



**MODUL PENINGKATAN PRESTASI TINGKATAN 5
TAHUN 2016
MAJLIS PENGETUA SEKOLAH MALAYSIA (KEDAH)**
<https://cikguadura.wordpress.com/>

MODUL A 2016 CHEMISTRY 4541/1

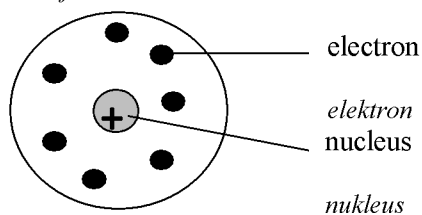
**Kertas 1
Ogos/sept
1 1/4 jam**

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.*

Kertas modul ini mengandungi 30 halaman bercetak

- 1 Diagram shows a model of an atom.
Rajah menunjukkan suatu model atom.



Which one of the following scientists introduce this model?
Manakah antara saintis berikut memperkenalkan model ini?

- A John Dalton
B JJ Thomson
C Ernest Rutherford
D Niels Bohr
- 2 Which of the following is true about Relative Atomic Mass?
Pernyataan manakah benar tentang Jisim Atom Relatif ?

- A The average mass of one atom
 $\frac{1}{12}$ X mass of an atom of C-12
Jisim purata satu atom
 $\frac{1}{12}$ X jisim satu atom C-12
- B The average mass of one molecule
 $\frac{1}{12}$ X mass of an atom of C-12
Jisim purata satu molekul
 $\frac{1}{12}$ X jisim satu atom C-12
- C The average mass of one atom
 $\frac{1}{14}$ X mass of an atom of C-14
Jisim purata satu atom
 $\frac{1}{14}$ X jisim satu atom C-14
- D The average mass of one molecule
 $\frac{1}{14}$ X mass of an atom of C-14
Jisim purata satu molekul
 $\frac{1}{14}$ X jisim satu atom C-14

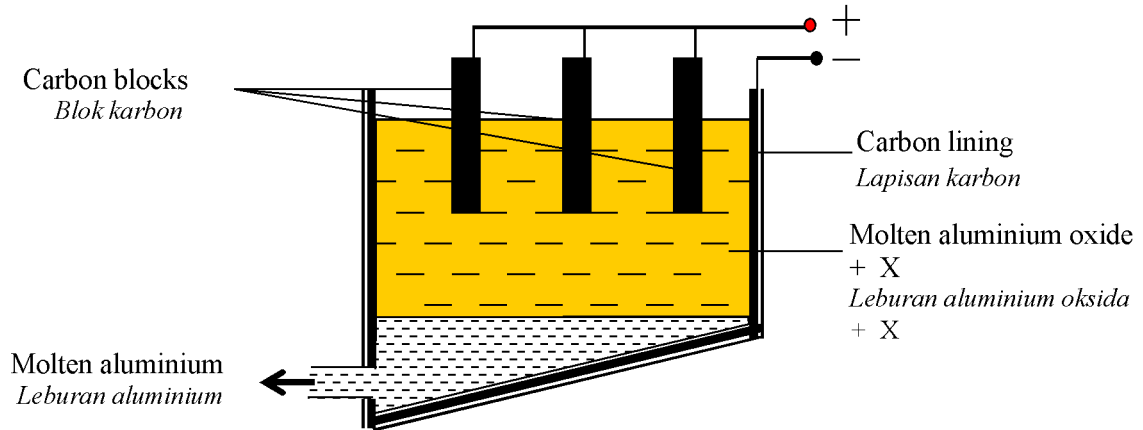
- 3 Sodium, potassium and rubidium are in the same group in the Periodic Table of Elements. What is the name of the group?

Natrium, kalium dan rubidium berada dalam kumpulan yang sama dalam Jadual Berkala Unsur. Apakah nama kumpulan tersebut?

- A Halogen
Halogen
 - B Alkali metal
Logam alkali
 - C Transition element
Logam peralihan
 - D Alkaline earth metal
Logam alkali bumi
- 4 Which of the following atom will form an ion with +1 charge?
Antara atom berikut, yang manakah akan membentuk ion bercas +1 ?

- A Lithium
Litium
- B Chlorine
Klorin
- C Magnesium
Magnesium
- D Oxygen
Oksigen

- 5 Diagram shows the electrolytic cell used for the extraction of aluminium.
Rajah menunjukkan sel elektrolisis yang digunakan bagi pengestrakan aluminium.



What is the purpose of adding X to aluminium oxide?
Apakah tujuan menambahkan X ke dalam aluminium oksida?

- A** To coagulate the impurities in the mixture
Untuk menggumpalkan bendasing dalam campuran
- B** To reduce the melting point of aluminium oxide
Untuk merendahkan takat lebur aluminium oksida
- C** To increase the rate of reaction
Untuk meningkatkan kadar tindak balas
- D** To increase the electrical conductivity
Untuk meningkatkan kekonduksian elektrik
- 6 Which of the following is a diprotic acid ?
Antara berikut , yang manakah asid dwibes?
- A** Sulphuric acid , H_2SO_4
Asid sulfurik , H_2SO_4
- B** Hydrochloric acid , HCl
Asid hidroklorik , HCl
- C** Phosphoric acid , H_3PO_4
Asid fosforik , H_3PO_4
- D** Ethanoic acid , CH_3COOH
Asid etanoik , CH_3COOH

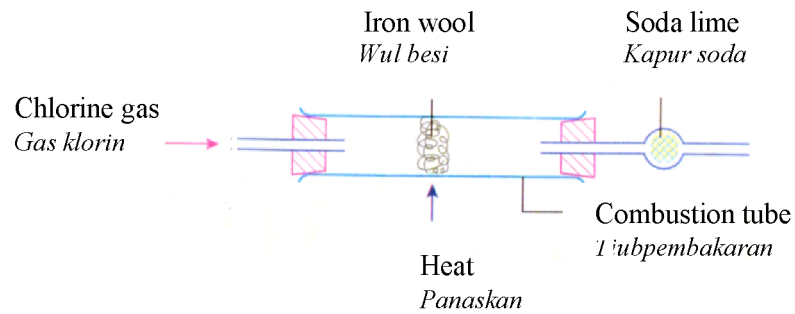
- 7 Diagram shows National Monument which contains copper as the main component.
Rajah menunjukkan Tugu Negara yang mengandungi kuprum sebagai komponen utama.



- Which element is added to manufacture the alloy ?
Element manakah ditambahkan dalam pembuatan aloi tersebut ?
- A** Tin
Timah
- B** Zinc
Zink
- C** Antimony
Antimoni
- D** Manganese
Mangan
- 8 What is the meaning of the rate of reaction?
Apakah yang dimaksudkan dengan kadar tindak balas?
- A** Increase in the quantity of reactant per unit time
Pertambahan dalam kuantiti bahan tindak balas per unit masa
- B** Decrease in the quantity of product per unit time
Pengurangan hasil tindak balas per unit masa
- C** Change in the quantity of reactant or product per unit time
Perubahan kuantiti bahan atau hasil tindak balas per unit masa.
- D** Change in the physical state of reactant or product per unit time
Perubahan keadaan fizikal bahan atau hasil tindak balas per unit masa

- 9 Which of the following is **not** a redox reaction?
*Antara berikut, yang manakah **bukan** tindak balas redoks?*
- A $2\text{Mg} + \text{O}_2 \rightarrow 2\text{MgO}$
- B $\text{Cl}_2 + 2\text{KBr} \rightarrow 2\text{KCl} + \text{Br}_2$
- C $\text{NaOH} + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O}$
- D $2\text{FeCl}_3 + \text{Zn} \rightarrow 2\text{FeCl}_2 + \text{ZnCl}_2$
- 10 Which of the following medicines is an analgesic?
Antara ubat berikut, manakah analgesik?
- A Insulin
Insulin
- B Penicillin
Penisilin
- C Streptomycin
Streptomisin
- D Aspirin
Aspirin
- 11 What is the meaning of one mole?
Apakah maksud satu mol?
- A The mass of 6.02×10^{23} particles of any substance.
Jisim bagi 6.02×10^{23} zarah sebarang bahan.
- B The volume occupied by any gas at a particular temperature and pressure.
Isipadu yang ditempati oleh sebarang gas pada suhu dan tekanan tertentu.
- C The amount of substance that contains the same number of atoms in 12 g of carbon-12.
Kuantiti bahan yang mengandungi bilangan atom yang sama dalam 12 g karbon-12
- D The amount of substance that contains the same number of molecules in 32 g of oxygen gas.
Kuantiti bahan yang mengandungi bilangan molekul yang sama dalam 32 g gas oksigen.

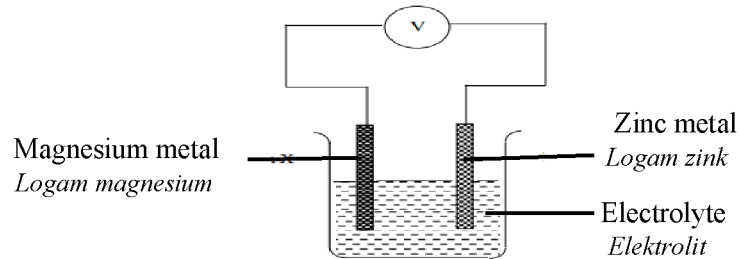
- 12 Diagram shows a reaction between chlorine and iron wool.
Rajah menunjukkan tindak balas antara klorin dan wul besi.



What is the name and the colour of the product formed?
Apakah nama dan warna hasil yang terbentuk?

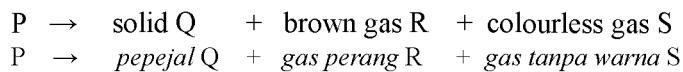
	Name <i>Nama</i>	Colour <i>Warna</i>
A	Iron(II) chloride <i>Ferum(II) klorida</i>	Brown <i>Perang</i>
B	Iron(II) chloride <i>Ferum(II) klorida</i>	Green <i>Hijau</i>
C	Iron(III) chloride <i>Ferum(III) klorida</i>	Brown <i>Perang</i>
D	Iron(III) chloride <i>Ferum(III) klorida</i>	Green <i>Hijau</i>

- 13 Diagram shows a simple chemical cell. Two different metals are used as electrodes.
Rajah menunjukkan satu sel kimia ringkas. Dua logam yang berlainan digunakan sebagai elektrod.



Which metal can be used to replace zinc metal to obtain the highest voltage reading?
Logam yang manakah boleh menggantikan logam zink untuk mendapatkan bacaan voltan yang paling tinggi?

- A Tin
Stannum
- B Silver
Argentum
- C Iron
Ferum
- D Lead
Plumbum
- 14 Diagram below shows a reaction on white solid P when heated strongly.
Rajah di bawah menunjukkan tindak balas apabila pepejal putih P dipanaskan dengan kuat.



The solid Q is brown when hot and yellow when cold. Solid P is
Pepejal Q berwarna perang apabila panas dan kuning apabila sejuk. Pepejal P adalah

- A zinc nitrate
zink nitrat
- B zinc carbonate
zink karbonat
- C lead (II) nitrate
plumbum(II) nitrat
- D lead (II) carbonate
plumbum(II) karbonat

- 15 Which of the following pairs is **correct** ?
Antara pasangan berikut yang manakah betul?

	Types of glass <i>Jenis kaca</i>	Uses <i>Kegunaan</i>
I	Fused glass <i>Kaca silika terlakur</i>	Telescope mirrors <i>Cermin teleskop</i>
II	Soda-lime glass <i>Kaca soda kapur</i>	Window panes <i>Kepingan kaca tingkap</i>
III	Borosilicate glass <i>Kaca borosilikat</i>	Bottles <i>Botol</i>
IV	Lead crystal glass <i>Kaca plumbum</i>	Laboratory glass wares <i>Peralatan kaca makmal</i>

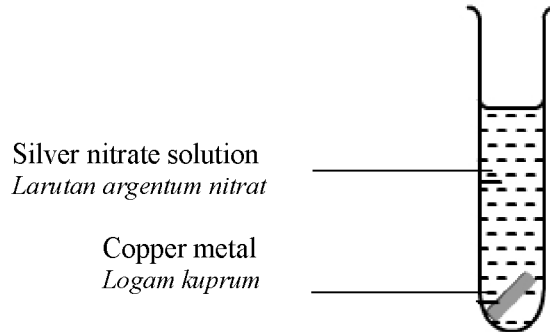
- A I and II
 B I and III
 C II and IV
 D III and IV
- 16 Diagram shows two containers filled with 1,1,1,2 – tetrafluoroethane gas .The gas is used as cooling agent in refrigerant system in car.
Rajah menunjukkan dua bekas berisi gas 1,1,1,2- tetrafloroetana. Gas tersebut digunakan sebagai agen pendingin dalam sistem penghawa dingin kereta.



1,1,1,2 – tetrafluoroethane gas can be produced from ethane gas. The reaction involved is
Gas 1,1,1,2- tetrafloroetana boleh dihasilkan daripada gas etana. Tindak balas terlibat adalah

- A Oxidation
Pengoksidaan
- B Esterification
Pengesteran
- C Addition
Penambahan
- D Substitution
Penukargantian

- 17 The diagram shows a reaction between a metal and a solution.
Rajah menunjukkan satu tindak balas antara logam dan suatu larutan.



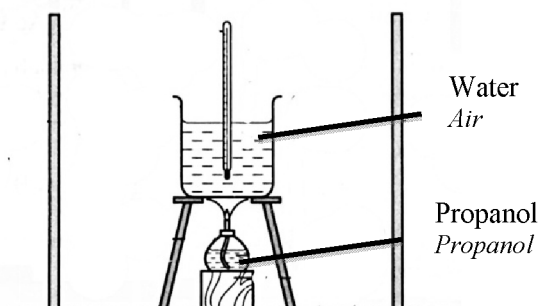
Which of the following is true?

Pernyataan berikut yang manakah adalah benar?

- A** Copper is oxidised
Kuprum dioksidakan
- B** Brown solid deposited on copper
Pepejal perang terendap pada kuprum
- C** Blue solution turns to colourless
Larutan biru bertukar menjadi tidak berwarna
- D** Oxidation number of silver increases from 0 to +2
Nombor pengoksidaan bagi argentum bertambah daripada 0 ke +2

- 18 Diagram below shows the apparatus set-up for an experiment to determine the heat of combustion of propanol.

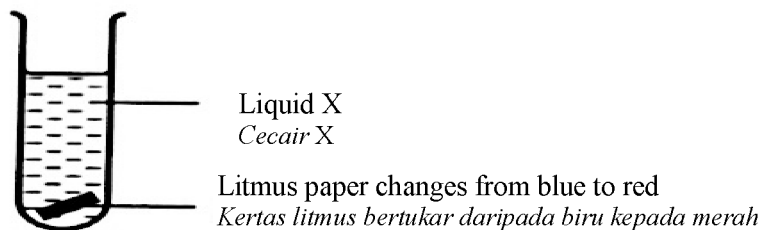
Rajah menunjukkan susunan radas bagi suatu eksperimen untuk menentukan haba pembakaran propanol.



Which of the following is **not** required for calculating the heat of combustion of propanol?
*Yang manakah antara berikut yang **tidak** diperlukan bagi pengiraan haba pembakaran propanol?*

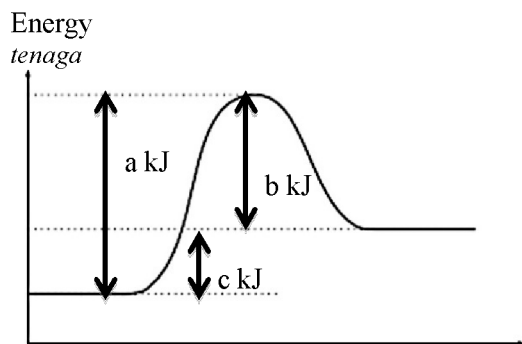
- A Volume of water
Isipadu air
- B Volume of propanol
Isipadu propanol
- C Molar mass of propanol
Jisim molar propanol
- D Rise of water temperature
Kenaikan suhu air

- 19 Diagram shows the effect of liquid X on a piece of litmus paper .
Rajah menunjukkan kesan cecair X terhadap suatu kertas litmus .



What is liquid X ?
Apakah cecair X ?

- A Ammonia in water
Ammonia dalam air
- B Hydrogen chloride in water
Hidrogen klorida dalam air
- C Sodium hydroxide in methylbenzene
Natrium hidroksida dalam metilbenzena
- D Glacial ethanoic acid in methylbenzene
Asid etanoik glasial dalam metilbenzena
- 20 Diagram represents an energy profile diagram for an endothermic reaction.
Rajah menunjukkan diagram profil tenaga bagi satu tindak balas endotermik.



