10 shows the results of three sets of experiments to investigate the factors that affect the rate of reaction. 50 cm³ of carbon dioxide gas is collected in each experiment.

Jadual 10 menunjukkan keputusan bagi tiga set eksperimen untuk menyiasat faktor yang mempengaruhi kadar tindakbalas. 50 cm³ gas karbon dioksida dikumpulkan dalam setiap eksperimen.

Eksperimen <i>Eksperimen</i>	Reactants <i>Bahan tindak balas</i>	Temperature °C <i>Suhu °C</i>	Time taken to collect gas/s <i>Masa yang diambil untuk mengumpulkan gas /s</i>
I	50 cm ³ of 1.0 mol dm ⁻³ nitric acid + excess marble chips <i>50 cm³ asid nitrik 1.0 mol dm⁻³ + serpihan marmar berlebihan</i>	28	240
II	50 cm ³ of 1.0 mol dm ⁻³ nitric acid + excess powdered marble chips <i>50 cm³ asid nitrik 1.0 mol dm⁻³ + serbuk marmar berlebihan</i>	28	60
III	50 cm ³ of 1.0 mol dm ⁻³ nitric acid + excess marble chips <i>50 cm³ asid nitrik 1.0 mol dm⁻³ + serpihan marmar berlebihan</i>	40	150

Table 10
Jadual 10

- (a) Nitric acid reacts with marble chips to produce calcium nitrate, carbon dioxide gas and water.

Write a balanced chemical equation for the reaction and calculate the maximum volume of carbon dioxide gas produced in experiment I.

[Relative atomic mass: C = 12, Ca = 40; 1 mole of gas occupies 24 dm³ at room conditions]

Asid nitrik bertindak balas dengan serpihan marmar untuk menghasilkan kalsium nitrat, gas karbon dioksida dan air.

Tulis persamaan kimia yang seimbang bagi tindakbalas itu dan hitung isi padu maksimum gas karbon dioksida yang dihasilkan dalam eksperimen I.

[Jisim atom relatif: C = 12, Ca = 40; 1 mol gas menempati 24 dm³ pada keadaan bilik]

[5 marks]

- (b) Based on table 10, compare the rate of reaction between:
Berdasarkan Jadual 10, bandingkan kadar tindak balas antara:

- (i) experiment I and experiment II
eksperimen I dan eksperimen II
- (ii) experiments I dan experiment III
eksperimen I dan eksperimen III

In each case explain the difference in the rate of reaction with reference to the collision theory.

Bagi setiap kes terangkan perbezaan dalam kadar tindak balas dengan merujuk kepada teori perlanggaran.

[6 marks]

- (c) Catalyst can be used to increase the rate of reaction between metal and acid. By using a suitable named of metal and acid, describe an experiment to show how catalyst affects the rate of reaction.

Mangkin boleh digunakan untuk meningkatkan kadar tindak balas antara logam dan asid. Dengan menggunakan satu logam, asid dan mangkin yang dinamakan, huraikan satu eksperimen untuk menunjukkan bagaimana mangkin boleh mempengaruhi kadar tindak balas.

[9 marks]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

THE PERIODIC TABLE OF ELEMENTS

10 Ne Neon 20	Proton number	Symbol	Name of element	Relative atomic mass
1 H Hydrogen	1	H	Hydrogen	1
2 He Helium	2	He	Helium	4
3 Li Lithium	3	Li	Lithium	7
4 Be Beryllium	4	Be	Beryllium	9
5 B Boron	5	B	Boron	11
6 C Carbon	6	C	Carbon	12
7 N Nitrogen	7	N	Nitrogen	14
8 O Oxygen	8	O	Oxygen	16
9 F Fluorine	9	F	Fluorine	19
10 Ne Neon	10	Ne	Neon	20
11 Na Sodium	11	Na	Sodium	23
12 Mg Magnesium	12	Mg	Magnesium	24
13 Al Aluminium	13	Al	Aluminium	27
14 Si Silicon	14	Si	Silicon	28
15 P Phosphorus	15	P	Phosphorus	31
16 S Sulfur	16	S	Sulfur	32
17 Cl Chlorine	17	Cl	Chlorine	35
18 Ar Argon	18	Ar	Argon	40
19 K Potassium	19	K	Potassium	39
20 Ca Calcium	20	Ca	Calcium	40
21 Sc Scandium	21	Sc	Scandium	45
22 Ti Titanium	22	Ti	Titanium	48
23 V Vanadium	23	V	Vanadium	51
24 Cr Chromium	24	Cr	Chromium	52
25 Mn Manganese	25	Mn	Manganese	55
26 Fe Iron	26	Fe	Iron	56
27 Co Cobalt	27	Co	Cobalt	59
28 Ni Nickel	28	Ni	Nickel	59
29 Cu Copper	29	Cu	Copper	64
30 Zn Zinc	30	Zn	Zinc	65
31 Ga Gallium	31	Ga	Gallium	70
32 Ge Germanium	32	Ge	Germanium	73
33 As Arsenic	33	As	Arsenic	75
34 Se Selenium	34	Se	Selenium	79
35 Br Bromine	35	Br	Bromine	80
36 Kr Krypton	36	Kr	Krypton	84
37 Rb Rubidium	37	Rb	Rubidium	85
38 Sr Strontium	38	Sr	Strontium	88
39 Y Yttrium	39	Y	Yttrium	89
40 Zr Zirconium	40	Zr	Zirconium	91
41 Nb Niobium	41	Nb	Niobium	93
42 Mo Molybdenum	42	Mo	Molybdenum	96
43 Tc Technetium	43	Tc	Technetium	98
44 Ru Ruthenium	44	Ru	Ruthenium	101
45 Rh Rhodium	45	Rh	Rhodium	103
46 Pd Palladium	46	Pd	Palladium	106
47 Ag Silver	47	Ag	Silver	108
48 Cd Cadmium	48	Cd	Cadmium	112
49 In Indium	49	In	Indium	115
50 Sn Tin	50	Sn	Tin	119
51 Sb Antimony	51	Sb	Antimony	122
52 Te Tellurium	52	Te	Tellurium	128
53 I Iodine	53	I	Iodine	127
54 Xe Xenon	54	Xe	Xenon	131
55 Cs Cesium	55	Cs	Cesium	133
56 Ba Barium	56	Ba	Barium	137
57 La Lanthanum	57	La	Lanthanum	139
58 Ce Cerium	58	Ce	Cerium	140
59 Pr Praseodymium	59	Pr	Praseodymium	141
60 Nd Neodymium	60	Nd	Neodymium	144
61 Pm Promethium	61	Pm	Promethium	147
62 Sm Samarium	62	Sm	Samarium	150
63 Eu Europium	63	Eu	Europium	152
64 Gd Gadolinium	64	Gd	Gadolinium	157
65 Tb Terbium	65	Tb	Terbium	159
66 Dy Dysprosium	66	Dy	Dysprosium	163
67 Ho Holmium	67	Ho	Holmium	165
68 Er Erbium	68	Er	Erbium	167
69 Tm Thulium	69	Tm	Thulium	169
70 Yb Ytterbium	70	Yb	Ytterbium	173
71 Lu Lutetium	71	Lu	Lutetium	175
72 Hf Hafnium	72	Hf	Hafnium	179
73 Ta Tantalum	73	Ta	Tantalum	181
74 W Tungsten	74	W	Tungsten	184
75 Re Rhenium	75	Re	Rhenium	186
76 Os Osmium	76	Os	Osmium	190
77 Ir Iridium	77	Ir	Iridium	192
78 Pt Platinum	78	Pt	Platinum	195
79 Au Gold	79	Au	Gold	197
80 Hg Mercury	80	Hg	Mercury	201
81 Tl Thallium	81	Tl	Thallium	204
82 Pb Lead	82	Pb	Lead	207
83 Bi Bismuth	83	Bi	Bismuth	209
84 Po Polonium	84	Po	Polonium	210
85 At Astatine	85	At	Astatine	210
86 Rn Radon	86	Rn	Radon	222
87 Fr Francium	87	Fr	Francium	223
88 Ra Radium	88	Ra	Radium	226
89 Ac Actinium	89	Ac	Actinium	227
89 Th Thorium	90	Th	Thorium	232
90 Pa Protactinium	91	Pa	Protactinium	231
91 U Uranium	92	U	Uranium	238
92 Np Neptunium	93	Np	Neptunium	237
93 Pu Plutonium	94	Pu	Plutonium	244
94 Am Americium	95	Am	Americium	243
95 Cm Curium	96	Cm	Curium	247
96 Bk Berkelium	97	Bk	Berkelium	247
97 Cf Californium	98	Cf	Californium	251
98 Es Einsteinium	99	Es	Einsteinium	254
99 Fm Fermium	100	Fm	Fermium	253
100 Md Mendelevium	101	Md	Mendelevium	258
101 No Nobelium	102	No	Nobelium	259
102 Lr Lawrencium	103	Lr	Lawrencium	260
103 Rf Rutherfordium	104	Rf	Rutherfordium	261
104 Db Dubnium	105	Db	Dubnium	262
105 Sg Seaborgium	106	Sg	Seaborgium	263
106 Bh Bohrium	107	Bh	Bohrium	264
107 Hs Hassium	108	Hs	Hassium	265
108 Mt Meitnerium	109	Mt	Meitnerium	266
109 Uue Ununennium	110	Uue	Ununennium	267
110 Uuh Ununhexium	111	Uuh	Ununhexium	268
111 Uuq Ununquadium	112	Uuq	Ununquadium	269
112 Uuo Ununoctium	113	Uuo	Ununoctium	270
113 Uuq Ununquadium	114	Uuq	Ununquadium	271
114 Uuh Ununhexium	115	Uuh	Ununhexium	272
115 Uuq Ununquadium	116	Uuq	Ununquadium	273
116 Uuo Ununoctium	117	Uuo	Ununoctium	274
117 Uuh Ununhexium	118	Uuh	Ununhexium	275
118 Uuo Ununoctium	119	Uuo	Ununoctium	276
119 Uuh Ununhexium	120	Uuh	Ununhexium	277
120 Uuo Ununoctium	121	Uuo	Ununoctium	278
121 Uuh Ununhexium	122	Uuh	Ununhexium	279
122 Uuo Ununoctium	123	Uuo	Ununoctium	280
123 Uuh Ununhexium	124	Uuh	Ununhexium	281
124 Uuo Ununoctium	125	Uuo	Ununoctium	282
125 Uuh Ununhexium	126	Uuh	Ununhexium	283
126 Uuo Ununoctium	127	Uuo	Ununoctium	284
127 Uuh Ununhexium	128	Uuh	Ununhexium	285
128 Uuo Ununoctium	129	Uuo	Ununoctium	286
129 Uuh Ununhexium	130	Uuh	Ununhexium	287
130 Uuo Ununoctium	131	Uuo	Ununoctium	288
131 Uuh Ununhexium	132	Uuh	Ununhexium	289
132 Uuo Ununoctium	133	Uuo	Ununoctium	290
133 Uuh Ununhexium	134	Uuh	Ununhexium	291
134 Uuo Ununoctium	135	Uuo	Ununoctium	292
135 Uuh Ununhexium	136	Uuh	Ununhexium	293
136 Uuo Ununoctium	137	Uuo	Ununoctium	294
137 Uuh Ununhexium	138	Uuh	Ununhexium	295
138 Uuo Ununoctium	139	Uuo	Ununoctium	296
139 Uuh Ununhexium	140	Uuh	Ununhexium	297
140 Uuo Ununoctium	141	Uuo	Ununoctium	298
141 Uuh Ununhexium	142	Uuh	Ununhexium	299
142 Uuo Ununoctium	143	Uuo	Ununoctium	300
143 Uuh Ununhexium	144	Uuh	Ununhexium	301
144 Uuo Ununoctium	145	Uuo	Ununoctium	302
145 Uuh Ununhexium	146	Uuh	Ununhexium	303
146 Uuo Ununoctium	147	Uuo	Ununoctium	304
147 Uuh Ununhexium	148	Uuh	Ununhexium	305
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149 Uuh Ununhexium	150	Uuh	Ununhexium	307
150 Uuo Ununoctium	151	Uuo	Ununoctium	308
151 Uuh Ununhexium	152	Uuh	Ununhexium	309
152 Uuo Ununoctium	153	Uuo	Ununoctium	310
153 Uuh Ununhexium	154	Uuh	Ununhexium	311
154 Uuo Ununoctium	155	Uuo	Ununoctium	312
155 Uuh Ununhexium	156	Uuh	Ununhexium	313
156 Uuo Ununoctium	157	Uuo	Ununoctium	314
157 Uuh Ununhexium	158	Uuh	Ununhexium	315
158 Uuo Ununoctium	159	Uuo	Ununoctium	316
159 Uuh Ununhexium	160	Uuh	Ununhexium	317
160 Uuo Ununoctium	161	Uuo	Ununoctium	318
161 Uuh Ununhexium	162	Uuh	Ununhexium	319
162 Uuo Ununoctium	163	Uuo	Ununoctium	320
163 Uuh Ununhexium	164	Uuh	Ununhexium	321
164 Uuo Ununoctium	165	Uuo	Ununoctium	322
165 Uuh Ununhexium	166	Uuh	Ununhexium	323
166 Uuo Ununoctium	167	Uuo	Ununoctium	324
167 Uuh Ununhexium	168	Uuh	Ununhexium	325
168 Uuo Ununoctium	169	Uuo	Ununoctium	326
169 Uuh Ununhexium	170	Uuh	Ununhexium	327
170 Uuo Ununoctium	171	Uuo	Ununoctium	328
171 Uuh Ununhexium	172	Uuh	Ununhexium	329
172 Uuo Ununoctium	173	Uuo	Ununoctium	330
173 Uuh Ununhexium	174	Uuh	Ununhexium	331
174 Uuo Ununoctium	175	Uuo	Ununoctium	332
175 Uuh Ununhexium	176	Uuh	Ununhexium	333
176 Uuo Ununoctium	177	Uuo	Ununoctium	334
177 Uuh Ununhexium	178	Uuh	Ununhexium	335
178 Uuo Ununoctium	179	Uuo	Ununoctium	336
179 Uuh Ununhexium	180	Uuh	Ununhexium	337
180 Uuo Ununoctium	181	Uuo	Ununoctium	338
181 Uuh Ununhexium	182	Uuh	Ununhexium	339
182 Uuo Ununoctium	183	Uuo	Ununoctium	340
183 Uuh Ununhexium	184	Uuh	Ununhexium	341
184 Uuo Ununoctium	185	Uuo	Ununoctium	342
185 Uuh Ununhexium	186	Uuh	Ununhexium	343
186 Uuo Ununoctium	187	Uuo	Ununoctium	344
187 Uuh Ununhexium	188	Uuh	Ununhexium	345
188 Uuo Ununoctium	189	Uuo	Ununoctium	346
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193 Uuh Ununhexium	194	Uuh	Ununhexium	351
194 Uuo Ununoctium	195	Uuo	Ununoctium	352
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202 Uuo Ununoctium	203	Uuo	Ununoctium	360
203 Uuh Ununhexium	204	Uuh	Ununhexium	361
204 Uuo Ununoctium	205	Uuo	Ununoctium	362
205 Uuh Ununhexium	206	Uuh	Ununhexium	363
206 Uuo Ununoctium	207	Uuo	Ununoctium	364
207 Uuh Ununhexium	208	Uuh	Ununhexium	365
208 Uuo Ununoctium	209	Uuo	Ununoctium	366
209 Uuh Ununhexium	210	Uuh	Ununhexium	367
210				