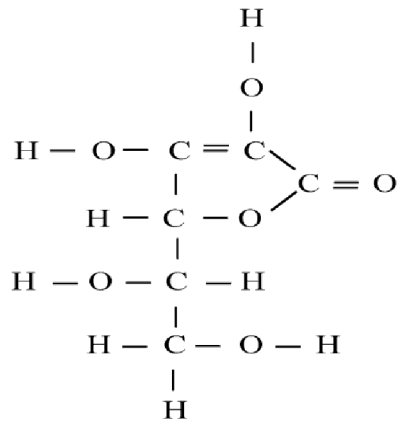
What is the value of the activation energy?
Apakah nilai tenaga pengaktifan?

- A a kJ
- B b kJ
- C c kJ
- D (a + c) kJ

21 Which of the following is the usage of Iodin-131 isotope ?
Antara berikut yang manakah kegunaan isotop Iodin-131 ?

- A Kill cancer cells
Membunuh sel-sel kanser
- B Diagnose thyroid problems
Mengesan penyakit tiroid
- C Determine the age of fossil
Menentukan umur fosil
- D Trace leaks in gas or oil pipes
Kesan kebocoran pada paip gas dan minyak

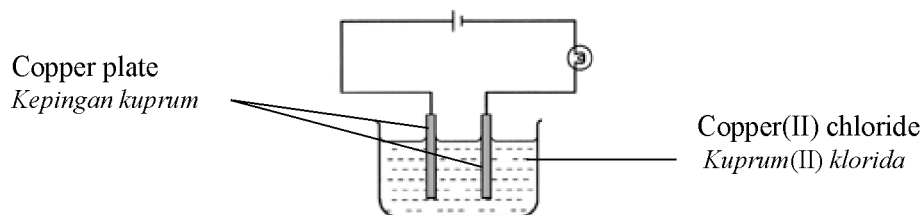
22 Diagram shows the structural formula of Vitamin C.
Rajah menunjukkan formula struktur bagi Vitamin C.



The molecular formula of the vitamin C is
Formula molekul bagi vitamin C tersebut adalah

- A $\text{C}_3\text{H}_4\text{O}_3$
- B $\text{C}_3\text{H}_4\text{O}_6$
- C $\text{C}_6\text{H}_8\text{O}_3$
- D $\text{C}_6\text{H}_8\text{O}_6$

- 23 Diagram shows the apparatus set-up of electrolysis of aqueous copper(II) chloride solution.
Rajah menunjukkan susunan radas bagi elektrolisis larutan kuprum(II) klorida.



The half equation at anode is
Persamaan setengah di anod adalah

- A $4\text{OH}^- \rightarrow 2\text{H}_2\text{O} + \text{O}_2 + 4\text{e}^-$
 B $\text{Cu}^{2+} + 2\text{e}^- \rightarrow \text{Cu}$
 C $\text{Cu} \rightarrow \text{Cu}^{2+} + 2\text{e}^-$
 D $2\text{Cl}^- \rightarrow \text{Cl}_2 + 2\text{e}^-$
- 24 Which of the following salts is insoluble?
Antara berikut yang manakah garam tak terlarut?
- A Lead(II) nitrate
Plumbum(II) nitrat
- B Copper(II) sulphate
Kuprum(II) sulfat
- C Silver chloride
Argentum klorida
- D Ammonium carbonate
Ammonium karbonat

- 25 Table shows the concentration and pH value of nitric acid and ethanoic acid .
Jadual menunjukkan kepekatan dan nilai pH bagi asid nitrik and asid etanoik .

Type of acid <i>Jenis asid</i>	Concentration (mol dm ⁻³) <i>Kepekatan (mol dm⁻³)</i>	pH value <i>Nilai pH</i>
Nitric acid <i>Asid nitrik</i>	1.0	1
Ethanoic acid <i>Asid etanoik</i>	1.0	4

Which of the following diagram shows the relationship of pH value of the two acids with the concentration of hydrogen ions ?

Antara rajah berikut , yang manakah menunjukkan hubungan antara nilai pH kedua-dua asid dengan kepekatan ion hidrogen ?

	Nitric acid <i>Asid nitrik</i>	Ethanoic acid <i>Asid etanoik</i>
A	<p>Diagram A shows a solution of nitric acid with particles: two HNO₃ molecules, two NO₃⁻ ions, and two H⁺ ions.</p>	<p>Diagram A shows a solution of ethanoic acid with particles: two CH₃COOH molecules and one CH₃COO⁻ ion.</p>
B	<p>Diagram B shows a solution of nitric acid with particles: five HNO₃ molecules.</p>	<p>Diagram B shows a solution of ethanoic acid with particles: two CH₃COO⁻ ions and three H⁺ ions.</p>
C	<p>Diagram C shows a solution of nitric acid with particles: one HNO₃ molecule, two NO₃⁻ ions, and two H⁺ ions.</p>	<p>Diagram C shows a solution of ethanoic acid with particles: five CH₃COOH molecules.</p>
D	<p>Diagram D shows a solution of nitric acid with particles: three H⁺ ions and three NO₃⁻ ions.</p>	<p>Diagram D shows a solution of ethanoic acid with particles: two CH₃COOH molecules and one CH₃COO⁻ ion.</p>

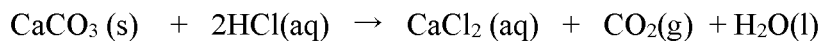
- 26 The diagram shows a object manufactured from ceramic.
Rajah menunjukkan suatu objek diperbuat daripada seramik.



Which of the following is **not** an important property of ceramic in the making of the object?
*Antara berikut yang manakah **bukan** sifat seramik yang penting dalam pembuatan objek ini ?*

- A Inert
Lengai
- B Hardness
Kekerasan
- C Electrical insulator
Penebat elektrik
- D Can with stand compression
Boleh menahan tekanan

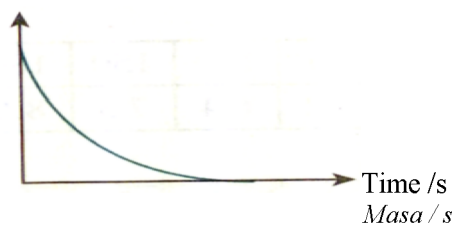
- 27 The equation represents the reaction between excess calcium carbonate and dilute hydrochloric acid.
Persamaan mewakili tindak balas antara kalsium karbonat berlebihan dan asid hidroklorikcair.



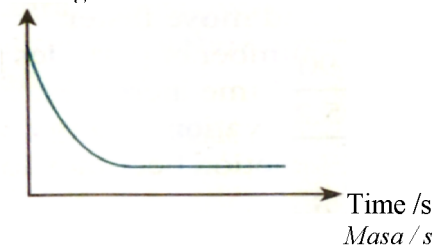
Which of the following graphs represents the mass of calcium carbonate against time?

Antara graf berikut, yang manakah mewakili jisim kalsium karbonat melawan masa?

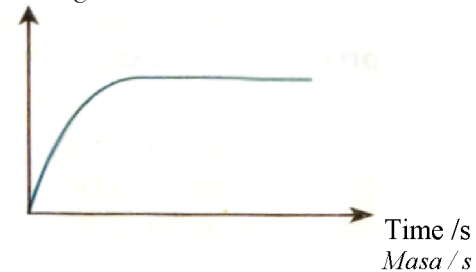
- A Mass / g
Jisim / g



- B Mass / g
Jisim / g

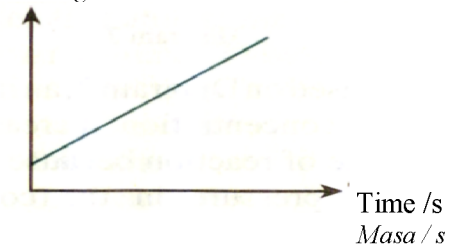


- C Mass / g
Jisim / g

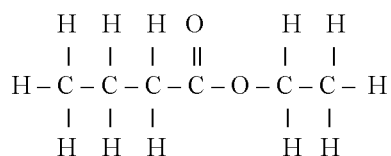


- D

Mass / g
Jisim / g



- 28 Diagram below represents the structural formula of a carbon compound.
Rajah di bawah mewakili formula struktur satu sebatian karbon.

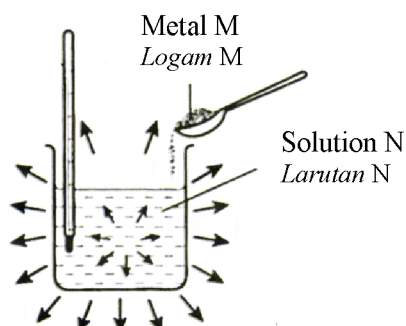


The compound is produced by the reaction between...
Sebatian tersebut dihasilkan melalui tindak balas antara...

- A** Ethanol and propanoic acid.
Etanol dan asid propanoik
- B** Ethanol and butanoic acid.
Etanol dan asid butanoik.
- C** Propanol and ethanoic acid.
Propanol dan asid etanoik.
- D** Propanol and butanoic acid.
Propanol dan asid butanoik.
- 29 Which of the metal oxides can be reduced by heating with carbon powder?
Antara oksida logam yang manakah boleh diturunkan melalui pemanasan dengan serbuk karbon?
- A** Calcium oxide
Kalsium oksida
- B** Magnesium oxide
Magnesium oksida
- C** Copper(II) oxide
Kuprum(II) oksida
- D** Aluminium oxide
Aluminium oksida

- 30 Diagram shows the apparatus set-up to determine the heat of displacement between metal M and solution N.

Rajah menunjukkan susunan radas untuk menentukan haba penyesaran di antara logam M dan larutan N.



Which substances produce the highest heat of displacement ?

Bahan manakah menghasilkan haba penyesaran yang tertinggi ?

	Metal M <i>Logam M</i>	Solution N <i>Larutan N</i>
A	Copper <i>Kuprum</i>	Silver nitrate <i>Argentum nitrat</i>
B	Magnesium <i>Magnesium</i>	Copper (II) sulphate <i>Kuprum (II) sulfat</i>
C	Zinc <i>Zink</i>	Copper (II) nitrate <i>Kuprum (II) nitrat</i>
D	Magnesium <i>Magnesium</i>	Iron (II) chloride <i>ferum (II) klorida</i>

- 31 Which of the following is true about a liquid?

Antara berikut, yang manakah benar tentang suatu cecair?

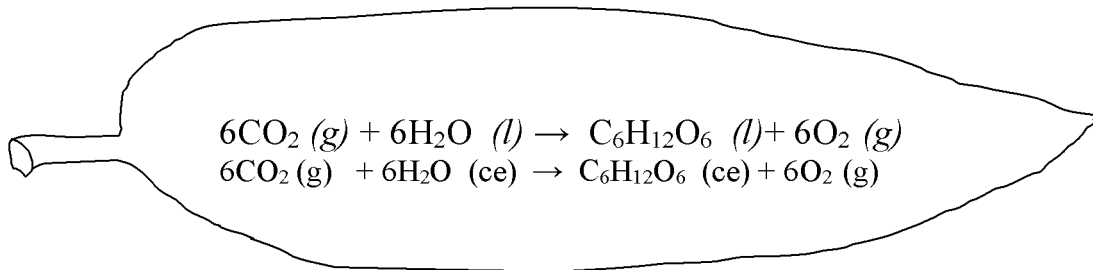
- A Particles move randomly
Zarah-zarah bergerak secara rawak
- B Energy content is higher than solid
Kandungan tenaga lebih tinggi daripada pepejal
- C Particles are arranged in order
Zarah-zarah disusun dengan teratur
- D Force of attraction between particles is very weak
Daya tarikan antara zarah-zarah sangat lemah

- 32 Tyra used chloroform to glue back the letters and numbers which fall from her car plate number. This is because chloroform is an organic solvent that used to dissolve the plastic.
Tyra menggunakan kloroform untuk melekatkan semula huruf dan nombor plastik yang terjatuh daripada plat nombor kenderaannya. Ini kerana kloroform merupakan pelarut organik yang boleh melarutkan plastik.



- Which of the following substance can also dissolve in chloroform?
Antara bahan berikut, yang manakah juga boleh larut dalam kloroform?
- A Ammonia
Ammonia
 - B Magnesium chloride
Magnesium klorida
 - C Iron (III) chloride
Ferum (III) klorida
 - D Potassium oxide
Kalium iodida
- 33 Which compound is a saturated hydrocarbon?
Sebatian manakah adalah hidrokarbon tepu?
- A $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$
 - B $\text{CH}_3\text{CHCHCH}_3$
 - C $\text{CH}_2\text{CHCH}_2\text{CH}_2\text{CH}_2$
 - D $\text{CH}_3\text{CH}_2\text{CH}_2\text{CHCH}_2$

- 34 Diagram shows a leaf undergoes photosynthesis reaction as in the equation.
Rajah menunjukkan sehelai daun mengalami tindak balas fotosintesis seperti dalam persamaan.



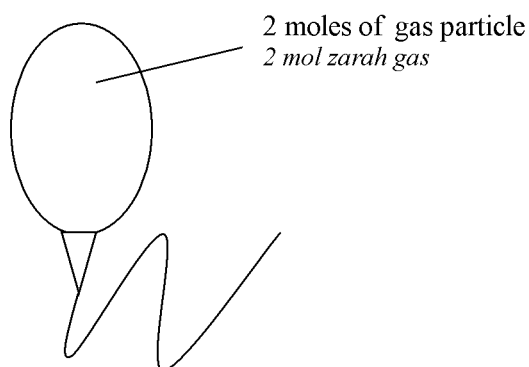
Which of the following statements is **correct** ?
*Antara pernyataan berikut yang manakah **betul** ?*

- I Carbon dioxide and water are products while glucose and oxygen are reactants .
Karbon dioksida dan air adalah hasil sementara glukosa dan oksigen adalah bahan.
- II Carbon dioxide and oxygen exist as gas while water and glucose exist as liquid.
Karbon dioksida dan oksigen wujud sebagai gas sementara air dan glukosa adalah cecair.
- III 6 moles of carbon dioxide react with 6 moles of water to form 1 mole of glucose and 6 mole of oxygen atom.
6 mol karbon dioksida bertindak balas dengan 6 mol air membentuk 1 mol glukosa dan 6 mol atom oksigen.
- IV 6 moles of carbon dioxide react with 6 moles of water to form 1 mole of glucose and 6 mole of oxygen molecule.
6 mol karbon dioksida bertindak balas dengan 6 mol air membentuk 1 mol glukosa dan 6 mol molekul oksigen
- A I and II
 B I and III
 C II and III
 D II and IV

- 35 Which of the following are the products formed at the anodes for the electrolysis of sodium nitrate solution and copper(II) sulphate solution by using carbon as electrode?
Antara berikut yang manakah hasil-hasil yang terbentuk pada anod untuk elektrolisis bagi larutan natrium nitrat dan larutan kuprum(II) sulfat dengan mengguna karbon sebagai elektrod?

	Sodium nitrate solution <i>Larutan natrium nitrat</i>	Copper(II) sulphate solution <i>Larutan kuprum(II) sulfat</i>
A	Hydrogen gas <i>Gas hidrogen</i>	Oxygen gas <i>Gas oksigen</i>
B	Oxygen gas <i>Gas oksigen</i>	Oxygen gas <i>Gas oksigen</i>
C	Oxygen gas <i>Gas oksigen</i>	Hydrogen gas <i>Gas hidrogen</i>
D	Hydrogen gas <i>Gas hidrogen</i>	Hydrogen gas <i>Gas hidrogen</i>

- 36 Diagram shows a balloon contain a type of gas.
Rajah menunjukkan sebiji belon terisi sejenis gas.



What is the volume of the gas in the ballon at room temperature?
Berapakah isipadu gas itu dalam belon tersebut pada suhu bilik?
 [Molar volume of gas = 24 dm^3
Isipadu molar gas = 24 dm^3]

- A 12 dm^3
 B 24 dm^3
 C 48 dm^3
 D 96 dm^3

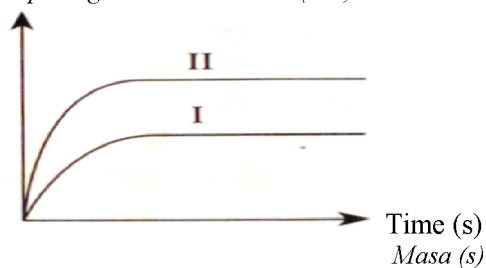
- 39 Table shows the reacting conditions of two sets of experiment.
Jadual menunjukkan keadaan tindak balas bagi dua set eksperimen.