INFORMATION FOR CANDIDATES

MAKLUMAT UNTUK CALON

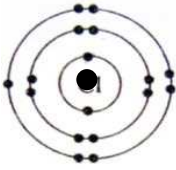
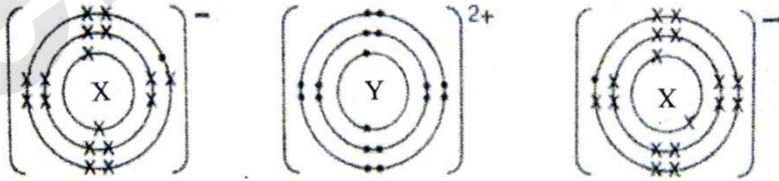
1. This question paper consists of three sections: **Section A**, **Section B** and **Section C**.
Kertas soalan ini mengandungi tiga bahagian: Bahagian A, Bahagian B dan Bahagian C.
2. Answer **all** questions in **Section A**. Write your answers for **Section A** in the spaces provided in this question paper.
Jawab semua soalan dalam Bahagian A. Jawapan anda bagi Bahagian A hendaklah ditulis pada ruang yang disediakan dalam kertas soalan.
3. Answer any **one** question from **Section B** and any **one** question from **Section C**. Write your answers for **Section B** and **Section C** on the 'helaian tambahan' provided by the invigilators. You may use equations, diagrams, tables, graphs and other suitable methods to explain your answers.
Jawab mana-mana satu soalan daripada Bahagian B dan mana-mana satu soalan daripada Bahagian C. Tulis jawapan anda bagi Bahagian B dan Bahagian C dalam helaian tambahan yang dibekalkan oleh pengawas peperiksaan. Anda boleh menggunakan persamaan, 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 dilukis mengikut skala kecuali dinyatakan.
5. Marks allocated for each question or sub-part of a question are shown in brackets.
Markah yang diperuntukkan bagi setiap soalan atau ceraihan 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.
Jika anda hendak menukar jawapan, batalkan jawapan yang telah dibuat. Kemudian tulis jawapan yang baru.
8. The Periodic Table of Elements is provided on pages 24 and 25.
Jadual Berkala Unsur disediakan di halaman 24 dan 25.
9. You may use a scientific calculator.
Anda dibenarkan menggunakan kalkulator saintifik.
10. 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 dinasihati supaya mengambil masa **90** minit untuk menjawab soalan dalam Bahagian A, **30** minit untuk Bahagian B dan **30** minit untuk Bahagian C.*
11. Detach **Section B** and **Section C** from this question paper. Tie the "helaian tambahan" together with this question paper and hand in to the invigilator at the end of the examination.
Ceraikan Bahagian B dan Bahagian C daripada kertas soalan ini. Ikat helaian tambahan bersama-sama kertas soalan ini dan serahkan kepada pengawas peperiksaan pada akhir peperiksaan.

MODUL 2 TG 5 KIMIA 2: SKEMA PEMARKAHAN

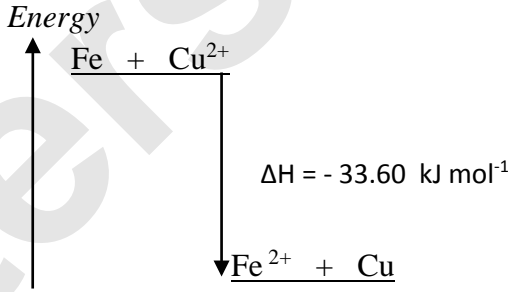
1	(a)	Empirical formula is the formula that shows the simplest whole number ratio of atoms of each element present in a compound.	1	1
	(b)	<ul style="list-style-type: none"> The lid must be opened at intervals The crucible is quickly covered with the lid //quickly replace the cover/lid of the crucible 	1 1	2
	(c)	Repeat the process of heating, cooling and weighing until a constant mass is obtained.	1	1
	(d) (i)	<ul style="list-style-type: none"> No of mole of R = $(30.64 - 28.24) / 24 = 0.1 \text{ mol}$ No of mole of oxygen = $(32.24 - 30.64) / 16 = 0.1 \text{ mol}$ 	1 1	2
	(ii)	Empirical formula = RO	1	1
	(iii)	$2 \text{ R} + \text{O}_2 \rightarrow 2 \text{ RO}$ ✓ Chemical formula ✓ Balanced eq	1 1	2
Total				9

2	(a)	(i)	Negative charged ion	1	3
		(ii)	Cl^- and OH^-	1	
		(iii)	Chlorine	1	
	(b)	(i)	Y	1	3
		(ii)	$2\text{H}^+ + 2\text{e} \rightarrow \text{H}_2$ 1.correct formula of reactant and product 2.correct balancing	1 1	
	(c)		$2.4 \text{ dm}^3 // 0.1 \times 24 \text{ dm}^3$	1	
	(d)	(i)	Hydroxide ion	1	2
		(ii)	Concentration of KCl is very low//no of hydroxide ion is higher//the solution is dilute	1	
Total					9

3	(a)	(i)	Copper(II) sulphate Carbon dioxide	1 1	3
		(ii)	$\text{CuCO}_3 + \text{H}_2\text{SO}_4 \rightarrow \text{CuSO}_4 + \text{H}_2\text{O} + \text{CO}_2$	1	
	(b)		$\text{Cu}(\text{OH})_2$	1	1
	(c)	(i)	Potassium carbonate//sodium carbonate//ammonium carbonate	1	2
		(ii)	Double decomposition reaction	1	
	(d)	(i)	Heat salt L solution until 1/3 of its original volume//until saturated Cool the solution Filter	1 1 1	4
		(ii)	Green	1	
					10

4	(a)	(i)		1	1
		(ii)	X	1	1
	(b)		$2\text{W} + 3\text{X}_2 \rightarrow 2\text{WX}_3$ Correct formula of products Balanced equation	1 1	2
	(c)	(i)	Soluble in water // insoluble in organic solvent//.....	1	1
		(ii)		1 1	2
			Number of shells and electrons Charge		

(d)	Number of moles of Y = $\frac{4}{40} = 0.1 \text{ mol}$	1	
	2 mol of Y : 2 mol of YO // 0.1 mol of Y : 0.1 mol of YO	1	
	Mass of YO = $0.1[40 + 16]$ $= 5.6 \text{ g}$	1	3
Total			10