Set <i>Set</i>	Reacting conditions <i>Keadaan tindak balas</i>
I	Excess marble chips + 25 cm ³ of 0.1 mol dm ⁻³ nitric acid at room temperature <i>Marmar berlebihan + 25 cm³ asid nitrik 0.1 mol dm⁻³ pada suhu bilik</i>
II	Excess marble chips + 50 cm ³ of 0.05 mol dm ⁻³ nitric acid at room temperature <i>Marmar berlebihan + 50 cm³ asid nitrik 0.05 mol dm⁻³ pada suhu bilik.</i>

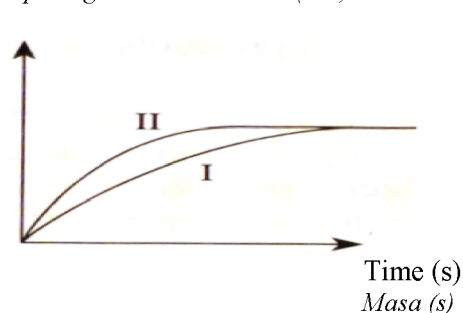
Which of the following graph shows the volume carbon dioxide gas liberated against time for both experiment?

Antara graf berikut yang manakah menunjukkan isipadu gas karbon dioksida yang terbebas melawan masa bagi kedua-dua eksperimen?

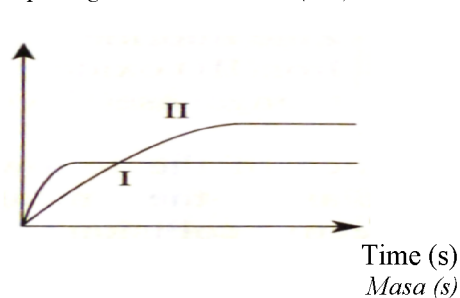
- A Volume of carbon dioxide gas (cm³)
Isipadu gas karbondioksida (cm³)



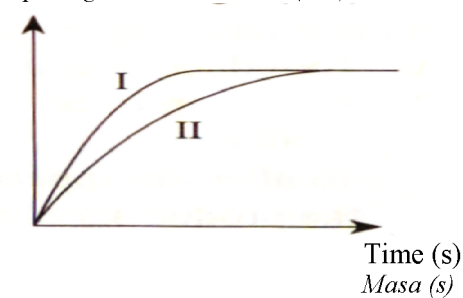
- C Volume of carbon dioxide gas (cm³)
Isipadu gas karbondioksida (cm³)



- B Volume of carbon dioxide gas (cm³)
Isipadu gas karbondioksida (cm³)



- D Volume of carbon dioxide gas (cm³)
Isipadu gas karbondioksida (cm³)



- 40 Syahmi accidentally spill the carbonated drink on the toilet floor and he finds that all the stain vanished.

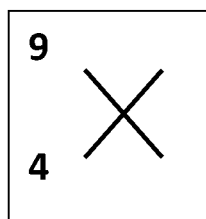
Syahmi secara tidak sengaja menumpahkan minuman berkarbonat di atas lantai bilik mandi dan dia mendapati kesan kotoran pada lantai tandasnya hilang.



In your opinion, which carbon compound involved in this reaction?

Pada pandangan anda, sebatian karbon yang manakah yang terlibat dalam tindak balas ini?

- A Alkane
Alkana
- B Alkene
Alkena
- C Ester
Ester
- D Carboxylic acid
Asid karboksilik
- 41 Diagram shows the symbol of X atom.
Rajah menunjukkan simbol bagi atom X.



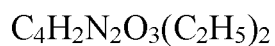
Which of the following is true about X atom?

Antara berikut yang manakah benar tentang atom X?

	Proton <i>Proton</i>	Electron <i>Elektron</i>	Neutron <i>Neutron</i>
A	4	5	4
B	4	4	5
C	4	4	9
D	11	5	9

- 42 Veronal is a barbiturate used to induce sleep in psychiatric patients. The molecular formula of veronal is shown in the diagram below

Veronal ialah ubat pelali yang digunakan untuk merangsang pesakit mental untuk tidur. Formula molekul bagi veronal ditunjukkan dalam rajah di bawah



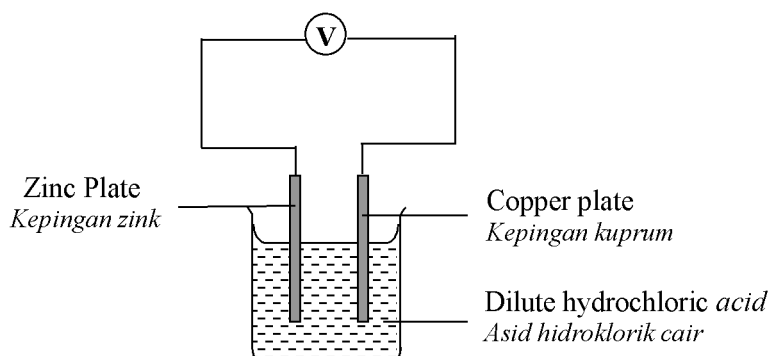
Determine the relative molecular mass of veronal.

Tentukan jisim molekul relatif bagi veronal.

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

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

- A 196
 B 186
 C 184
 D 160
- 43 Diagram shows the apparatus set up of voltaic cell.
Rajah menunjukkan susunan radas bagi sel voltan.



Which of the half equation represents the reactions at the positive and negative terminals?

Antara persamaan setengah berikut, yang manakah mewakili tindak balas di terminal positif dan terminal negatif?


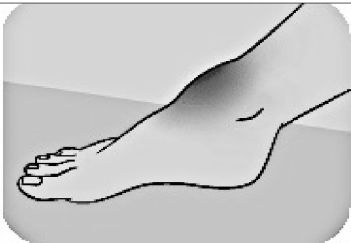
	Positive terminal <i>Terminal positif</i>	Negative terminal <i>Terminal negatif</i>
A	$2\text{H}^+ + 2\text{e} \rightarrow \text{H}_2$	$\text{Zn} \rightarrow \text{Zn}^{2+} + 2\text{e}$
B	$\text{Zn} \rightarrow \text{Zn}^{2+} + 2\text{e}$	$\text{Cu}^{2+} + 2\text{e} \rightarrow \text{Cu}$
C	$\text{Cu} \rightarrow \text{Cu}^{2+} + 2\text{e}$	$\text{Zn} \rightarrow \text{Zn}^{2+} + 2\text{e}$
D	$\text{Zn} \rightarrow \text{Zn}^{2+} + 2\text{e}$	$2\text{H}^+ + 2\text{e} \rightarrow \text{H}_2$

- 44 Pak Amin finds rubber strip that he dips in a beaker containing methylbenzene is not hard and low heat resistant. What is the another substance that can be used to produce the rubber with better properties?

Pak Amin mendapati kepingan getah yang dicelup dalam bikar yang mengandungi metilbenzena tidak keras dan tidak tahan haba. Apakah bahan lain yang boleh diguna untuk menghasilkan getah yang lebih baik sifatnya?

- A** Ethanoic acid
Asid etanoik
- B** Potassium hydroxide
Kalium hidroksida
- C** Hydrogen chloride
Hidrogen klorida
- D** Disulphur dichloride
Disulfur diklorida

- 45 Diagram shows the application of chemical reactions in daily life.
Rajah menunjukkan aplikasi tindak balas kimia dalam kehidupan seharian.

		
	Melting ice <i>Meleburkan ais</i>	Swollen leg <i>Kaki bengkak</i>
Chemicals used <i>Bahan kimia yang digunakan</i>	K	L

What is K and L?
Apakah K dan L?

	Material K <i>Bahan K</i>	Material L <i>Bahan L</i>
A	Sodium hydroxide <i>Natrium hidroksida</i>	Sodium carbonate <i>Natrium karbonat</i>
B	Magnesium sulphate <i>Magnesium sulfat</i>	Ammonium hydroxide <i>Ammonium hidroksida</i>
C	Sodium bicarbonate <i>Natrium bikarbonat</i>	Sodium acetate <i>Natrium asetat</i>
D	Calcium chloride <i>Kalsium klorida</i>	Ammonium nitrate <i>Ammonium nitrat</i>

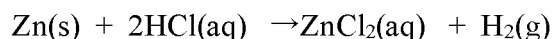
- 46 Table shows the information of three voltaic cells.

Jadual menunjukkan maklumat bagi tiga sel voltan.

Voltaic cell <i>Sel voltan</i>	Electrodes <i>Elektrod</i>	Potential difference/V <i>Beza keupayaan/V</i>	Negative terminal <i>Terminal negatif</i>
X	Zinc and magnesium <i>Zink dan magnesium</i>	1.6	Magnesium
Y	Iron and zinc <i>Besi dan zink</i>	0.2	Zinc
Z	Copper and magnesium <i>Kuprum dan magnesium</i>	2.6	Magnesium

What is the potential difference of the voltaic cell consisting of copper and iron electrodes?
Berapakah beza keupayaan sel voltan yang terdiri daripada elektrod kuprum dan besi?

- A** 0.8 V
B 1.0 V
C 1.8 V
D 2.4 V
- 47 The following equation represents the reaction between zinc and hydrochloric acid.
Persamaan berikut mewakili tindak balas antara zink dan asid hidroklorik.



What is the average rate of reaction when 1.63 g of zinc is completely reacted with excess hydrochloric acid in 20 seconds?

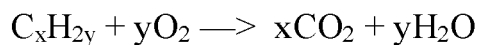
Berapakah kadar tindak balas purata apabila 1.63 g zink bertindak balas lengkap dengan asid hidroklorik berlebihan dalam masa 20 saat?

[Relative atomic mass: Zn=65; Molar volume of gas = 24 dm³ mol⁻¹ at room condition]

[Jisim atom relatif: Zn=65; Isi padu molar gas = 24 dm³ mol⁻¹ pada keadaan bilik]

- A** 0.025 cm³ s⁻¹
B 0.03 cm³ s⁻¹
C 15.0 cm³ s⁻¹
D 30.0 cm³ s⁻¹

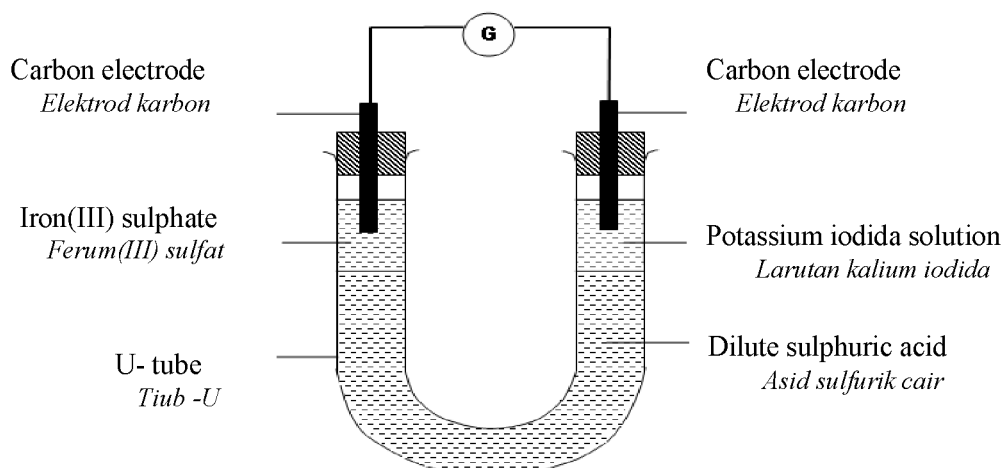
- 48 The following equation represents the complete combustion of a hydrocarbon.
Persamaan berikut mewakili pembakaran lengkap bagi satu hidrokarbon.



What are the values of x and y ?
Apakah nilai bagi x dan y?

	x	y
A	1	2
B	2	3
C	3	4
D	4	5

- 49 Diagram shows the apparatus set up to investigate the reaction of acidified potassium iodide with iron(III) sulphate solution.
Rajah menunjukkan susunan radas untuk mengkaji tindak balas antara kalium iodida dan larutan ferum(III) sulfat

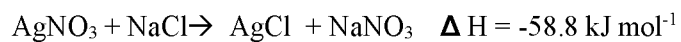


Which of the following reaction occurs in the solutions?

Antara berikut, manakah tindak balas yang berlaku dalam larutan tersebut?

- A Iodide ion is oxidize to iodine
Ion iodida dioksidakan kepada iodin
- B Iron(III) is oxidize iron(II)
Ferum(III) dioksidakan kepada ferum (II)
- C Potassium iodide is oxidizing agent
Kalium iodida adalah agen pengoksidanan
- D The colour of potassium iodide change from green to yellow
Warna kalium iodida berubah dari hijau ke kuning

- 50 The following shows the thermochemical equation for the precipitation of silver chloride.
Yang berikut menunjukkan persamaan termokimia bagi tindak balas pemendakan argentum klorida.



If 25 cm³ of 0.5 mol dm⁻³ silver nitrate solution is poured into a plastic cup containing 25 cm³ 0.5 mol dm⁻³ sodium chloride solution, calculate the temperature change of the mixture.

Jika 50 cm³ of 1.0 mol dm⁻³ larutan argentum nitrat dituang ke dalam sebuah cawan plastik yang berisi 100 cm³ 1.0 mol dm⁻³ larutan sodiium klorida, hitung perubahan suhu campuran itu.

- A 2.0 °C
- B 3.5 °C
- C 5.0 °C
- D 7.0 °C

End of Question Paper

<https://cikguadura.wordpress.com/>
Kertas Soalan Tamat



NAMA:

TINGKATAN:

**MODUL PENINGKATAN PRESTASI TINGKATAN 5
TAHUN 2016**

MAJLIS PENGETUA SEKOLAH MALAYSIA (KEDAH)

<https://cikguadura.wordpress.com/>

**MODUL A 2016
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.*

<i>Untuk Kegunaan Pemeriksa</i>			
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 **26** halaman bercetak

- (c) The atomic size of Y is smaller than X. Explain why.
Saiz atom Y lebih kecil daripada atom X. Terangkan mengapa.

.....

 [2 marks]

- (d) Element Q has three shells occupied with electron and three valence electrons.
 Mark Q, in Diagram 1 to indicate the position of element Q.
*Element Q mempunyai tiga petala berisi elektron dan tiga elektron valens.
 Tanda Q, di dalam Rajah 1 bagi menunjukkan kedudukan unsur Q.*

[1 mark]

- (e) When a small piece of element X is put into water, alkaline solution is formed and hydrogen gas is released.
Apabila satu ketulan kecil unsur X dimasukkan kedalam air, larutan beralkali terhasil dan gas hidrogen terbebas.

- (i) Write a chemical equation for this reaction.
Tuliskan persamaan kimia bagi tindakbalas ini.

.....

 [2 marks]

- (ii) Element A is located below element X in the Periodic Table of Elements.
 Compare the reactivity of element A and element X when react with water.
*Unsur A berada di bawah unsur X dalam Jadual Berkala Unsur.
 Bandingkan kereaktifan unsur A dan unsur X apabila bertindak balas dengan air.*

.....

 [1 mark]

- 2 (a) Table 2 shows the molecular formulae of two carbon compound.
Jadual 2 menunjukkan formula molekul bagi dua sebatian karbon.

Compound <i>Sebatian</i>	Molecular formula <i>Formula molekul</i>
P	C_4H_8
Q	C_5H_{12}

Table 2
Jadual 2

Based on Table 2,
Berdasarkan Jadual 2,

- (i) what is the general formula of compound Q?
apakah formula am bagi sebatian Q?

.....
[1 mark]

- (ii) state the simplest ratio of atom of the elements exist in compound P.
nyatakan nisbah teringkas bagi atom unsur yang terdapat dalam sebatian P.

.....
[1 mark]

- (iii) draw the structural formula for compound P.
lukiskan formula struktur bagi sebatian P.

.....
[1 mark]

- (b) Diagram 2 shows the apparatus set-up to investigate the effect of heat on zinc carbonate.
Rajah 2 menunjukkan susunan radas untuk mengkaji kesan haba ke atas zink karbonat.

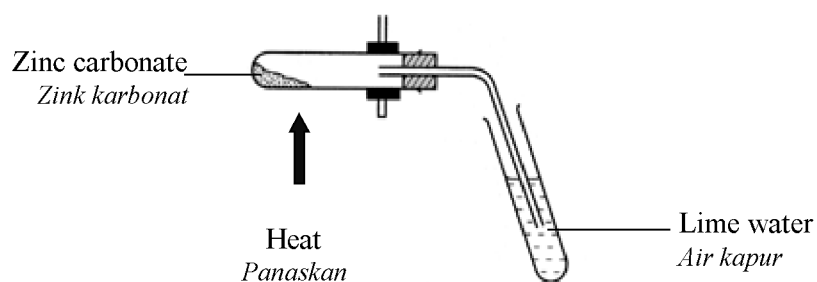
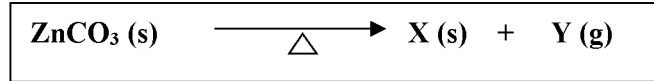


Diagram 2
Rajah 2

The chemical equation for the reaction is as follow:
Persamaan kimia bagi tindak balas adalah seperti berikut:



- (i) Name residue X and gas Y released.
Namakan baki X dan gas Y yang terbebas.