5 (a)	Heat change/released when 1 mol of copper is displaced by iron from copper(II) nitrate solution.	1	1
(b)	To /reduce heat loss to surrounding //High rate of reaction // Reaction is fast	1	1
(c)	Correct formulae of reactants Correct formulae of products $\text{Fe} + \text{Cu}^{2+} \rightarrow \text{Fe}^{2+} + \text{Cu}$	1 1	2
(d)(i)	$100 \times 4.2 \times (32.0 - 28.0) \text{ J}$ // 1680 J // 1.68 kJ (r: without unit)	1	
(ii)	$n = \frac{1.0 \times 50}{1000}$ // 0.05 mol	1	2
(iii)	$\Delta H = \frac{1680}{0.05}$ // $\frac{1.68}{0.05}$ $= -33600 \text{ J mol}^{-1}$ // $-33.60 \text{ kJ mol}^{-1}$ (r: without unit)	1 1	2
(e)	Arrow upward with label <i>energy</i> and two levels Correct position of reactans and products and heat of displacement 	1 1	2
(f)	Heat of reaction become higher.	1	1
TOTAL			11

6	a)	Saponification	1	1
	b)	Potassium hydroxide // KOH	1	1
	c)	To precipitate the soap // To reduce solubility of soap	1	1
	d)i	Hard water	1	
	ii	P: anion of soap react with oily stain No scum produced Q : anion of soap react with magnesium ion and calcium ion in hard water scum produced	1 1 1 1	5
	e)	1. Pour 2 cm ³ of soap and and detergent into different test tube 2. Add 2 cm ³ of hard water into both test tube and shake 3. Observation: soap → scum produced detergent → scum not produced	1 1 1	3
		TOTAL		11

7	a)	acid X ionise completely in water//strong acid produce high concentration of hydrogen ion acid Y ionise partially in water//weak acid produce low concentration of hydrogen ion the concentration of hydrogen ion in acid X is higher than acid Y Higher concentration of hydrogen ion, lower the pH value	1 1 1 1 1 1	Max 5
	b)i	acid P – sulphuric acid fertiliser Q – ammonium sulphate substance R - calcium oxide gas T – carbon dioxide	1 1 1 1	4
	ii	Reaction 1 $H_2SO_4 + 2NH_3 \rightarrow (NH_4)SO_4$ Reaction 2 $CO_2 + 2NH_3 \rightarrow CO(NH_2)_2 + H_2O$ *Correct formulae of reactant and product - 1 Balanced - 1	1+1 1+1	4
	c)(i)	Substance R /CaO is basic Neutralise the acid/acidic soil	1 1	2
	(ii)	Percentage of N in <i>Urea</i> , $(NH_2)_2CO$ $= \frac{28}{60} \times 100\%$ $= 46.67\%$ Percentage of N in <i>ammonium sulphate</i> , $(NH_4)_2SO_4$ $= \frac{28}{132} \times 100\%$ $= 21.21\%$ Best fertiliser = Urea Higher percentage of nitrogen by mass Crops need nitrogen to grow well	1 1 1 1 1	5
			TOTAL	20

8	(a)	(i)	<p>Percentage of C in P $= \frac{36}{44} \times 100\%$ $= 81.81\%$</p> <p>Percentage of C in Q $= \frac{36}{42} \times 100\%$ $= 85.7\%$</p> <p>Q produce more soot because percentage of carbon by mass of Q more than P</p>	1 1 1 1	4
		(ii)	<p>Test I</p> <p>1.P is saturated hydrocarbon/P has single bond between carbon atoms</p> <p>2.do not undergo addition reaction //do not react with bromin</p> <p>Test II</p> <p>3.Q is unsaturated hydrocarbon /Q has double bond between carbon atom</p> <p>4.undergoes addition reaction// react with bromin</p>	1 1 1 1	4
	(b)	<p>$C_2H_5OH + 3O_2 \rightarrow 2CO_2 + 3H_2O$</p> <p>1.correct formula and reactant</p> <p>2.correct balancing</p> <p>3.No of mole of ethanol = $\frac{2.3}{46}$ / 0.05 mol</p> <p>4. 1 mole of ethanol produce 2 mole of carbon dioxide// 0.05 mole of ethanol produce 0.1 mole of carbon dioxide</p> <p>5. volume = $0.1 \times 24 \text{ dm}^3$ // 2.4 dm^3</p>	1 1 1 1 1	5	
	(c)	(i)	<p>1.R</p> <p>2.S</p> <p>3.ethyl butanoate</p> <p>4.</p>	1 1 1	4

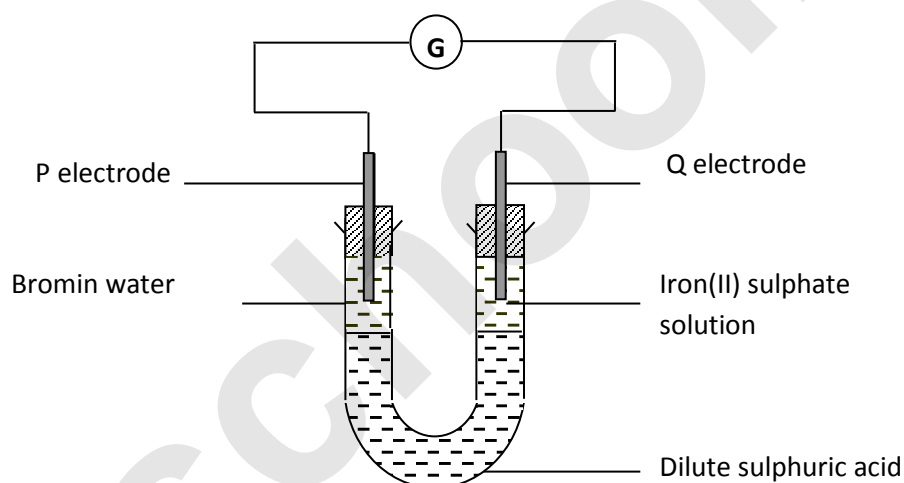
			$ \begin{array}{ccccccc} & \text{H} & \text{H} & \text{H} & \text{O} & & \text{H} & \text{H} \\ & & & & & & & \\ \text{H} & - \text{C} & - \text{C} & - \text{C} & - \text{C} & - \text{O} & - \text{C} & - \text{C} & - \text{H} \\ & & & & & & & \\ & \text{H} & \text{H} & \text{H} & & & \text{H} & \text{H} \end{array} $	1		
		(ii)	1.T= sulphuric acid $2\text{H}^+ + \text{CO}_3^{2-} \rightarrow \text{CO}_2 + \text{H}_2\text{O}$ 2.correct formula of reactant and product 3.correct balancing	1 1 1		3
			TOTAL			20

9(a)		Reaction X – not a redox reaction Reaction Y – redox reaction <u>Reaction X:</u> No change in oxidation number of reactants <u>Reaction Y</u> Oxidation number of zinc changes/increases from 0 to +2 Oxidation number of copper changes/decreases from +2 to 0 The oxidation and reduction occur simultaneously	1 1 1 1 1		5
(b)	(i)	Compound R : + 2 , iron(II) chloride Compound S : + 3 , iron(III) chloride	1+1 1+1		4
	(ii)	Acidified potassium manganate (VII)[Any suitable oxidising agent] green solution turns brown // [any suitable observation for related oxidising agent used]	1 1		2
9 (c)		Reducing agent: iron (II) sulphate Functional diagram Labelled diagram : Electron flows from electrode Q(electrode dipped into iron(II) sulphate) to electrode P(electrode dipped in bromine water) through external circuit / connecting wires Observation <ul style="list-style-type: none"> Galvanometer needle deflects 	1 1 1 1 1		