.....
 [2 marks]

- (ii) State the colour of residue X.
Nyatakan warna baki X.

.....
 [1 mark]

- (iii) Calculate the volume of gas Y produced if 5g of zinc carbonate is heated at room conditions.
 [Relative atomic mass: Zn = 65 ; C = 12 ; O = 16, Molar volume: 24 dm³ mol⁻¹ at room condition]
Hitungkan isipadu gas Y yang dihasilkan apabila 5g zink karbonat dipanaskan pada keadaan bilik.
[Jisim atom relatif : Zn = 65 ; C = 12 ; O = 16, Isipadu molar 24 dm³ mol⁻¹ pada keadaan bilik]

.....
 [3 marks]

3. Diagram 3 shows standard representation of element X, Y and Z.
Rajah 3 menunjukkan perwakilan piawai bagi unsur X, Y dan Z.

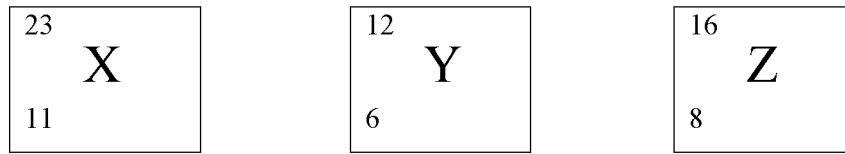


Diagram 3
Rajah 3

- (a) (i) State the valence electron of element Y.
Nyatakan elektron valen bagi unsur Y.

.....
 [1 mark]

- (ii) What is the physical state of element Y at room temperature?
Apakah keadaan fizik unsur Y pada suhu bilik?

.....
 [1 mark]

- (b) Element Y and element Z can react to form a compound.
Unsur Y dan unsur Z boleh bertindak balas untuk membentuk suatu sebatian.

- (i) Write the formula of the compound.
Tuliskan formula sebatian itu.

.....
 [1 mark]

- (ii) Explain the melting point and boiling point of the compound.
Terangkan tentang takat lebur dan takat didih bagi sebatian itu.

.....
 [3 marks]

- (c) Element X and element Z can react to form a compound.
Unsur X dan unsur Z boleh bertindakbalas untuk membentuk suatu sebatian.

- (i) Write chemical equation for the reaction between element X and Z.
Tuliskan persamaan kimia bagi tindak balas antara unsur X dan Z.

.....
[2 marks]

- (ii) Draw the electron arrangement of the compound.
Lukiskan susunan elektron bagi sebatian itu.

[2 marks]

4. Diagram 4.1 shows the reading of pH meter, dipped into acid solutions P, Q, R and S.
Rajah 4.1 menunjukkan bacaan meter pH, yang dicelup ke dalam larutan asid P, Q, R dan S.

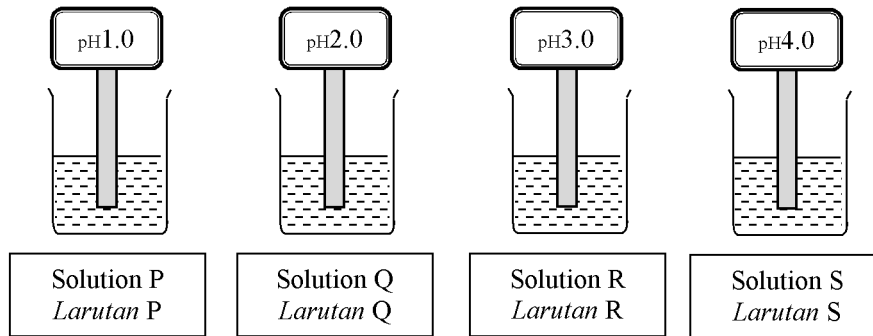


Diagram 4.1
Rajah 4.1

- (a) State the meaning of acid.
Nyatakan maksud asid.

.....
 [1 mark]

- (b) Which of the solutions has the lowest degree of ionisation?
Larutan yang manakah mempunyai darjah pengionan yang terendah?

.....
 [1 mark]

- (c) Solution P, Q, R and S have different pH values.
Larutan P, Q, R dan S mempunyai nilai pH yang berbeza.

- (i) Which solution is a strong acid?
Larutan manakah adalah suatu asid kuat?

.....
 [1 mark]

- (ii) Based on the concentration of hydrogen ion, explain your answer in c(i).
Berdasarkan kepekatan ion hidrogen, terangkan jawapan anda dalam c(i).

.....
 [1 mark]

- (d) Diagram 4.2 shows the apparatus set-up to determine the end point of neutralisation between 1.0 mol dm^{-3} sulphuric acid added to 20 cm^3 of sodium hydroxide solution. The ammeter readings are recorded for each 5 cm^3 addition of sulphuric acid.
Rajah 4.2 menunjukkan susunan radas untuk menentukan takat akhir peneutralan antara asid sulfurik 1.0 mol dm^{-3} yang ditambahkan ke dalam 20 cm^3 larutan natrium hidroksida. Bacaan ammeter direkodkan setiap kali 5 cm^3 asid sulfurik ditambahkan.

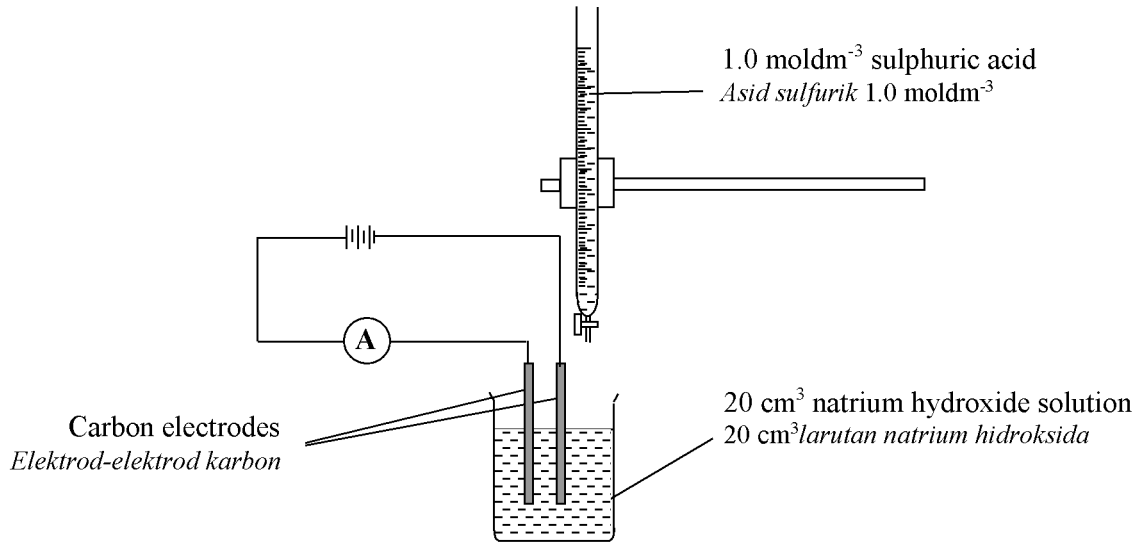


Diagram 4.2
Rajah 4.2

A graph of the ammeter readings versus the volumes of sulphuric acid is as shown in Diagram 4.2.

Graf bacaan ammeter melawan isi padu asid sulfurik ditunjukkan dalam Rajah 4.2.

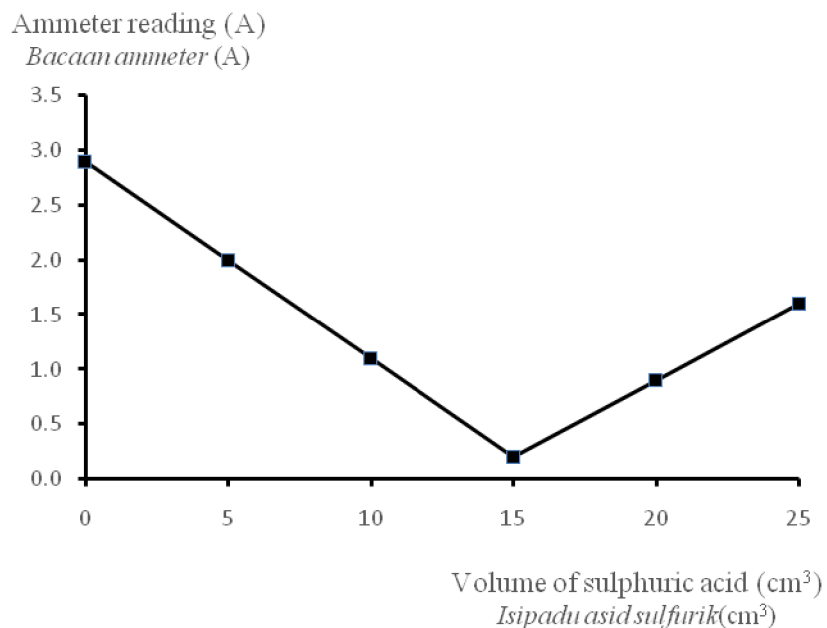


Diagram 4.3
Rajah 4.3

- (i) Based on Diagram 4.3, determine the volume of sulphuric acid needed when the end point is achieved.
Berdasarkan Rajah 4.3, tentukan isipadu asid sulfurik yang diperlukan apabila takat akhir dicapai.

.....
[1 mark]

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

.....
[2 marks]

- (iii) Calculate the molarity of the sodium hydroxide solution.
Hitungkan kemolaran larutan natrium hidroksida.

[3 marks]

5. Diagram 5.1 shows the structural formula of monomer of natural rubber.
Rajah 5.1 menunjukkan formula struktur bagi monomer getah asli.

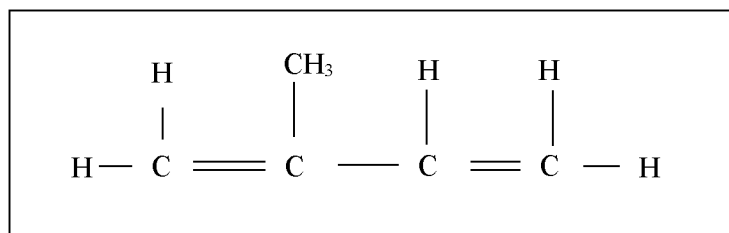


Diagram 5.1
Rajah 5.1

- (a) State the name of the monomer of natural rubber.
Nyatakan nama bagi monomer getah asli.

.....
[1 mark]

- (b) (i) The monomers react each other to form a long-chain molecule, P through process Q. Name process Q.
Monomer bertindak balas antara satu sama lain untuk membentuk satu molekul rantai panjang, P melalui proses Q. Namakan proses Q.

.....
[1 mark]

- (ii) Draw the structural formula of P.
Lukiskan formula struktur bagi P.

[1 mark]

- (c) An experiment is carried out to study the effect of solution A and solution B when added to latex.
Table 5 shows the results of the experiment.
Suatu eksperimen telah dijalankan untuk mengkaji kesan larutan A dan larutan B apabila ditambah kepada lateks.
Jadual 5 menunjukkan keputusan eksperimen itu.

Mixture <i>Campuran</i>	Observation <i>Pemerhatian</i>
Latex + solution A <i>Lateks + larutan A</i>	Latex coagulate <i>Getah menggumpal</i>
Latex + solution B <i>Lateks + larutan B</i>	Latex does not coagulate <i>Getah tidak menggumpal</i>

Table 5
Jadual 5

Based on Table 5,
 Berdasarkan Jadual 5,

- (i) Name the solutions.
 Namakan larutan-larutan tersebut.

Solution A:

Larutan A :

Solution B:

Larutan B :

[2 marks]

- (ii) Latex can also coagulate after being left overnight.
 Explain how the process occurs.
 Lateks juga boleh menggumpal apabila dibiarkan semalaman. Terangkan bagaimana proses ini berlaku.

.....

.....
 [2 marks]

- (d) Vulcanisation is a process used to enhance the quality of natural rubber.
 Diagram 5.2 below shows two products K and L made of rubber.
 Pemvulkanan adalah satu proses dijalankan untuk meningkatkan kualiti getah.
 Rajah 5.2 menunjukkan dua produk K dan L yang dihasilkan daripada getah.



Diagram 5.2
 Rajah 5.2

- (i) Choose the product that is made of vulcanised rubber.
 Pilih produk yang dibuat menggunakan getah ter Vulkan.

.....
 [1 mark]

- (ii) Explain your choice in term of their properties.
Terangkan pilihan anda dari segi sifatnya.

.....
.....

[2 marks]

- (iii) Draw the structural formula of vulcanised rubber.
Lukiskan formulastruktur bagi getah tervulkan.



[1 mark]

6. Diagram 6.1 shows the apparatus set-up to investigate the transfer of electrons at a distance in a redox reaction.

Rajah 6.1 menunjukkan susunan radas untuk mengkaji pemindahan elektron pada suatu jarak dalam tindak balas redoks.

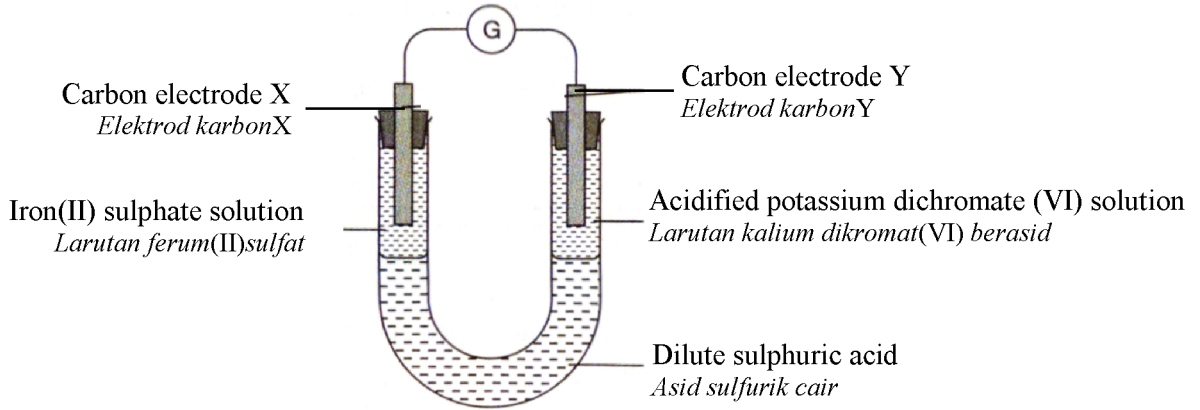


Diagram 6.1

Rajah 6.1

Based on Diagram 6.1,

Berdasarkan Rajah 6.1,

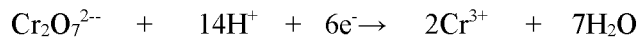
- (a) State the function of dilute sulphuric acid.

Nyatakan fungsi asid sulfurik cair.

[1 mark]

- (b) The following equation shows the reaction that takes place at carbon electrode Y.

Persamaan berikut menunjukkan tindak balas yang berlaku pada elektrod karbon Y.



- (i) State the change of oxidation number for chromium.

Nyatakan perubahan nombor pengoksidaan bagi kromium.

[1 mark]

- (ii) State the type of reaction that occurs.

Nyatakan jenis tindak balas yang berlaku.

[1 mark]

- (c) Based on the reaction that takes place at carbon electrode X,
Berdasarkan tindak balas yang berlaku pada elektrod karbon X,

(i) write the half equation for the reaction
tuliskan persamaan setengah bagi tindak balasnya.

.....
[1 mark]

(ii) describe briefly a chemical test to identify the cation formed in (c)(i)
huraikan secara ringkas ujian kimia untuk mengenalpastikan kation yang terbentuk di c(i).

.....
[2 marks]

- (d) Table 6 shows the results of four sets of experiment to determine the position of hydrogen in the reactivity series.

Jadual 6 menunjukkan keputusan bagi empat set eksperimen untuk mengkaji kedudukan hidrogen dalam siri kereaktifan.