	<p>Half equation at electrode P $\text{Br}_2 + 2\text{e}^- \rightarrow 2\text{Br}^-$</p> <p>Half equation at electrode Q $\text{Fe}^{2+} \rightarrow \text{Fe}^{3+} + \text{e}^-$</p> <p>redox equation: $\text{Br}_2 + 2\text{Fe}^{2+} \rightarrow 2\text{Br}^- + 2\text{Fe}^{3+}$</p> <p>Dilute sulphuric acid : complete the circuit//allow ions flow</p>	<p>1+1</p> <p>1</p> <p>1 + 1</p> <p>1</p>	<p>Max 9</p>
--	--	---	--------------------------------

LAMPIRAN

Functional and labelled diagram



10.	(a)	$\text{CaCO}_3 + 2\text{HNO}_3 \rightarrow \text{Ca}(\text{NO}_3)_2 + \text{H}_2\text{O} + \text{CO}_2$ ✓ Chemical formula ✓ Balanced eq Number of mol HNO_3 $= (50 \times 0.1) / 1000$ $= 0.05 \text{ mol}$ $2 \text{ mol HNO}_3 : 1 \text{ mol CO}_2$ Number of mol of CO_2 produced $= 0.05 / 2$ $= 0.025 \text{ mol}$	<p>1</p> <p>1</p> <p>1</p> <p>1</p>	
-----	-----	--	-------------------------------------	--

		Maximum volume of CO ₂ = 0.025 X 24 = 0.6 dm ³ = 600 cm ³	1	5
(b)	(i)	<ul style="list-style-type: none"> ✓ The rate of reaction of Experiment II higher than Experiment I ✓ Powdered marble chip has higher Total Surface Area that exposed to collision with hydrogen ions ✓ So, the frequency of collisions is higher. ✓ So, the frequency of effective collisions is higher 	1 1 1 1	Max 3
	(ii)	<ul style="list-style-type: none"> ✓ The rate of reaction of Experiment III higher than Experiment I ✓ The temperature in experiment III is higher than experiment I. ✓ the kinetic energy of reactants/hydrogen ions is higher//the reactants move faster. ✓ So, the frequency of collisions between hydrogen ions and calcium carbonate is higher. ✓ So, the frequency of effective collisions is higher. 	1 1 1	3
(c)		Zinc/ magnesium Nitric acid//hydrochloric acid//sulphuric acid Catalyst: copper(II) sulphate 1. Fill a burette with water , invert into a basin with water, clamp with retort stand, adjust the meniscus to 50 cm ³ 2. 50cm ³ of 1.0 mol dm ⁻³ nitric acid is poured into a conical flask. 3. Excess zinc/ magnesium granules are added into the acid 4. A stopper with delivery tube is immediately connected to collect the gas released. (consider diagram if any) 5. Start the stop watch //the time taken/ to collect 50 cm ³ of gas is recorded. 6. Step 1 to 5 are repeated by adding copper(II) sulphate in step 2. 7. The present of catalyst/copper(II) sulphate will increase the rate of reaction//reduced time taken to collect 50 cm ³ of gas.	1 1 1 1 1 1 1 1 1	Max 9
			Total	20

END OF MARK SCHEME

NAMA:

TINGKATAN:



**MODUL PENINGKATAN PRESTASI TINGKATAN 5
TAHUN 2015
MAJLIS PENGETUA SEKOLAH MALAYSIA
(KEDAH)**

**MODUL 2 2015
CHEMISTRY
4541/3
Kertas 3
Okt/Nov
1 ½ jam**

JANGAN BUKA MODUL 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>		
Soalan	Markah Penuh	Markah Diperoleh
1	18	
2	15	
3	17	
Jumlah	50	

Kertas soalan ini mengandungi 9 halaman bercetak.

Answer all questions
Jawab semua soalan

- 1 An experiment was carried out to construct an electrochemical series of metals. Diagram 1.1 shows the set-up apparatus for an experiment to measure the potential difference between magnesium electrode and W electrode. An experiment was repeated by replacing W electrode with X, Y and Z electrodes. The magnesium electrode is the negative terminal in all the experiments.

Satu eksperimen telah dijalankan untuk membina siri elektrokimia beberapa logam. Rajah 1.1 menunjukkan susunan radas untuk mengukur beza keupayaan di antara elektrod magnesium dan elektrod W. Eksperimen diulangi dengan menggantikan elektrod W dengan elektrod X, Y dan Z. Elektrod magnesium adalah terminal negatif dalam kesemua eksperimen.

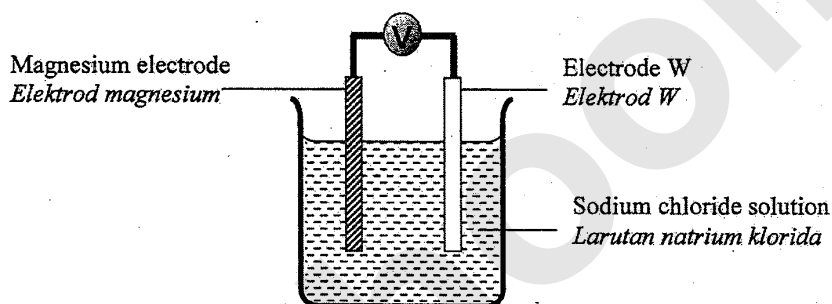


Diagram 1.1
Rajah 1.1

Diagram 1.2 shows the voltmeter readings of all the experiments.
Rajah 1.2 menunjukkan bacaan voltmeter bagi semua eksperimen.

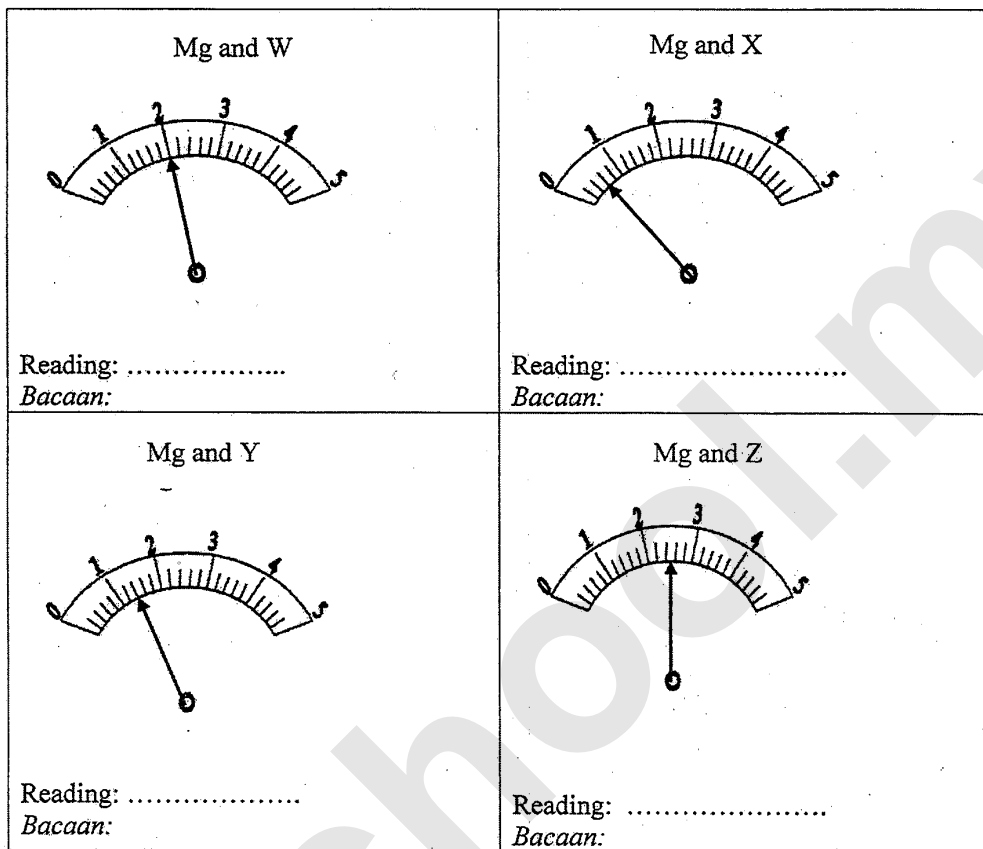


Diagram 1.2
Rajah 1.2

- (a) Record the voltmeter readings in the spaces provided in Diagram 1.2.
Catatkan bacaan voltmeter pada ruang yang disediakan dalam Rajah 1.2.