Set <i>Set</i>	Reaction <i>Tindak balas</i>	Observation <i>Pemerhatian</i>
I	Hydrogen + oxide P <i>Hidrogen + oksida P</i>	Burns quickly with bright flame <i>Terbakar cepat dengan nyalaan terang</i> Black powder turns to brown <i>Serbuk hitam bertukar menjadi perang</i>
II	Hydrogen + oxide Q <i>Hidrogen + oksida Q</i>	Burns with bright flame <i>Terbakar dengan nyalaan terang</i> Yellow powder turns to shiny grey <i>Serbuk kuning bertukar menjadi kelabu berkilat</i>
III	Hydrogen + oxide R <i>Hidrogen + oksida R</i>	No change <i>Tiada perubahan</i>
IV	Hydrogen + oxide S <i>Hidrogen + oksida S</i>	Glow dimly <i>Berbara malap</i> Brown powder turns to shiny grey <i>Serbuk perang bertukar menjadi kelabu berkilat</i>

Table 6
Jadual 6

Based on the results in Table 6,
Berdasarkan keputusan di dalam Jadual 6,

(i) Arrange P, Q, R, S and hydrogen in ascending order of reactivity.
Susun P, Q, R, S dan hidrogen mengikut tertib kereaktifan menaik.

.....
[1 mark]

- (ii) Based on experiment I, identify P. State the role of oxide P in term of redox reaction.
Berdasarkan eksperimen I, kenal pasti P. Nyatakan peranan oksida P dari segi tindak balas redoks.

.....

.....

.....

[2 marks]

- (iii) Diagram 6.2 for the apparatus set-up used to determine the position of hydrogen in reactivity series.

Complete the apparatus set-up in Diagram 6.2.

Rajah 6.2 bagi susunan radas yang digunakan untuk menentukan kedudukan hidrogen dalam siri kereaktifan.

Lengkapkan susunan radas dalam Rajah 6.2.

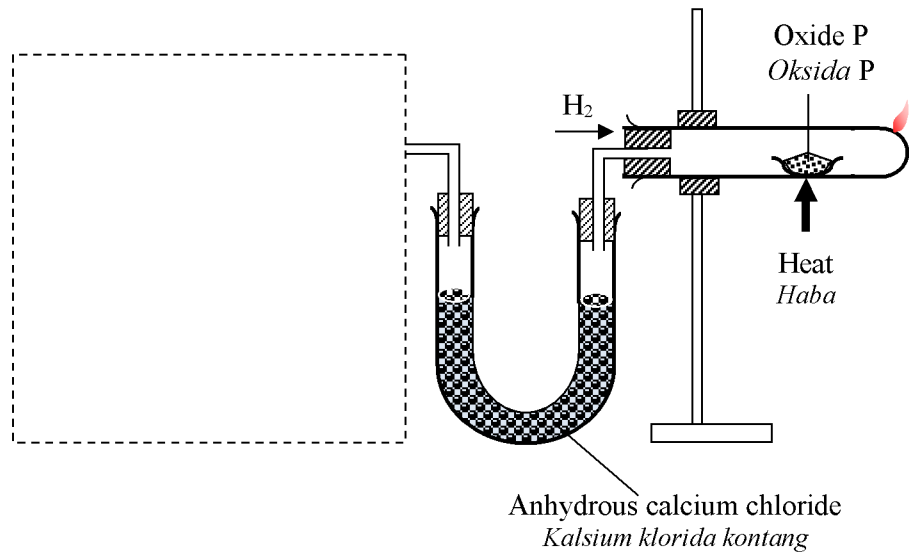


Diagram 6.2

Rajah 6.2

[2 marks]

Section B
Bahagian B

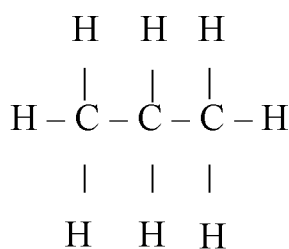
[20 marks]

[20 markah]

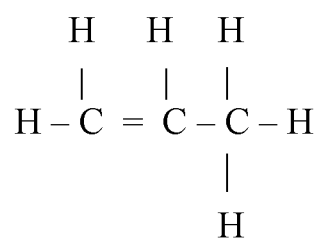
Answer any **one** question.

Jawab mana-mana **satu** soalan daripada bahagian ini.
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7. Diagram 7 shows the structural formulae of two hydrocarbons.
Rajah 7 menunjukkan formula struktur bagi dua hidrokarbon.



Hydrocarbon A
Hidrokarbon A



Hydrocarbon B
Hidrokarbon B

Diagram 7.1
Rajah 7.1

- (a) State the differences between hydrocarbon A and hydrocarbon B.
Nyatakan perbezaan antara hidrokarbon A dan hidrokarbon B.
- (b) The information below is about hydrocarbon Q.
Maklumat di bawah adalah tentang hidrokarbon Q.

[4 marks]

- | |
|--|
| <ul style="list-style-type: none"> <input type="radio"/> The empirical formula is CH₂ <input type="radio"/> <i>Formula empirik ialah CH₂</i>
 <input type="radio"/> Mass of 1 mole of Q is 28 g <input type="radio"/> <i>Jisim bagi 1 mol Q ialah 28 g</i>
 <input type="radio"/> Dehydration process is used to produce hydrocarbon Q. <input type="radio"/> <i>Proses pendehidratan digunakan untuk menghasilkan Q</i> |
|--|

Diagram 7.2
Rajah 7.2

Determine the molecular formula for hydrocarbon Q.

State the name of homologous series for Q and explain your answer.

Write the balanced chemical equation for the reaction of hydrocarbon Q with steam and name the product formed.

[Relative atomic mass of C = 12 ; H = 1]

Tentukan formula molekul bagi hidrokarbon Q.

Nyatakan nama siri homolog bagi Q dan terangkan jawapan anda.

Tulis persamaan kimia seimbang untuk tindak balas hidrokarbon Q dengan stim dan namakan hasil yang terbentuk.

[Jisim atom relatif bagi C = 12 ; H = 1]

[6 marks]

- (c) Table 7 shows the observations of the reaction between compound L with magnesium, ethanol and calcium carbonate respectively. Compound L consists of two carbon atoms.
Jadual 7 menunjukkan pemerhatian bagi tindak balas antara sebatian L dengan magnesium, etanol dan kalsium karbonat masing-masing. Sebatian L terdiri daripada dua atom karbon.

Experiment <i>Eksperimen</i>	Reactants <i>Bahan tindak balas</i>	Observation <i>Pemerhatian</i>
I	Compound L and magnesium <i>Sebatian L dan magnesium</i>	Effervescence occurs. Gas X produced, a 'pop' sound produced when gas tested with a burning splinter. <i>Pembuakan berlaku.</i> <i>Gas X dihasilkan. Bunyi 'pop' terhasil apabila gas diuji dengan kayu uji menyala.</i>
II	Compound L and ethanol with a catalyst <i>Sebatian L dan etanol dengan sejenis mangkin</i>	Produced compound K with fruity smell. <i>Menghasilkan sebatian K yang berbau wangi.</i>
III	Compound L and calcium carbonate <i>Sebatian L dan kalsium karbonat.</i>	Effervescence occurs. Gas Y produced, turns lime water chalky. <i>Pembuakan berlaku.</i> <i>Gas Y dihasilkan, menukarkan air kapur menjadi keruh.</i>

Table 7
Jadual 7

Based on Table 7,
Berdasarkan Jadual 7,

State the molecular formula for compound L and its functional group.

Name compound L then identify gas X, compound K and gas Y

Based on experiment II, State type of reaction occurred, write the chemical equation and name the catalyst used.

Nyatakan formula molekul bagi sebatian L dan kumpulan berfungsinya.

Namakan sebatian L kemudian kenalpasti gas X, sebatian K dan gas Y.

Dari eksperimen II, nyatakan jenis tindak balas berlaku, tuliskan persamaan kimia dan namakan mangkin yang digunakan.

[10 marks]

- 8 (a) A group of students carried out two sets of experiment to investigate the factor affecting the rate of reaction between zinc and hydrochloric acid.

Sekumpulan pelajar telah menjalankan dua set eksperimen untuk mengkaji kesan faktor yang mempengaruhi kadar tindak balas antara zink dan asid hidroklorik.

Table 8 shows the information about the reactants and the time taken to collect 50 cm³ of hydrogen gas.

Jadual 8 menunjukkan maklumat tentang bahan tindak balas dan masa diambil untuk mengumpulkan 50 cm³ gas hidrogen.

Set Set	Reactants <i>Bahan-bahan tindak balas</i>	Time taken / s <i>Masa diambil / s</i>
I	Powdered zinc + 20 cm ³ of 1.0 mol dm ⁻³ hydrochloric acid <i>Serbuk zink + 20 cm³ asid hidroklorik 1.0 mol dm⁻³</i>	20
II	Powdered zinc + 50 cm ³ of 0.4 mol dm ⁻³ hydrochloric acid <i>Serbuk zink + 50 cm³ asid hidroklorik 0.4 mol dm⁻³</i>	50

Table 8

Jadual 8

- (i) Referring to experiment in Set I and II, state:

- the meaning of rate of reaction
- **one** factor that affects rate of reaction.

Write a balanced chemical equation for the reaction in Set I.

Merujuk kepada eksperimen di Set I dan II, nyatakan :

- *maksud kadar tindak balas*
- **satu** faktor yang mempengaruhi kadar tindak balas.

Tulis persamaan kimia yang seimbang bagi tindak balas dalam Set I.

[4 marks]

- (ii) Calculate the average rate of reaction of Set I and Set II.

Based on your answer, compare the rate of reaction for both set by using collision theory.

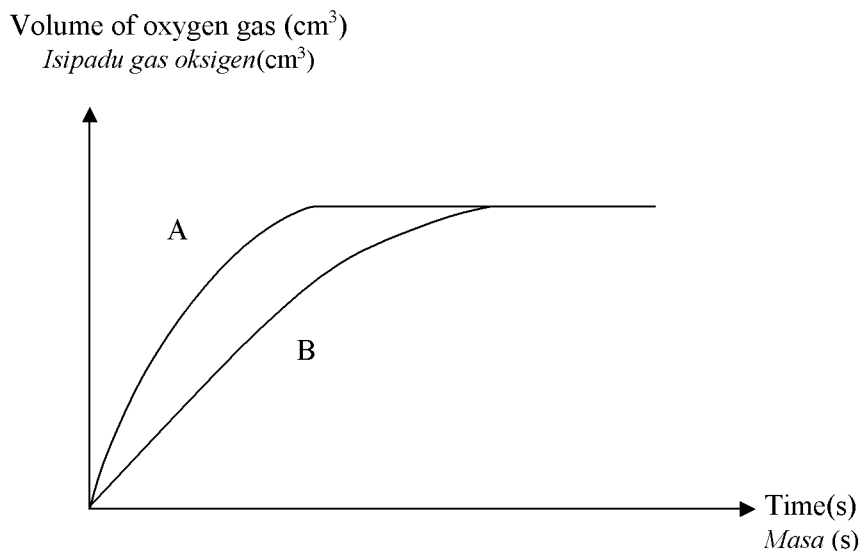
Hitung kadar tindak balas purata bagi Set I dan Set II.

Berdasarkan jawapan anda, bandingkan kadar tindak balas antara kedua-dua set dengan menggunakan teori perlanggaran.

[6 marks]

- (b) Another experiment is carried out to study the factors of catalyst in the reaction of decomposition of hydrogen peroxide, H_2O_2 . The results of this experiment is shown in Diagram 8.

Satu eksperimen lain dijalankan untuk mengkaji faktor mangkin dalam tindak balas penguraian hidrogen peroksida, H_2O_2 . Keputusan eksperimen ini ditunjukkan dalam Rajah 8.



- (i) Which set of experiment used catalyst? State the catalyst used.
Set eksperimen yang manakah menggunakan mangkin? Nyatakan mangkin yang digunakan.
- [2 marks]
- (ii) The decomposition reaction of hydrogen peroxide, H_2O_2 release heat.
Draw an energy profile diagram for both reactions in A and B. Label E_a for the activation energy with catalyst and E'_a for the activation energy without a catalyst.

Based on collision theory, explain why rate of reaction increase with time?

Tindak balas penguraian hidrogen peroksida, H_2O_2 membebaskan haba. Lukiskan satu gambar rajah profil tenaga bagi kedua-dua tindak balas dalam A dan B. Labelkan E_a bagi tenaga pengaktifan dengan mangkin dan E'_a bagi tenaga pengaktifan tanpa mangkin.

Berdasarkan teori perlanggaran, terangkan mengapa kadar tindak balas bertambah dengan masa?

[8 marks]

Section C
Bahagian C

[20 marks]

[20 markah]

Answer any **one** question from this section.

*Jawab mana-mana **satu** soalan daripada bahagian ini.*

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- 9 (a) Salman intends to electroplate an iron spoon with nickel.

Salman ingin menyadur satu sudu besi dengan nikel.

Nickel ,Ni is a transition element with oxidation number of +2 and +3.
Nikel ,Ni adalah unsur peralihan dengan nombor pengoksidaan +2 dan +3

Draw a labeled diagram to show how he can set up the apparatus.

Write the half equations at anode and cathode.

Lukiskan rajah berlabel untuk menunjukkan bagaimana dia dapat menyediakan susunan radas tersebut.

Tuliskan persamaan setengah pada anod dan katod.

[4 marks]

- (b) Two sets of experiment are carried out to investigate the factors affecting the discharged of ions at the anode.

Dua set eksperimen dijalankan untuk mengkaji faktor yang mempengaruhi nyahcas ion-ion pada anod.

Table 9.1 shows information about both experiment.

Jadual 9.1 menunjukkan maklumat tentang kedua-dua eksperimen.

Experiment <i>Eksperimen</i>	Electrolyte <i>Elektrolit</i>	Type of anode <i>Jenis anod</i>	Observation at anode <i>Pemerhatian pada anod</i>
I	0.0001 mol dm ⁻³ MI solution <i>Larutan MI</i> 0.0001 mol dm ⁻³	Carbon <i>karbon</i>	Bubble of gas produced light up a glowing splinter. <i>Gelembung gas terhasil dan menyalakan kayu uji berbara.</i>
II	1.0 mol dm ⁻³ MI solution <i>Larutan MI</i> 1.0 mol dm ⁻³	Carbon <i>karbon</i>	The solution turns brown and turns dark blue when starch solution is added. <i>Larutan bertukar perang dan bertukar ke biru gelap apabila larutan kanji ditambah.</i>

Table 9.1

Jadual 9.1

Name the product formed at the anode in set I and set II. Explain how the products are formed.

Namakan hasil yang terbentuk di anod dalam set I dan set II. Terangkan bagaimana hasil-hasil tersebut terbentuk.

[6 marks]

(c)

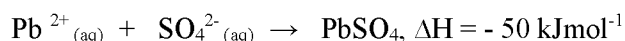
Chemical cell produces electrical energy through chemical reaction.
Sel kimia menghasilkan tenaga elektrik melalui tindak balas kimia.

By using two suitable metal electrodes and an electrolyte, describe an experiment to verify the above statement.

Dengan menggunakan dua elektrod logam yang sesuai dan satu elektrolit, huraikan suatu eksperimen untuk mengesahkan pernyataan di atas.

[10 marks]

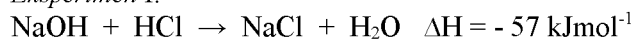
- 10 The thermochemical equation below shows the formation of lead(II) sulphate.
Persamaan termokimia dibawah menunjukkan pembentukan plumbum(II) sulfat.



- (a) Draw an energy level diagram for the above equation.
 Explain the differences in energy content of the reactants compared to the product.
Lukiskan gambarajah aras tenaga bagi persamaan di atas.
Terangkan perbezaan kandungan tenaga dalam bahan tindak balas berbanding dengan hasil tindak balas.
- [4 marks]
- (b) Table 10 shows the thermochemical equations of neutralization reactions of three experiments.
Jadual 10 menunjukkan persamaan termokimia bagi tindak balas peneutralan bagi tiga eksperimen.

Experiment I :

Eksperimen I:



Experiment II

Eksperimen II:



Experiment III

Eksperimen III:



Table 10

Jadual 10

Compare heat of neutralisation between;

Bandingkan haba peneutralan antara;

- (i) Experiment I and Experiment II
Eksperimen I dan Eksperimen II
- (ii) Experiment I and Experiment III
Eksperimen I dan Eksperimen III

[6marks]

(c) Describe a laboratory experiment to determine the heat of displacement of metal by a more electropositive metal. In your description, include the following aspects:

- Materials and apparatus needed
- Procedure of experiment
- A table to collect data
- Calculation

Huraikan satu eksperimen makmal untuk menentukan haba penyesaran logam oleh logam yang lebih elektropositif. Dalam huraian anda, sertakan aspek-aspek berikut :

- *Bahan-bahan dan radas yang diperlukan*
- *Prosedur eksperimen*
- *Jadual untuk mengumpul data*
- *Penghitungan*

[10marks]

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END OF QUESTION PAPER
KERTAS SOALAN TAMAT

THE PERIODIC TABLE OF ELEMENTS

1 H Hydrogen 1		Proton number										2 He Helium 4																																																	
3 Li Lithium 7		4 Be Beryllium 9		5 B Boron 11		6 C Carbon 12		7 N Nitrogen 14		8 O Oxygen 16		9 F Fluorine 19		10 Ne Neon 20																																															
11 Na Sodium 23		12 Mg Magnesium 24		13 Al Aluminum 27		14 Si Silicon 28		15 P Phosphorus 31		16 S Sulfur 32		17 Cl Chlorine 35		18 Ar Argon 40																																															
19 K Potassium 39		20 Ca Calcium 40		21 Sc Scandium 45		22 Ti Titanium 48		23 V Vanadium 51		24 Cr Chromium 52		25 Mn Manganese 55		26 Fe Iron 56		27 Co Cobalt 59		28 Ni Nickel 59		29 Cu Copper 64		30 Zn Zinc 65		31 Ga Gallium 70		32 Ge Germanium 73		33 As Arsenic 75		34 Se Selenium 79		35 Br Bromine 80		36 Kr Krypton 84																											
37 Rb Rubidium 86		38 Sr Strontium 88		39 Y Yttrium 89		40 Zr Zirconium 91		41 Nb Niobium 93		42 Mo Molybdenum 96		43 Tc Technetium 98		44 Ru Ruthenium 101		45 Rh Rhodium 103		46 Pd Palladium 106		47 Ag Silver 108		48 Cd Cadmium 112		49 In Indium 115		50 Sn Tin 119		51 Sb Antimony 122		52 Te Tellurium 128		53 I Iodine 127		54 Xe Xenon 131																											
55 Cs Cesium 133		56 Ba Barium 137		57 La Lanthanum 139		72 Hf Hafnium 179		73 Ta Tantalum 181		74 W Tungsten 184		75 Re Rhenium 186		76 Os Osmium 190		77 Ir Iridium 192		78 Pt Platinum 195		79 Au Gold 197		80 Hg Mercury 201		81 Tl Thallium 204		82 Pb Lead 207		83 Bi Bismuth 209		84 Po Polonium 210		85 At Astatine 210		86 Rn Radon 222																											
87 Fr Francium 223		88 Ra Radium 226		89 Ac Actinium 227		104 Unq Ununquadium 257		105 Uup Ununpentium 260		106 Unh Ununhexium 263		107 Uns Ununseptium 262		108 Uno Ununoctium 265		109 Uue Ununennium 266																																													
58 Ce Cerium 140		59 Pr Praseodymium 141		60 Nd Neodymium 144		61 Pm Promethium 147		62 Sm Samarium 150		63 Eu Europium 152		64 Gd Gadolinium 157		65 Tb Terbium 159		66 Dy Dysprosium 163		67 Hb Holmium 165		68 Er Erbium 167		69 Tm Thulium 169		70 Yb Ytterbium 173		71 Lu Lutetium 175		87 Fr Francium 223		88 Ra Radium 226		89 Ac Actinium 227		90 Th Thorium 232		91 Pa Protactinium 231		92 U Uranium 238		93 Np Neptunium 237		94 Pu Plutonium 244		95 Am Americium 243		96 Cm Curium 247		97 Bk Berkelium 247		98 Cf Californium 249		99 Es Einsteinium 254		100 Fm Fermium 253		101 Md Mendelevium 256		102 No Nobelium 254		103 Lr Lawrencium 257	

INFORMATION FOR CANDIDATES*MAKLUMAT UNTUK CALON*

1. This question paper consists of three sections: **Section A**, **Section B** and **Section C**.
Kertas soalan ini mengandungi tiga bahagian: Bahagian A, Bahagian B dan Bahagian C.
2. Answer **all** questions in **Section A**. Write your answers for **Section A** in the spaces provided in 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 ceraian soalan ditunjukkan dalam kurungan.
6. Show your working. It may help you to get marks.
Tunjukkan kerja mengira. Ini membantu anda mendapatkan markah.
7. If you wish to change your answer, cross out the answer that you have done. Then write down the new answer.
Jika anda hendak memukar 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.

NAMA:

TINGKATAN:

**MODUL PENINGKATAN PRESTASI TINGKATAN 5****TAHUN 2016****MAJLIS PENGETUA SEKOLAH MALAYSIA (KEDAH)**
<https://cikguadura.wordpress.com/>**MODUL A 2016****CHEMISTRY****4541/3****Kertas 3****Ogos/Sept****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	33	
2	17	
Jumlah	50	

Kertas soalan ini mengandungi 7 halaman bercetak.

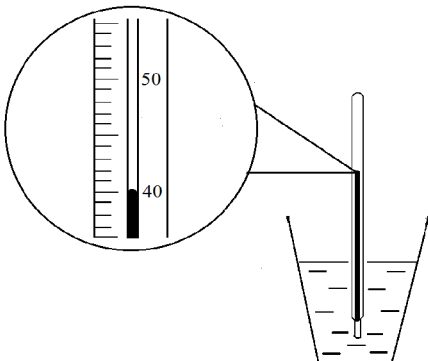
This question paper consists of two questions : **Question 1** and **Question 2**
Kertas soalan ini mengandungi dua soalan : Soalan 1 dan Soalan 2

Answer **all** questions.
Jawab semua soalan.

- 1 Two sets of experiment are conducted to compare the heat of neutralisation using two types of acids, nitric acid, HNO_3 and ethanoic acid, CH_3COOH react with potassium hydroxide solution, KOH .

Table 1 shows the initial temperature and the highest temperature of the solution mixture for both sets respectively.

Dua set eksperimen telah dijalankan untuk membandingkan haba peneutralan menggunakan dua jenis asid yang berlainan, asid nitrik, HNO_3 dan asid etanoik, CH_3COOH bertindak balas dengan larutan kalium hidroksida, KOH . Jadual 1 menunjukkan suhu awal dan suhu tertinggi campuran larutan bagi kedua-dua set masing-masing.

	Initial temperature/ $^{\circ}\text{C}$ <i>Suhu Awal</i>	Highest temperature/ $^{\circ}\text{C}$ <i>Suhu tertinggi</i>
Set 1	Initial temperature of potassium hydroxide solution = 28.0°C <i>Suhu awal larutan kalium hidroksida = 28.0°C</i> Initial temperature of nitric acid = 28.0°C <i>Suhu awal asid nitrik = 28.0°C</i>	Highest temperature = _____ <i>Suhu tertinggi</i> Temperature change = _____ <i>Perubahan suhu</i>  25cm^3 of 2mol dm^{-3} potassium hydroxide solution + 25cm^3 of 2mol dm^{-3} nitric acid <i>25cm^3 of 2mol dm^{-3} larutan kalium hidroksida + 25cm^3 of 2mol dm^{-3} asid nitrik</i>

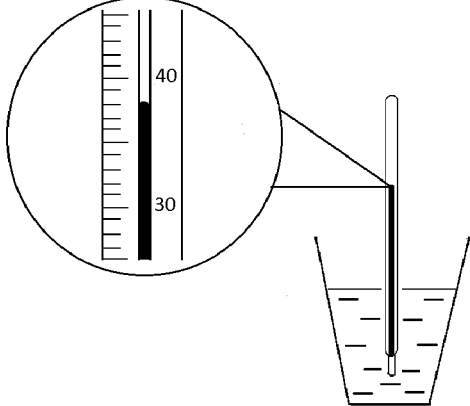
Set II	<p>Initial temperature of Potassium hydroxide solution = 28.0°C <i>Suhu awal larutan kalium hidroksida = 28.0°C</i></p> <p>Initial temperature of Ethanoic acid = 28.0°C <i>Suhu awal asid etanoik = 28.0°C</i></p>	<p>Highest temperature = _____ <i>Suhu tertinggi</i></p> <p>Temperature change = _____ <i>Perubahan suhu</i></p>  <p>25cm³ of 2mol dm⁻³ KOH + 25cm³ of 2mol dm⁻³ CH₃COOH 25cm³ of 2mol dm⁻³ KOH + 25cm³ of 2mol dm⁻³ CH₃COOH</p>
--------	---	---

Table 1

- (a) Record the highest temperature and the change of temperature for both sets of experiment in Table 1
Rekod suhu tertinggi dan perubahan suhu bagi kedua-dua set eksperimen dalam Jadual 1
- [3marks]
- (b) Construct a table that can be used to record the data from both set of experiments
Bina satu jadual yang boleh digunakan untuk merekod data bagi kedua-dua set eksperimen

[3marks]

(c) State one hypothesis for both sets of experiments
Nyatakan satu hipotesis bagi kedua-dua set eksperimen

.....
.....

[3marks]

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

(i) The manipulated variable
Pembolehubah dimanipulasikan

.....

(ii) The responding variable
Pembolehubah bergerak balas

.....

(iii) The fixed variable
Pembolehubah dimalarkan

.....

[3marks]

(e) State three observations that you could obtain in Set II other than change in temperature.
Nyatakan tiga pemerhatian yang boleh anda dapati dalam eksperimen Set II selain daripada perubahan suhu

(i).....

(ii).....

(iii).....

[3marks]

(f) State the inference based on the answer in 1(e)
Nyatakan inferens berdasarkan jawapan dalam 1(e)

.....
.....

[3marks]

- (g) Calculate the value of heat of neutralisation for the reactions in Set I and Set II
Hitung nilai haba peneutralan untuk tindak balas dalam Set I dan Set II

Set I	Set II

- (h) State the relationship between type of acid used and value of heat of neutralisation. Explain your answer. [3marks]

Nyatakan hubungan antara jenis asid dan nilai haba peneutralan . Terangkan jawapan anda

.....

[3marks]

- (i) Give the operational definition for the heat of neutralisation.
Berikan definisi secara operasi untuk haba peneutralan.

.....

[3marks]

- (j) Based on the temperature in Set II , predict the change in temperature if potassium hydroxide solution replaced by ammonia solution.
Berdasarkan suhu dalam Set II , ramalkan perubahan suhu jika larutan kalium hidroksida digantikan dengan larutan ammonia.
-

[3marks]

- (k) The experiment is repeated using acid W, acid X, acid Y and acid Z with potassium hydroxide solution . The values of the heat of neutralisation of these acids are given in table 1. Complete table 1 by classifying the acids as strong acid or weak acid.
Eksperimen diulangi dengan menggunakan asid W, asid X, asid Y dan asid Z. Nilai haba penutralan untuk semua asid diberikan dalam jadual 1. Lengkapkan jadual 1 dengan membuat klasifikasi asid kepada asid kuat atau asid lemah.

Name of acid <i>Nama asid</i>	Heat of neutralisation/ kJmol^{-1} <i>Haba penutralan/ kJmol^{-1}</i>
Acid W	-50.3
Acid X	-57.2
Acid Y	-50.5
Acid Z	-54.0

[3marks]

- 2 Diagram 2 shows the conversation between two students about the electrolysis experiment.
Rajah 2 menunjukkan perbualan antara dua orang pelajar tentang eksperimen elektrolisis

Ahmad : I carried out an experiment of electrolysis copper(II) sulphate solution using carbon electrodes. I observed the gas bubbles are released at anode.

Saya telah menjalankan eksperimen elektrolisis larutan kuprum(II) sulfat dengan menggunakan elektrod karbon. Saya perhatikan gelembong gas dibebaskan di anod.

Muthu: When I used copper as electrodes , I observed the anode become thinner.

Bila saya menggunakan kuprum sebagai elektrod, saya perhatikan anod semakin nipis

Referring to the conversation above, plan a laboratory experiment to investigate the effect of the type of electrode to the product at anode.

Merujuk kepada perbualan di atas ,rancang satu eksperimen untuk mengkaji kesan jenis elektrod ke atas hasil di anod.

Your planning should include the following aspects:

Perancangan anda hendaklah mengandungi aspek-aspek berikut:

- (a) Problem statement
Pernyataan masalah
- (b) All the variables
Semua pemboleh ubah
- (c) Statement of the hypothesis
Pernyataan hipotesis
- (d) List of substances and apparatus
Senarai bahan dan radas
- (e) Procedure of the experiment
Prosedur eksperimen
- (f) Tabulation of data
Penjadualan data

[17 marks]

<https://cikguadura.wordpress.com/>


END OF QUESTION PAPER
KERTAS SOALAN TAMAT

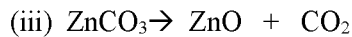
INFORMATION FOR CANDIDATES
MAKLUMAT UNTUK CALON

1. This question paper consists of two sections: **Question 1** and **Question 2**.
*Kertas soalan ini mengandungi dua soalan: **Soalan 1** dan **Soalan 2**.*
2. Answer **all** questions . Write your answers for **Question 1** in the spaces provided in the question paper.
*Jawab **semua** soalan. Tuliskan jawapan bagi **Soalan 1** pada ruang yang disediakan dalam kertas soalan ini.*
3. Write your answers for **Question 2** 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 2** 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 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.
Sekiranya anda hendak menukar jawapan, batalkan jawapan yang telah dibuat, kemudian tulis jawapan yang baru.
8. You may use a non-programmable scientific calculator.
Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogramkan.
9. Tie together your answer sheets with this question paper at the end of the examination.
Ikat semua kertas jawapan anda bersama-sama soalan ini di akhir peperiksaan.

MODUL A
Answer Paper 1
<https://cikguadura.wordpress.com/>

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

No	Mark scheme	Sub Mark	Total mark
1.	(a) (i) 2	1	1
	(ii) Y/ Cl/ Chlorine	1	1
	(b) (i) Z/ Fe/ iron/ Ferum/ Besi	1	1
	(c) 1. No. of proton//positive charges of nucleus of atom Y is more than in atom X <i>Bil proton/ cas positif nucleus atom Y lebih banyak berbanding atom X</i>	1	
	2. the forces of attraction of the nucleus towards of atom Y is stronger <i>Daya tarikan antara nukleus terhadap elektron atom Y lebih kuat</i>	1	
	(d) 		2
	(e) (i) 1. Correct formulae of reactant and product 2. Balance equation		
	$2X + 2H_2O \rightarrow 2XOH + H_2 //$	1	
	$2Na + 2H_2O \rightarrow 2NaOH + H_2$	1	2
	(ii) A is more reactive than X A lebih reaktif dari X	1	1
	TOTAL		9
2	(a) (i) C_nH_{2n+2}	1	1
	(ii) C_1H_2	1	1
	(iii) $\begin{array}{cccc} H & H & H & H \\ & & & \\ C & = & C - C - C & - H \\ & & & \\ H & & H & H \end{array}$	1	1
	(b) (i) zinc oxide and carbon dioxide <i>Zink oksida dan karbon dioksida</i>	1+1	2
	(ii) yellow when hot, white when cold <i>Kuning bila panas, putih bila sejuk</i>	1	1



$$\text{No. of mole/ bil. mol} = \frac{5}{125} = 0.04 \text{ mol} \quad 1$$

1 mol ZnCO_3 produced 1 mol gas Y 1

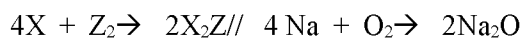
$$\begin{aligned} \text{Volume/ isipadu} &= 0.04 \text{ mol} \times 24 \text{ dm}^3 \text{ mol}^{-1} \\ &= 0.96 \text{ dm}^3 = 960 \text{ cm}^3 \end{aligned} \quad \begin{array}{l} 1 \\ 3 \end{array}$$

Total 9

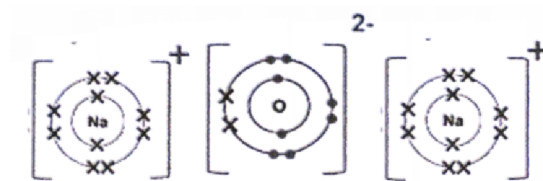
- 3 a i. 4 1 1
- ii Solid / pepejal 1 1
- b i YZ_2 1 1
- ii 1. The melting point and the boiling point is low 1
2. The particles/molecules are attracted together by a weak Van der Waals / intermolecular force // the forces of attraction between particles is weak 1
3. Low heat energy is required to overcome the forces. 1 3

- 1. takat lebur dan takat didih rendah*
- 2. zarah/molekul ditarik oleh daya tarikan Van der Waals/daya dalam molekul yang lemah// daya tarikan antara zarah yang lemah*
- 3. tenaga haba yang rendah diperlukan untuk mengatasi daya*