[3 marks]

- (b) Construct a table to record the voltmeter reading for the different pair of metal.
Bina satu jadual untuk merekod bacaan voltmeter untuk pasangan logam yang berlainan.

[3 marks]

- (c) State one hypothesis for this experiment.
Nyatakan satu hipotesis bagi eksperimen ini.

.....

.....

.....

[3 marks]

- (d) For this experiment, state:
Bagi eksperimen ini, nyatakan:

- (i) The manipulated variable
Pembolehubah dimanipulasikan

.....

- (ii) The responding variable
Pembolehubah bergerak balas

.....

- (iii) The constant variable
Pembolehubah dimalarkan

.....

[3 marks]

Diagram 1.2 shows the voltmeter readings of all the experiments.
Rajah 1.2 menunjukkan bacaan voltmeter bagi semua eksperimen.

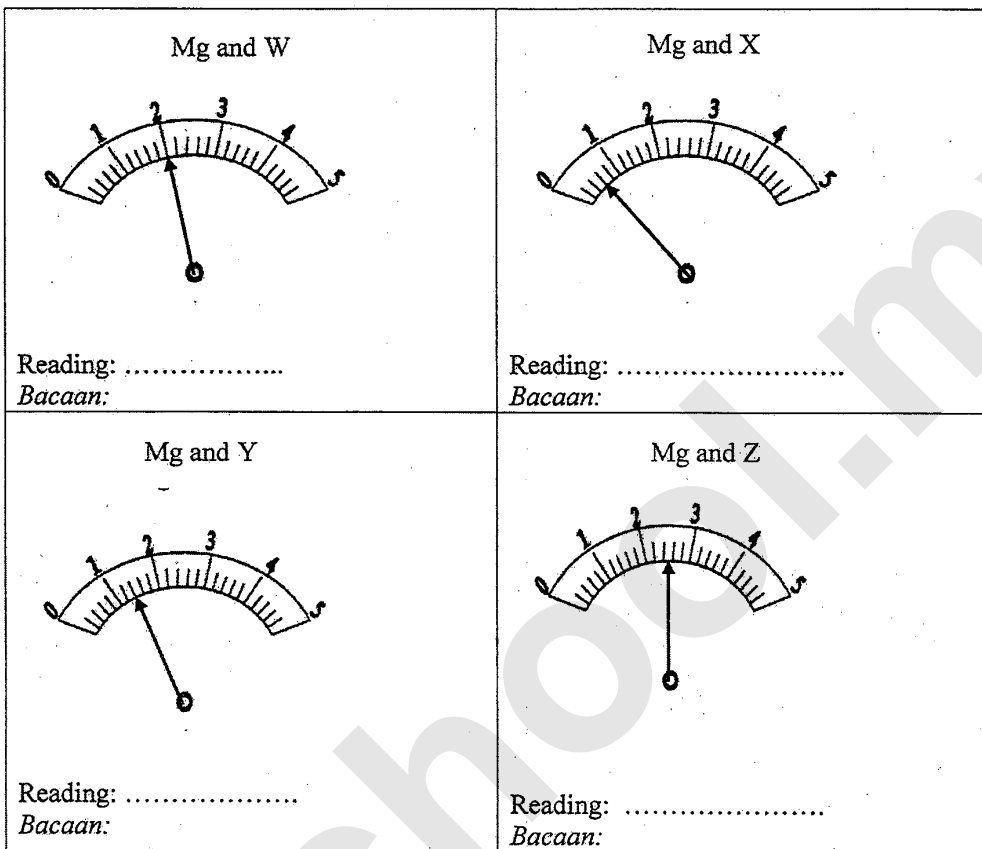


Diagram 1.2
Rajah 1.2

- (a) Record the voltmeter readings in the spaces provided in Diagram 1.2.
Catatkan bacaan voltmeter pada ruang yang disediakan dalam Rajah 1.2.

[3 marks]

- (b) Construct a table to record the voltmeter reading for the different pair of metal.
Bina satu jadual untuk merekod bacaan voltmeter untuk pasangan logam yang berlainan.

[3 marks]

- (c) State one hypothesis for this experiment.
Nyatakan satu hipotesis bagi eksperimen ini.

.....

.....

.....

[3 marks]

- (d) For this experiment, state:
Bagi eksperimen ini, nyatakan:

- (i) The manipulated variable
Pembolehubah dimanipulasikan

.....

- (ii) The responding variable
Pembolehubah bergerak balas

.....

- (iii) The constant variable
Pembolehubah dimalarkan

.....

[3 marks]

- (e) Based on the voltmeter readings, arrange all the metals in ascending order of their electropositivity.

Berdasarkan bacaan voltmeter, susunkan semua logam dalam susunan menaik keelektropositifan.

.....
[3 marks]

- (f) Suggest the possible voltage if X and Z electrodes is used to construct electrochemical series.

Cadangkan nilai voltan yang mungkin jika elektrod X dan Z digunakan untuk membina siri elektrokimia.

.....
[3 marks]

2 A student carried out an experiment to investigate the role of water in showing the properties of acids as shown in the Diagram 2.

Seorang pelajar telah menjalankan satu eksperimen untuk menyoiasat peranan air dalam menunjukkan sifat-sifat bagi asid seperti yang ditunjukkan dalam Rajah 2.

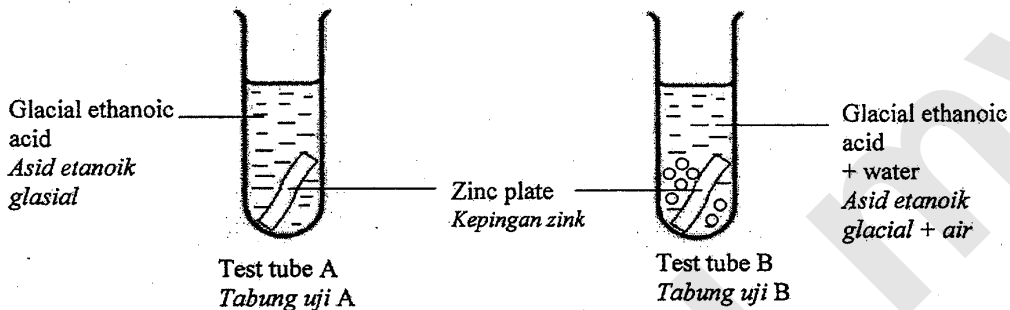


Diagram 2
Rajah 2

(a) State the observation and the corresponding inferences in Table 2.1.
Nyatakan pemerhatian dan inferens yang sepadan dalam Jadual 2.1.