- c i 1. Correct formula of reactant and product 1
2. Balance equation 1
- 1. formula bahan dan hasil yang betul* 2
- 2. persamaan seimbang*



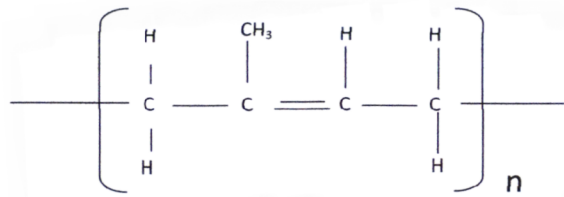
ii



1. Correct number of shells and nucleus 1
2. Correct number of electrons and charges 1 2
- 1. bilangan petala dan nukleus yang betul*
- 2. bilangan electron dan cas yang betul*

Total 10

4.	a.	A substance that ionizes in water to produce hydrogen ions <i>Bahan yang mengion dalam air untuk menghasilkan ion hidrogen</i>	1	1
	b.	S	1	1
	c.	i. P	1	1
		ii. Solution P has the highest concentration of hydrogen ions. <i>Larutan P mempunyai kepekatan ion hidrogen yang paling tinggi</i>	1	1
	d.	i. 60 cm ³	1	1
		ii. 1. Correct formula of reactant and product 2. Balance equation <i>1.formula bahan dan hasil yang betul</i> <i>2.persamaan seimbang</i>	1 1	2
		$\text{H}_2\text{SO}_4 + 2\text{NaOH} \rightarrow \text{Na}_2\text{SO}_4 + 2\text{H}_2\text{O}$		
		iii. Molarity of the sulphuric acid / <i>Kepekatan asid sulfurik</i>	1	
		$\text{Mol H}_2\text{SO}_4 = \frac{(1.0)(15)}{1000} = 0.015$	1	
		From equation, 1 mole sulphuric acid react with 2 mole of sodium hydroxide 0.015 mole of sulphuric acid react with 0.03 mole of sodium hydroxide <i>Dari persamaan,</i> <i>1 mol asid sulfurik bertindak balas dengan 2 mol natrium hidroksida</i> <i>0.015 mol asid sulfurik bertindak balas dengan 0.03 mol natrium hidroksida</i>	1	3
		Molarity/ <i>Kepekatan NaOH</i> = $\frac{0.03 \times 1000}{20}$ = 1.5 mol dm ⁻³		
		Total		10
5	(a)	2-methylbut-1,3-diene / <i>2-metilbut-1,3-diena</i>	1	1
	(b)	(i) Polymerization/ <i>pempolimeran</i> (ii)	1	1



			1	1
(c)	(i)	A: ethanoic acid//any suitable acid <i>Asid etanoik// apa-apa asid yang sesuai</i>	1	2
		B: ammonia solution//any suitable alkali <i>Ammonia // apa-apa alkali yang sesuai</i>		
	(ii)	1.Reaction of bacteria in the air produce an acid. 2.Presence of H^+ ion neutralize the negative charge of latex particles	1	2
		<i>1.Tindak balas bakteria dalam udara menghasilkan suatu asid</i> <i>2.kehadiran ion H^+ meneutralkan cas negatif pada zarah getah</i>		
(d)	(i)	L	1	1
	(ii)	Vulcanised rubber is : - harder - high resistant to heat - not easily oxidized. <i>Getah tervulkan</i> - <i>lebih kuat</i> - <i>mempunyai daya ketahanan terhadap haba</i> - <i>tidak mudah dioksidakan.</i> (Any two)	2	2
	(iii)	<p style="text-align: center;">Vulcanised rubber</p>	1	1
		Total		11
6.	(a)	Allows the flow of ions <i>Membenarkan ion-ion mengalir.</i>	1	1
	(b) (i)	+6 to +3 +6 <i>kepada</i> +3	1	1
	(ii)	Reduction <i>Penurunan</i>	1	1

- (c) (i) $\text{Fe}^{2+} \rightarrow \text{Fe}^{3+} + e$ 1 1
 (ii) Add a few drops of sodium hydroxide solution into the solution at carbon electrode X. 1
 Brown precipitate form. 1

*Tambahkan beberapa titis larutan natrium hidroksida ke dalam larutan pada elektrod karbon X.
 Mendakanperangterbentuk.*

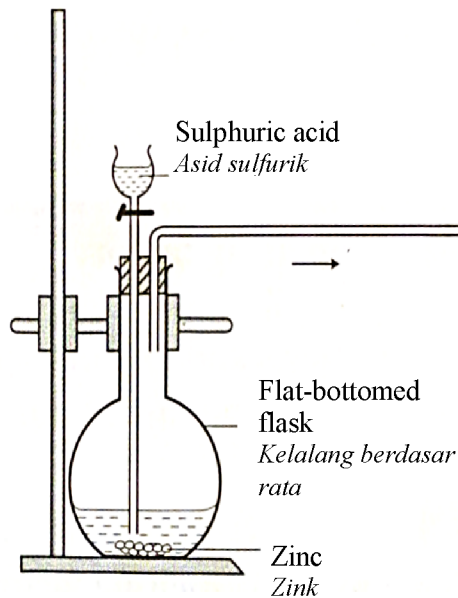
1
 1 2

Note:

Accept any suitable reagents and correct observation respectively.

- (d) (i) P, Q, S, H, R 1 1
 (ii) - Copper 1
 - Oxidizing agent 1
 - *Kuprum*
 - *Agen pengoksidaan* 2

(iii)



- Functional diagram 1
 Correct label 1 2
Gambarajah berfungsi
Label yang betul

TOTAL 11

7 (a)

	Hydrocarbon A <i>Hidrokarbon A</i>	Hydrocarbon B <i>Hidrokarbon B</i>		
Functional group <i>Kumpulan befungsi</i>	Single bond <i>Ikatan tunggal</i>	Double bond <i>Ikatan ganda dua</i>	1	
Chemical formula <i>Formula kimia</i>	C ₃ H ₈	C ₃ H ₆	1	
Homologous series <i>Siri homolog</i>	Alkane <i>Alkana</i>	Alkene <i>Alkena</i>	1	
General formula <i>Formula am</i>	C _n H _{2n}	C _n H _{2n+2}	1	4

(b) Molecular formula / *formula molekul*

$$\begin{aligned} C_n H_{2n} &= 28 \\ 12n + 1(2n) &= 28 \\ 14n &= 28 \\ n &= 2 \end{aligned} \quad 1$$

Homologous series = alkene / *alkene* 1Because it contains double bond / *mengandungi ikatan ganda dua* 1Ethanol / *etanol* 1 6

(c)

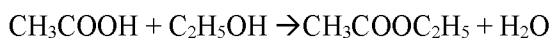


-COOH, carboxyl group 1

L= ethanoic acid / *asid etanoik* 1X= hydrogen gas / *gas hidrogen* 1K= ethyl ethanoate / *etil etanoat* 1Y= carbon dioxide gas / *gas karbon dioksida* 1Esterification / *pengesteran* 1

1. Correct formula of reactant and product 1

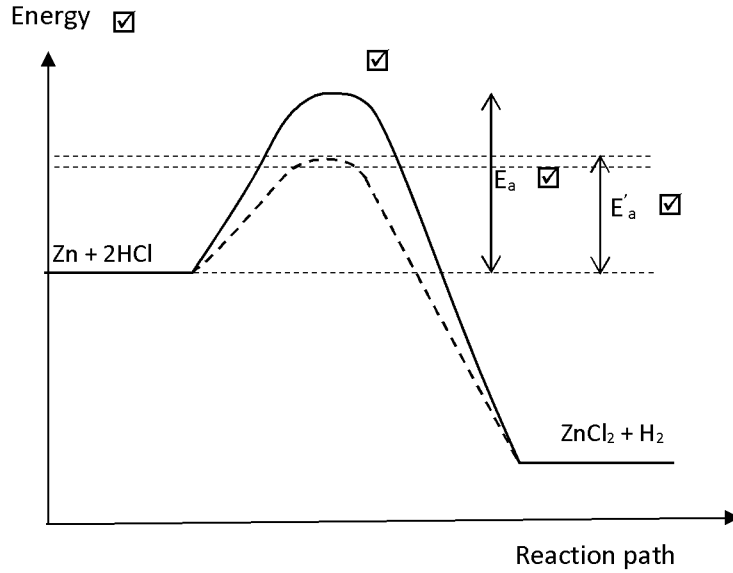
2. Balance equation 1

Catalyst / *mangkin* : concentrated sulphuric acid / *asid sulfurik pekat* 1 10

Total 20

8	(a)	(i)	Rate of reaction is the change in the volume of hydrogen gas released per unit time taken	1	
			Concentration	1	
			1. Correct formula of reactants and products	1	
			2. Balanced chemical equation	1	4
			$\text{Zn} + 2\text{HCl} \rightarrow \text{ZnCl}_2 + \text{H}_2$		
		(ii)	Experiment I = $\frac{50}{20}$ // $2.5 \text{ cm}^3\text{s}^{-1}$	1	
			Experiment II = $\frac{50}{50}$ // $1.0 \text{ cm}^3\text{s}^{-1}$	1	2
			-Rate of reaction in experiment I is higher than higher Experiment II	1	
			-The concentration of acid in Experiment I higher than in Experiment II // Number of hydrogen ions per unit volume in Experiment I bigger than in Experiment II.	1	
			-Frequency of collision between hydrogen ions and zinc atoms in Experiment I is higher	1	4
			-Frequency of effective collision between particles in Experiment I is higher than in Experiment II.		
			<i>-kadar tindak balas dalam eksperimen I lebih tinggi daripada eksperimen II</i>		
			<i>-kepekatan asid dalam eksperimen I lebih tinggi daripada eksperimen II // bilangan ion hidrogen per unit isipadu dalam eksperimen I lebih tinggi daripada eksperimen II</i>		
			<i>-frekuensi perlanggaran di antara ion hidrogen dengan atom logam zink dalam eksperimen I lebih tinggi daripada eksperimen II</i>		
			<i>-frekuensi perlanggaran berkesan di antara zarah dalam eksperimen I lebih tinggi daripada eksperimen II</i>		
	(b)	(i)	A	1	
			Manganese (IV) oxide/lead (II) oxide/lead (IV) oxide		
			<i>Mangan (IV)oksida/ plumbum (II) oksida/ plumbum (IV)oksida</i>	1	2
		(ii)	1. Label of energy on vertical axis	1	
			2. The position of the energy level of the reactants is higher than the energy level of the product.	1	
			3. Correct position for E_a	1	
			4. Correct position for E'_a		
			<i>1. label 'Tenaga' pada paksi menegak</i>		
			<i>2. kedudukan aras tenaga bagi bahan lebih tinggi daripada aras tenaga hasil</i>	1	4

- 3. kedudukan yang betul bagi E_a
- 4. kedudukan yang betul bagi E'_a

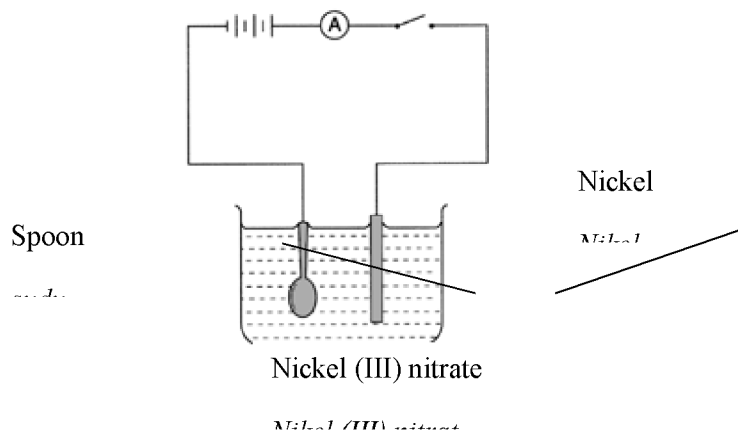


- | | | |
|---|---|---|
| 1. the presence of catalyst provide an alternative pathway | 1 | |
| 2. with a lower activation energy in created | 1 | |
| 3. number of colliding particles which are able to overcome the lower activation energy increases | 1 | |
| 4. frequency of effective collision increase | 1 | 4 |
-
- | | | |
|--|--|--|
| 1. dengan kehadiran mangkin, satu laluan alternatif | | |
| 2. dengan tenaga pengaktifan lebih rendah terbentuk | | |
| 3. maka, bilangan zarah berlanggar yang dapat mengatasi tenaga pengaktifan yang lebih rendah ini bertambah | | |
| 4. kadar tindak balas bertambah. | | |

Total

20

9 (a)

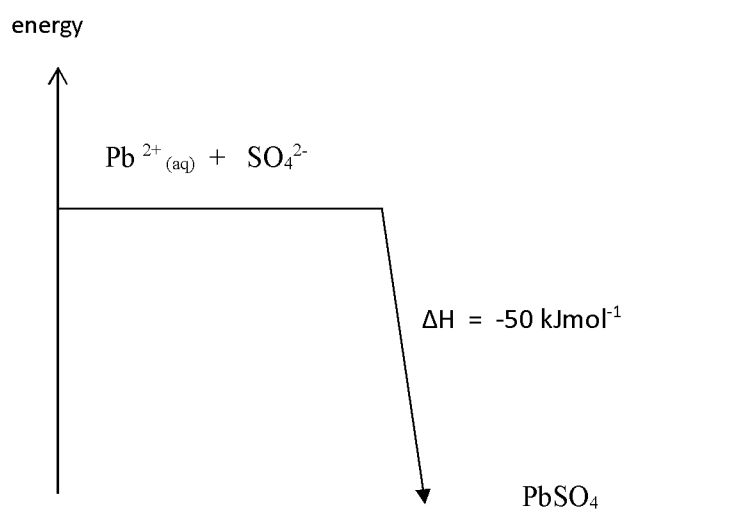


1

	1.functional diagram : anode and cathode correct,solution shaded,whole spoon immersed	1	
	2.label : nickel,spoon,nickel(III) nitrate solution		
	<i>1.gambarajah berfungsi : anod dan katod betul,larutan dilorek,sudu direndam sepenuhnya</i>		
	<i>2.label : Nikel,sudu ,larutan nikel(III) nitrat</i>	1	
	[a:any solution with nickel(II) /nickel(III) ion]	1	
			4
	3.anode : $\text{Ni} \rightarrow \text{Ni}^{2+} + 2\text{e} // \text{Ni} \rightarrow \text{Ni}^{3+} + 3\text{e}$ [refer solution]		
	4.cathode : $\text{Ni}^{2+} + 2\text{e} \rightarrow \text{Ni} // \text{Ni}^{3+} + 3\text{e} \rightarrow \text{Ni}$ [rujuk larutan]		
(b)	Experiment I		
	1.product = oxygen <i>Hasil =oksigen</i>	1	
	2.hydroxide ion is discharged <i>Ion hidroksida dinyahcaskan</i>	1	
	3.hydroxide ion is lower than iodide ion in the electrochemical series <i>Ion hidroksida di bawah ion iodida dalam siri elektrokimia.</i>	1	
	Experiment II		
	4. product = iodine <i>Hasil =iodin</i>	1	
	2.iodide ion is discharged <i>Ion iodida dinyahcaskan</i>	1	
	3.iodide ion is more concentrated <i>Ion iodide lebih pekat.</i>	1	6
(c)	1.Zn	1	
	2.Cu	1	
	3.CuSO ₄ solution	1	
	Procedure :		
	4. Zinc strip and copper strip are cleaned with sand paper <i>jalur zink dan jalur kuprum digosok dengan kertas pasir</i>	1	
	5.A beaker is filled with 0.1 mol dm ⁻³ of copper(II) sulphate solution until half full <i>Sebuah bikar diisi dengan larutan kuprum(II) sulfat 0.1 mol dm⁻³ sehinggaseparuh bikar</i>	1	
	6.Zinc strip and copper strip are dipped into the solution <i>jalur zink dan kuprum dicelup ke dalam larutan</i>	1	
	7.both strips are connected to voltmeter via connecting wire <i>kedua-dua jalur disambungkan ke voltmeter melalui wayar penyambung</i>	1	
	8.Zinc release electron to form zinc ion <i>zink menderma elektron dan membentuk ion zink</i>	1	

9. copper(II) ion receive electron to form copper <i>ion kuprum(II) menerima elektron dan membentuk kuprum</i>	1	10
10. when electron move from zinc to copper pointer of voltmeter deflect <i>apabila elektron bergerak dari zink ke kuprum jarum voltmeter terpesong</i>	1	
Total		20

10 (a) (i)