Test tube <i>Tabung uji</i>	Observation <i>Pemerhatian</i>	Inference <i>Inferens</i>
A	No change <i>Tiada perubahan</i>	
B		

Table 2.1.
Jadual 2.1

[3 marks]

(b) Based on the test tube B, what is the operational definition of acid?
Berdasarkan tabung uji B, apakah definisi secara operasi bagi asid?

.....

.....

[3 marks]

- (c) Explain the role of water in showing the properties of acid.
Terangkan peranan air dalam menunjukkan sifat-sifat asid.

.....

[3 marks]

- (d) Zinc plate is replaced by zinc carbonate in test tube B.
 Name the two products formed.
Kepingan zink digantikan dengan zink karbonat dalam tabung uji B.
Namakan dua hasil tindak balas yang terbentuk.

.....

[3 marks]

(e)

Hydrochloric acid, HCl <i>Asid hidroklorik, HCl</i>	Sulphuric acid, H ₂ SO ₄ <i>Asid sulfurik, H₂SO₄</i>
Phosphoric acid, H ₃ PO ₄ <i>Asid fosforik, H₃PO₄</i>	Carbonic acid, H ₂ CO ₃ <i>Asid karbonik, H₂CO₃</i>
Nitric acid, HNO ₃ <i>Asid nitrik, HNO₃</i>	Methanoic acid, HCOOH <i>Asid metanoik, HCOOH</i>

Classify the acids given into strong acid and weak acid.
Kelaskan asid-asid yang diberi kepada asid kuat dan asid lemah.

Strong acid <i>Asid kuat</i>	Weak acid <i>Asid lemah</i>

[3 marks]

- 3 Diagram 3 shows two reagent bottles labelled X and Y containing hexane and hexene.
Rajah 3 menunjukkan dua botol reagen berlabel X dan Y yang mengandungi heksana dan heksena.

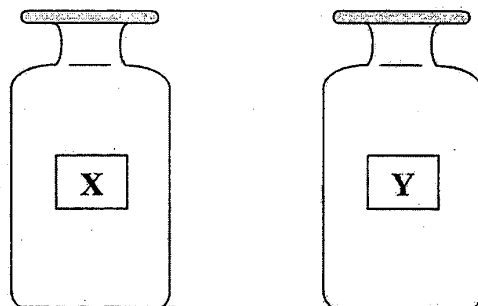


Diagram 3
Rajah 3

Plan a laboratory experiment to compare the properties of alkane and alkene using bromine water.

Rancang satu eksperimen makmal untuk membandingkan sifat-sifat alkana dan alkena menggunakan air bromin.

Your planning must include the following items:

Perancangan anda hendaklah mengandungi perkara-perkara berikut:

- (a) Aim of the experiment
Tujuan eksperimen
- (b) All the variables
Semua pembolehubah
- (c) Statement of the hypothesis
Pernyataan hipotesis
- (d) List of materials and apparatus
Senarai bahan dan radas
- (e) Procedure of the experiment
Prosedur eksperimen
- (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 mengandungi 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 cераian 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, kemnudian 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.
Ikut semua kertas jawapan anda bersama-sama soalan ini di akhir peperiksaan.

MARK SCHEME MODULE 2 KIMIA Paper 3

Question	Rubric	Score
1(a)	Able to state all the voltmeter readings accurately with correct unit and one decimal point. <u>Sample answer:</u> Mg and W : 2.0 V Mg and X : 0.6 V Mg and Y : 1.4 V Mg and Z : 2.5 V	3
	Able to state all the voltmeter readings accurately without unit. <u>Sample answer:</u> Mg and W : 2 Mg and X : 0.60 Mg and Y : 1.4 Mg and Z : 2.5	2
	Able to state at least two readings correctly without unit	1
	No response or wrong response	0

Question	Rubric	Score										
1(b)	Able to construct a table to record the voltmeter reading for each pair of metals that contain: 1. Correct titles 2. Readings <u>Sample answer:</u> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Pairs of metals</th> <th>Voltage / V</th> </tr> </thead> <tbody> <tr> <td>Mg and W</td> <td>2.0</td> </tr> <tr> <td>Mg and X</td> <td>0.6</td> </tr> <tr> <td>Mg and Y</td> <td>1.4</td> </tr> <tr> <td>Mg and Z</td> <td>2.5</td> </tr> </tbody> </table> a = potential difference	Pairs of metals	Voltage / V	Mg and W	2.0	Mg and X	0.6	Mg and Y	1.4	Mg and Z	2.5	3
	Pairs of metals	Voltage / V										
	Mg and W	2.0										
	Mg and X	0.6										
Mg and Y	1.4											
Mg and Z	2.5											
Able to construct a less accurate table that contains: 1. Titles 2. Readings	2											
Able to construct a table with at least one title / reading	1											
No response or wrong response	0											

Question	Rubric	Score
1(c)	Able to give the hypothesis accurately <u>Sample answer:</u> The further the distance between two metals in the electrochemical series, the higher the potential difference / voltage	3
	Able to give the hypothesis almost accurately <u>Sample answer:</u> The further the distance between two metals, the higher potential difference/voltage // vice versa	2
	Able to state an idea of hypothesis <u>Sample answer:</u> Different metals affects the potential difference	1
	No response or wrong response	0

Question	Rubric	Score
1(d)	Able to state all the three variables correctly <u>Sample answer:</u> Manipulated variable : Pair of metal Responding variable : Voltmeter reading/voltage Constant variable : magnesium/negative electrode// sodium chloride solution//electrolyte// concentration of electrolyte. r: volume of sodium chloride/electrolyte	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(e)	Able to arrange in ascending order of all the metals <u>Sample answer:</u> Z, W, Y, X, Mg	3
	Able to arrange any four metals in correct ascending order	2
	Able to arrange any three metals in correct ascending order// Able to arrange all the metals in decending order	1
	No response or wrong response	0

Question	Rubric	Score
1(f)	Able to predict the value of voltage accurately with unit. Answer: 1.9 V	3
	Able to predict the value of voltage accurately without unit. Answer: 1.9	2
	Able to give an idea the value of voltage. 1.4 < V < 2.5	1
	No response or wrong response	0

Question	Rubric	Score									
2(a)	Able to state the observation and corresponding inferences correctly <u>Sample answer:</u>	3									
	<table border="1"> <thead> <tr> <th>Test tube</th> <th>Observation</th> <th>Inference</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>-</td> <td>No reaction</td> </tr> <tr> <td>B</td> <td>Bubbles of gas produced</td> <td>Hydrogen gas releases</td> </tr> </tbody> </table>	Test tube	Observation	Inference	A	-	No reaction	B	Bubbles of gas produced	Hydrogen gas releases	
	Test tube	Observation	Inference								
	A	-	No reaction								
	B	Bubbles of gas produced	Hydrogen gas releases								
Able to state any two answer correctly	2										
Able to state any one answer correctly	1										
No response given / wrong response	0										

Question	Rubric	Score
2(b)	Able to give the meaning of acid correctly <u>Sample answer:</u> Substance that produced hydrogen gas when reacts with zinc in the present of water.	3
	Able to give the meaning of acid. <u>Sample answer:</u> Substance that ionize/dissolve in water to produce hydrogen ion // substance that produce (hydrogen gas) / bubbles when reacts with zinc.	2
	Able to give an idea of acid <u>Sample answer:</u> Substance that change blue litmus paper to red // substance that has pH value lower than 7.	1
	No response given / wrong response	0