1. Y-axes : energy	1	
2. Two different level of energy		
1. <i>Paksi Y : tenaga</i>	1	2
2. <i>Dua aras tenaga berbeza</i>		
(ii) 1. energy content of reactants is higher // products have less energy content <i>Bahan mempunyai tenaga yang lebih banyak//hasil mempunyai tenaga yang sedikit</i>	1	
2. heat is released during the experiment // this is exothermic reaction <i>haba dibebaskan semasa eksperimen// ini ialah tindak balas eksotermik</i>	1	2
(b) (i) 1. heat of neutralization of exp. I is higher than exp. II <i>Haba peneutralan eks. I lebih tinggi daripada eks. II</i>	1	
2. HCl is strong acid and CH ₃ COOH is weak acid		

	<i>HCl ialah asid kuat dan CH₃COOH ialah asid lemah</i>	1	
	3. strong acid / HCl ionized completely and weak acid / CH ₃ COOH ionized partially in water		3
	<i>Asid kuat/HCl mengion dengan lengkap dalam air dan asid lemah/CH₃COOH mengion separa dalam air</i>	1	
	4. some of the heat released are absorbed to ionizes ethanoic acid in the molecules completely		
	<i>sebahagian haba dibebaskan akan diserap untuk mengion molekul asid etanoik dengan lengkap</i>		
(ii)	1. Value of Heat of neutralization is same	1	
	2. both experiments contain same number of hydrogen ion	1	
	<i>1. Nilai Haba peneutralan adalah sama</i>	1	3
	<i>2. Ini kerana kedua-dua eksperimen mengandungi kepekatan ion hidrogen yang sama banyak</i>		
(c)	Apparatus : Polystyrene cup, thermometer, measuring cylinder, spatula.	1	
	<i>Radas : cawan polisterin, termometer, silinder penyukat, spatula</i>		
	Materials : 0.2 mol dm ⁻³ copper(II) sulphate solution, zinc powder.	1	2
	<i>Bahan kimia : 0.2 mol dm⁻³ larutan kuprum (II) sulfat, serbuk zink</i>		
	Procedure/kaedah :		
	1. Measure 25 cm ³ of 0.2 mol dm ⁻³ copper (II) sulphate solution and pour it into a polystyrene cup.	1	
	<i>Sukat 25 cm³ larutan kuprum (II) sulfat 0.2 mol dm⁻³ dan tuangkan ke dalam cawan polisterin</i>		
	2. Put the thermometer in the polystyrene cup and record the initial temperature of the solution.	1	
	<i>Letakkan thermometer ke dalam cawan polisterin dan rekodkan suhu awal larutan</i>		
	3. Add half a spatula of zinc powder quickly and carefully into the polystyrene cup.	1	
	<i>Dengan cepat dan berhati-hati, tambahkan setengah spatula serbuk zink ke dalam cawan polisterin</i>		
	4. Stir the reaction mixture with the thermometer to mix the reactants.	1	
	<i>Kacau campuran tindak balas dengan menggunakan termometer untuk memastikannya bercampur</i>		
	5. Record the highest temperature reached.	1	5
	<i>Suhu tertinggi yang dicapai direkodkan.</i>		

Tabulation of data:

Initial temperature of CuSO ₄ solution (°C) <i>Suhu awal larutan CuSO₄ (°C)</i>	θ ₁		
Highest temperature of the reaction mixture (°C) <i>Suhu tertinggi campuran tindak balas (°C)</i>	θ ₂		
Temperature change (°C) <i>Perubahan suhu (°C)</i>	θ ₂ - θ ₁	1	1

Calculation/ *pengiraan* :

Number of mole of CuSO₄

Bilangan mol CuSO₄

$$= MV/1000 = (0.2)(25)/1000 = 0.005 \text{ mol} \quad 1$$

Heat change/ *perubahan haba* = $mc(\theta_2 - \theta_1) = x \text{ J}$

Heat of displacement/*Haba penyesaran*

$$= x / 0.005 \text{ kJ mol}^{-1}$$

$$= y \text{ kJ mol}^{-1} \quad 1 \quad 2$$

Total 20

<https://cikguadura.wordpress.com/>

QUESTION	MARK SCHEME	MARK												
I(a)	<p>Able to record highest temperature and the change of temperature for both sets of experiment with unit and 1 decimal place correctly.</p> <p><u>Answer</u></p> <p>Set 1: Highest temperature 40.0^oC Temperature change = 12.0^oC</p> <p>Set II: Highest temperature 38.0^oC Temperature change = 10.0^oC</p>	3												
	<p>Able to record one set of readings correctly</p> <p><u>Answer</u></p> <p>Set 1: Highest temperature 40^oC Temperature change = 12^oC //</p> <p>Set II: Highest temperature 38^oC Temperature change = 10^oC</p>	2												
	<p>Able to record at least one reading correctly</p> <p><u>Sample answer</u></p> <p>Set 1: Highest temperature 40^oC // Temperature change = 12^oC //</p> <p>Set II: Highest temperature 38^oC// Temperature change = 10^oC</p>	1												
	No response or wrong response.	0												
(b)	<p>Able to construct a table with correct headings and unit</p> <p><u>Sample answer</u></p> <table border="1"> <thead> <tr> <th>Set</th> <th>Initial temperature^oC</th> <th>Highest Temperature^oC</th> <th>Temperature change^oC</th> </tr> </thead> <tbody> <tr> <td>I</td> <td>28.0</td> <td>40.0</td> <td>12.0</td> </tr> <tr> <td>II</td> <td>28.0</td> <td>38.0</td> <td>10.0</td> </tr> </tbody> </table>	Set	Initial temperature ^o C	Highest Temperature ^o C	Temperature change ^o C	I	28.0	40.0	12.0	II	28.0	38.0	10.0	3
Set	Initial temperature ^o C	Highest Temperature ^o C	Temperature change ^o C											
I	28.0	40.0	12.0											
II	28.0	38.0	10.0											

	<p>Able to construct a table with</p> <ul style="list-style-type: none"> • correct headings //unit <p><u>Sample answer</u></p> <table border="1"> <thead> <tr> <th>Set</th> <th>Initial temperature</th> <th>Highest Temperature</th> <th>Temperature change</th> </tr> </thead> <tbody> <tr> <td>I</td> <td>28</td> <td>40</td> <td>12</td> </tr> <tr> <td>II</td> <td>28</td> <td>38</td> <td>10</td> </tr> </tbody> </table>	Set	Initial temperature	Highest Temperature	Temperature change	I	28	40	12	II	28	38	10	2
Set	Initial temperature	Highest Temperature	Temperature change											
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	<p>Able to construct a table with headings</p> <p><u>Sample answer</u></p> <table border="1"> <thead> <tr> <th>Set</th> <th>Initial temperature</th> <th>Highest Temperature</th> <th>Temperature change</th> </tr> </thead> <tbody> <tr> <td>I</td> <td></td> <td></td> <td></td> </tr> <tr> <td>II</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Set	Initial temperature	Highest Temperature	Temperature change	I				II				1
Set	Initial temperature	Highest Temperature	Temperature change											
I														
II														
	No response or wrong response	0												
(c)	<p>Able to state the relationship between the manipulated variable and the responding variable with direction correctly</p> <p><u>Sample answer</u></p> <p>When strong acid react with strong alkali, produce a higher heat of neutralisation while strong alkali react with weak acid produce a lower heat of neutralisation</p>	3												
	<p>Able to state the relationship between the manipulated variable and the responding variable .</p> <p><u>Sample answer</u></p> <p>Strong acid and strong alkali has a higher heat of neutralisation// strong alkali and weak acid has a lower heat of neutralisation Heat of neutralisation of strong acid and strong alkali is higher// heat of neutralisation of weak acid and strong alkali is lower</p>	2												
	<p>Able to give an idea of the hypothesis</p> <p><u>Sample answer</u></p> <p>Acid react with alkali to produce heat</p>	1												
		0												

	No response or wrong response	
(d)	Able to state all the variables correctly <u>Sample answer</u> Manipulated variable Nitric acid and ethanoic acid Responding variable Heat of neutralisation Fixed variable Potassium hydroxide solution//polystyrene cup	3
	Able to state any two variables correctly	2
	Able to state one variable correctly	1
	No response or wrong response	0
(e)	Able to state three observations correctly <u>Sample answer</u> 1. Polystyrene cup becomes hot 2. Reading of thermometer increases 3, Colourless solution is formed	3
	Able to state two observations correctly	2
	Able to state one observation correctly	1
	No response or wrong response	0
(f)	Able to state the inference correctly <u>Sample answer</u> Reaction of acid ethanoic and potassium hydroxide solution release heat to the surroundings	3
	Able to state the inference less correctly <u>Sample answer</u> Heat is released//temperature increases	2

	Able to give an idea of inference <u>Sample answer</u> Temperature change	1
	No response or wrong response	0
(g)	Able to calculate the value of heat of neutralisation for the reactions in Set I and Set II correctly with unit. <u>Answer</u> Set I 1.No of mol = $2 \times 25 / 1000$ $= 0.05$ 2.Heat released = $50 \times 4.2 \times 12$ $= 2520 \text{ J}$ 3. $\Delta H = 2520 / 0.05$ $= 50400 \text{ J}$ $= -50.4 \text{ kJmol}^{-1}$ Set II 1.No of mol = $2 \times 25 / 1000$ $= 0.05$ 2.Heat released = $50 \times 4.2 \times 10$ $= 2100 \text{ J}$ 3. $\Delta H = 2100 / 0.05$ $= 42000 \text{ J}$ $= -42 \text{ kJmol}^{-1}$	3
	Able to calculate the value of heat of neutralisation for the reactions in Set I or Set II correctly	2
	Able to calculate the value of heat change for the reactions in Set I or Set II <u>Sample answer</u> Heat change = $50 \times 4.2 \times 12$ $= 2520 \text{ J}$ Heat released = $50 \times 4.2 \times 10$ $= 2100 \text{ J}$	1
	No response or wrong response	0
(h)	Able to state the relationship between type of acid and value of heat of neutralisation and explain the difference correctly <u>Sample answer</u> Strong acid and strong alkali will produce higher heat of neutralisation compared to weak acid and strong alkali. This is because weak acid ionise	3

	partially therefore some of the heat released is used to further ionise the molecules	
	Able to state the relationship between type of acid and value of heat of neutralisation or explain the difference correctly.	2
	Able to give an idea of relationship between type of acid and value of heat of neutralisation . <u>Sample answer.</u> Weak acid produce less heat// strong acid produce a lot of heat	1
	No response or wrong response	0
(i)	Able to give operational definition of heat of neutralisation and fulfill the following criteria (i) What must be done (ii) Observation <u>Sample answer</u> Temperature increases when acid is added to alkali to form 1 mol of water// When acid is added to alkali to form 1 mol water the temperature mixture increases	3
	Able to fulfill any one criterion	2
	Able to give any relevant idea <u>Sample answer</u> Heat released	1
	No response or wrong response	0
(j)	Able to predict the change in temperature correctly <u>Sample answer</u> 5 ^o C- 9 ^o C	3
	Able to predict the change in temperature less correctly <u>Sample answer</u> < 10 ^o C	2

	<p>Able to give an idea of change in temperature.</p> <p><u>Sample answer</u></p> <p>Temperature decrease</p>	1				
	No response or wrong response	0				
(k)	<p>Able to classify all the 4 type of acids correctly</p> <p><u>Sample answer</u></p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">Strong Acid</td> <td style="text-align: center;">Weak Acid</td> </tr> <tr> <td style="text-align: center;">Acid X</td> <td style="text-align: center;">Acid Y Acid W Acid Z</td> </tr> </table>	Strong Acid	Weak Acid	Acid X	Acid Y Acid W Acid Z	3
Strong Acid	Weak Acid					
Acid X	Acid Y Acid W Acid Z					
	Able to classify the two type of acids correctly	2				
	Able to classify one type of acid correctly (reverse)	1				
	No response or wrong response	0				

Questions	Mark Scheme	Mark
2(a)	<p>Able to state the problem statement correctly.</p> <p><u>Sample answer</u></p> <p>Do the types of electrodes affect the types of products formed at anode? Does the type of electrode/ anode affect the choice of ions to be discharged?</p>	3
	<p>Able to state the problem statement less correctly.</p> <p><u>Sample answer</u></p> <p>Do the types of electrodes affect the types of products formed during the electrolysis? To investigate the effect of electrodes on the types of products formed at anode. The type of electrode/ anode affect the choice of ions to be discharged?</p>	2

	<p>Able to give an idea of problem statement.</p> <p><u>Sample answer</u></p> <p>The electrode influence the products of the electrolysis. Electrodes affect the types of products formed</p>	1
	No response or wrong response	0

Questions	Mark Scheme	Mark
2(b)	<p>Able to state all the variables correctly.</p> <p><u>Sample answer</u></p> <p>Manipulated variable: Types of electrode/ anode</p> <p>Responding variable: Product formed at the anode</p> <p>Fixed variable: Electrolyte// The concentration of electrolyte</p>	3
	Able to state any two variables correctly.	2
	Able to state any one variable correctly.	1
	No response or wrong response	0

Questions	Mark Scheme	Mark
2(c)	<p>Able to state the relationship between the manipulated variable and the responding variable with direction correctly</p> <p><u>Sample answer</u></p> <p>When carbon electrodes are used oxygen/ bubble produced and when copper electrodes are used brown solid/ copper formed at the anode .</p>	3
	Able to state the relationship between the manipulated variable and the responding variable with direction correctly	2

	<p><u>Sample answer</u></p> <p>1. When copper electrodes are used instead of carbon electrodes, the types of products formed at the anode the cathode are different.</p> <p>2. (RV → MV)</p>	
	<p>Able to state an idea of hypothesis.</p> <p><u>Sample answer</u></p> <p>Different electrode produced different products.</p>	1
	<p>No response or wrong response</p>	0

Questions	Mark Scheme	Mark
2(d)	<p>[Able to list completely the materials and apparatus]</p> <p><u>Sample answer:</u></p> <p>Materials:</p> <ol style="list-style-type: none"> 1. copper(II) sulphate solution, (0.5 - 2.0) mol dm⁻³ //any suitable solution that match with metal plate used. 2. carbon rod 3. copper plate// any metal plate that match with a solution used. 4. wooden splinter// any suitable material used for testing a gas or any product at anode. <p>Apparatus:</p> <ol style="list-style-type: none"> 1. electrolytic cell 2. battery 3. connecting wire 4. test tube 	3
	<p>Able to list incompletely materials and apparatus.</p> <p><u>Sample answer:</u></p> <p>Materials:</p> <ol style="list-style-type: none"> 1. Copper(II) sulphate solution //any suitable solution that match with metal plate used. 2. carbon rod 3. copper plate// any metal plate that match with the solution used. <p>Apparatus:</p> <ol style="list-style-type: none"> 1. beaker/any suitable container 	2

	2. battery 3. connecting wire	
	[Able to give an idea of materials and apparatus] <u>Sample answer:</u> Materials: 1. any solution 2 carbon rod / any metal plate Apparatus: 1. any container 2.. battery	1
	No response or wrong response	0

Questions	Mark Scheme	Mark
2(e)	[Able to state all procedures completely and correctly] <u>Sample answer:</u> 1. Fill the electrolytic cell (beaker) with half full of copper(II) sulphate solution (any suitable electrolyte that match with metal plate used). 2. A test tube filled with copper(II) solution is inverted on the anode carbon electrode. 3. Complete the circuit. 4. Electricity is flowed. 5. Record observation at anode.. 6. Step 1 -5 is repeated using copper plate	3
	[Able to state procedures incompletely) <u>Sample answer:</u> 1. Copper(II) sulphate solution (any suitable electrolyte that match with metal plate used) is poured into a beaker/any suitable container. 2. Complete the circuit. 3. Record observation at anode . 4. Step 1 -3 is repeated using copper plate.	2
	[Able to give an idea of the procedure] <u>Sample answer:</u>	1

	1. Copper(II) sulphate solution is poured into a any container. 2. Complete the circuit // _	
	No response or wrong response	0

Questions	Mark Scheme	Mark						
2(f)	<p>[Able to exhibit the tabulation of data less accurately] With the following aspects:</p> <p>1. Correct headings 2. List all metals</p> <p><u>Sample answer</u></p> <table border="1"> <thead> <tr> <th>Type of electrode</th> <th>Observation</th> </tr> </thead> <tbody> <tr> <td>Carbon</td> <td></td> </tr> <tr> <td>Copper/ any metal</td> <td></td> </tr> </tbody> </table>	Type of electrode	Observation	Carbon		Copper/ any metal		2
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	<p>No response or wrong response https://cikguadura.wordpress.com/</p>	0						