Question	Rubric	Score
2(c)	Able to explain the role of water correctly <u>Sample answer:</u> Water can ionise/dissociate acid to form hydrogen ion.	3
	Able to explain the role of water less accurately <u>Sample answer:</u> Water can ionise/dissociate acid // water can produce hydrogen ion.	2
	Able to give an idea of the role of water. <u>Sample answer:</u> To show the acidity of acid.	1
	No response given / wrong response	0

Question	Rubric	Score
2(d)	Able to write the name of any two products correctly <u>Sample answer:</u> 1. Zinc ethanoate 2. Carbon dioxide 3. Water	3
	Able to write the name of any one product correctly or any two products less accurately <u>Sample answer:</u> 1. zinc ethanoate // carbon dioxide // water 2. CO ₂ and H ₂ O// (CH ₃ COO) ₂ Zn and CO ₂ // (CH ₃ COO) ₂ Zn and H ₂ O	2
	Able to state an idea of the product. <u>Sample answer:</u> (CH ₃ COO) ₂ Zn // CO ₂ // H ₂ O	1
	No response given / wrong response	0

Question	Rubric	Score							
2(e)	Able to classify all the acids correctly <u>Sample answer:</u> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Strong acid</th> <th>Weak acid</th> </tr> </thead> <tbody> <tr> <td>Hydrochloric acid, HCl Nitric acid, HNO₃ Sulphuric acid, H₂SO₄</td> <td>Phosphoric acid, H₃PO₄ Carbonic acid, H₂CO₃ Methanoic acid, HCOOH</td> </tr> </tbody> </table>	Strong acid	Weak acid	Hydrochloric acid, HCl Nitric acid, HNO ₃ Sulphuric acid, H ₂ SO ₄	Phosphoric acid, H ₃ PO ₄ Carbonic acid, H ₂ CO ₃ Methanoic acid, HCOOH	3			
	Strong acid	Weak acid							
	Hydrochloric acid, HCl Nitric acid, HNO ₃ Sulphuric acid, H ₂ SO ₄	Phosphoric acid, H ₃ PO ₄ Carbonic acid, H ₂ CO ₃ Methanoic acid, HCOOH							
	Able to classify any four acids correctly	2							
	Able to classify any two acids correctly or give opposite heading <u>Sample answer:</u> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Weak acid</th> <th>Strong acid</th> </tr> </thead> <tbody> <tr> <td>Hydrochloric acid. HCl Nitric acid, HNO₃ Sulphuric acid, H₂SO₄</td> <td>Phosphoric acid, H₃PO₄ Carbonic acid, H₂CO₃ Methanoic acid, HCOOH</td> </tr> </tbody> </table> <p style="text-align: center;"><i>Or</i></p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Weak acid</th> <th>Strong acid</th> </tr> </thead> <tbody> <tr> <td>Phosphoric acid, H₃PO₄ Carbonic acid, H₂CO₃ Methanoic acid, HCOOH</td> <td>Hydrochloric acid. HCl Nitric acid, HNO₃ Sulphuric acid, H₂SO₄</td> </tr> </tbody> </table>	Weak acid	Strong acid	Hydrochloric acid. HCl Nitric acid, HNO ₃ Sulphuric acid, H ₂ SO ₄	Phosphoric acid, H ₃ PO ₄ Carbonic acid, H ₂ CO ₃ Methanoic acid, HCOOH	Weak acid	Strong acid	Phosphoric acid, H ₃ PO ₄ Carbonic acid, H ₂ CO ₃ Methanoic acid, HCOOH	Hydrochloric acid. HCl Nitric acid, HNO ₃ Sulphuric acid, H ₂ SO ₄
Weak acid	Strong acid								
Hydrochloric acid. HCl Nitric acid, HNO ₃ Sulphuric acid, H ₂ SO ₄	Phosphoric acid, H ₃ PO ₄ Carbonic acid, H ₂ CO ₃ Methanoic acid, HCOOH								
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Phosphoric acid, H ₃ PO ₄ Carbonic acid, H ₂ CO ₃ Methanoic acid, HCOOH	Hydrochloric acid. HCl Nitric acid, HNO ₃ Sulphuric acid, H ₂ SO ₄								
No response given / wrong response	0								

Question Number	Rubric	Score
3(a)	Able to give the aim of the experiment correctly <u>Sample answer:</u> To compare the properties of hexane and hexene when react with bromine water.	3
	Able to give the aim of the experiment less accurately <u>Sample answer:</u> To compare the properties of alkane and alkene when react with bromine water/oxidizing agent // Does hexane and hexene can be distinguished using bromine water?	2
	Able to state an idea the statement of problem <u>Sample answer:</u> To study the properties of hexane/alkana and hexene/alkena	1
	No response given / wrong response	0

Question Number	Rubric	Score
3(b)	Able to state All variables correctly <u>Sample answer:</u> Manipulated variable : Hexane and hexane//Type of hydrocarbon // X and Y Responding variable : The colour change of bromine water Constant variable : Bromine water	3
	Able to state any two variables correctly	2
	Able to state any one variables correctly	1
	No response given / wrong response	0

Question Number	Rubric	Score
3(c)	Able to state the relationship between manipulated variable and responding variable correctly <u>Sample answer:</u> Hexene changes the brown colour of bromine water to colourless, whereas hexane does not.	3
	Able to state the relationship between manipulated variable and responding variable but in the opposite direction <u>Sample answer:</u> Hexene changes the brown colour of bromine water to colourless/ decolourised If RV follow by MV – give score 2	2
	Able to state an idea of the hypothesis <u>Sample answer:</u> Hexene changes / effect the colour of bromine water.	1
	No response given / wrong response	0

Question Number	Rubric	Score
3(d)	Able to give the list of the apparatus and materials correctly and completely <u>Sample answer:</u> List of apparatus and materials Bromine water, hexane, hexane Test tube, dropper, measuring cylinder	3
	Able to give at least two substances and at least two apparatus R= without bromine water	2
	Able to give at least two substance and at least one apparatus	1
	No response given / wrong response	0

Question Number	Rubric	Score
3(e)	Able to state all procedures correctly <u>Sample answer:</u> 1. [2 – 5] cm ³ of hexane/hexene is poured into a test tube 2. [2 – 3] drops of bromine water are added into the test tube 3. The test tube is closed with stopper 4. The mixture is shaken 5. The observation is recorded 6. Repeat steps 1-5 by using the hexene/hexane.	3
	Able to state 4 steps of procedures correctly Steps 1,2,5,6	2
	Able to state 2 steps of procedures correctly Steps 1,2	1
	No response given / wrong response	0

Question Number	Rubric	Score					
3(f)	Able to exhibit the tabulation of data correctly Tabulation of data has the following elements : 1. 2 columns and 3 rows <u>Sample answer:</u>	2					
	<table border="1"> <thead> <tr> <th>Reagent // Hydrocarbon</th> <th>Observation</th> </tr> </thead> <tbody> <tr> <td>Hexane // X//Y</td> <td></td> </tr> <tr> <td>Hexene // Y // X</td> <td></td> </tr> </tbody> </table>		Reagent // Hydrocarbon	Observation	Hexane // X//Y		Hexene // Y // X
	Reagent // Hydrocarbon	Observation					
Hexane // X//Y							
Hexene // Y // X							
Able to exhibit the tabulation of data less accurately Tabulation of data has the following elements : <u>Sample answer:</u>	1						
<table border="1"> <thead> <tr> <th>Reagent // Hydrocarbon</th> <th>Observation</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> </tbody> </table>		Reagent // Hydrocarbon	Observation				
Reagent // Hydrocarbon	Observation						
	No response given / wrong response	0					

END OF MARK SCHEME