SULIT

4541/1
CHEMISTRY
Kertas 1
Ogos/ Sep.
$1\frac{1}{4}$ jam

MAJLIS PENGETUA SEKOLAH MENENGAH MALAYSIA
CAWANGAN NEGERI SEMBILAN

PEPERIKSAAN PERCUBAAN BERSAMA
SIJIL PELAJARAN MALAYSIA 2011

CHEMISTRY

Kertas 1

Satu jam lima belas minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

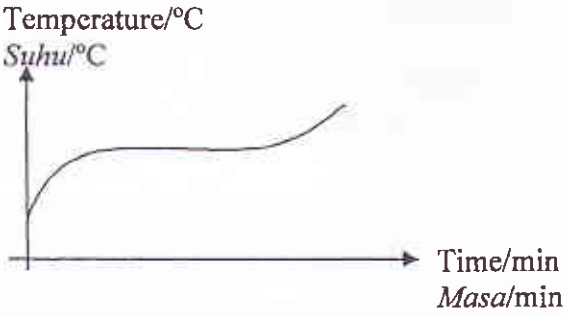
1. *Kertas soalan ini adalah dalam dwibahasa.*
2. *Soalan dalam bahasa Inggeris mendahului soalan yang sepadan dalam bahasa Melayu.*
3. *Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini.*

Kertas soalan ini mengandungi 28 halaman bercetak.

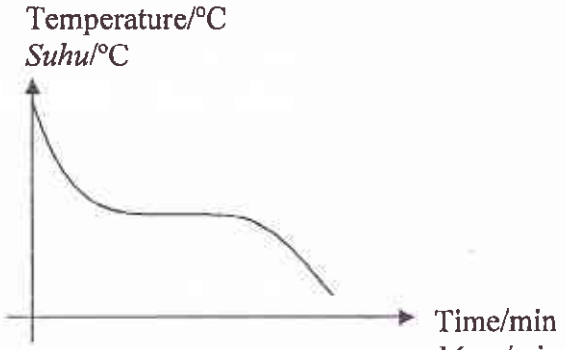
1 Naphthalene solid is heated until it melts.
Which of the following graphs is true?

Pepejal naftalena dipanaskan hingga melebur.
Antara graf berikut, yang manakah benar?

A



B



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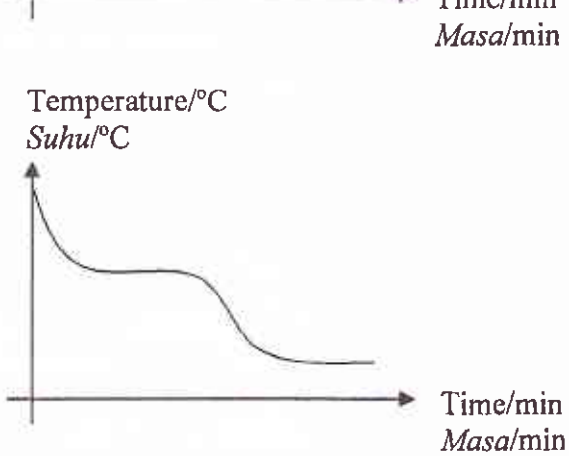
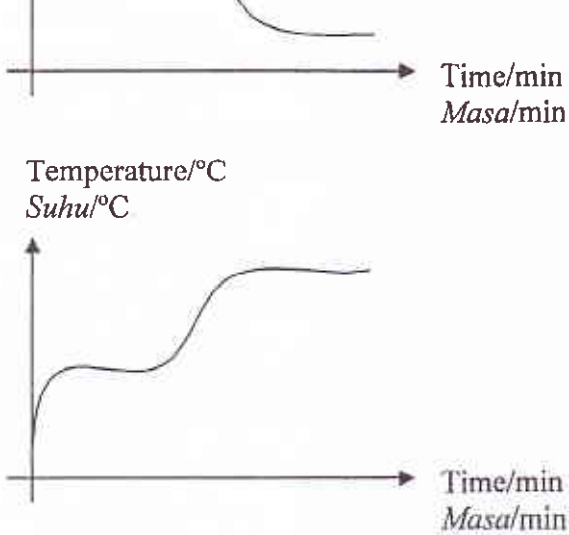


D



2 Which substance exists as molecules?
Antara bahan berikut, yang manakah wujud sebagai molekul?

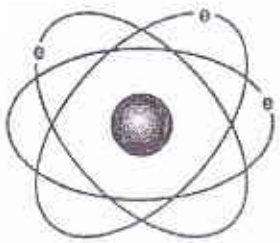
A Argon
Argon

B Magnesium
Magnesium

C Carbon dioxide
Karbon dioksida

D Copper(II) sulphate
Kuprum(II) *sulfat*

3 The diagram shows a model of an atom.
Rajah menunjukkan model satu atom.



Based on the diagram, which statement is true?
Berdasarkan kepada rajah tersebut, penyataan manakah yang betul?

A Proposed by J.J.Thompson
Dicadangkan oleh J.J.Thompson

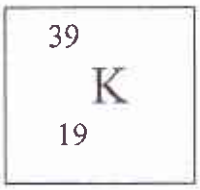
B Atom is an invisible particle
Atom adalah zarah yang tidak boleh dibahagi

C Atom is a positively charged sphere
Atom ialah sfera yang bercas positif

D Electrons orbit at specific energy levels called shells
Elektron-elektron beredar pada paras tenaga tertentu yang dipanggil petala

4 The diagram shows the standard representation for potassium.

Rajah menunjukkan perwakilan piawai bagi kalium.



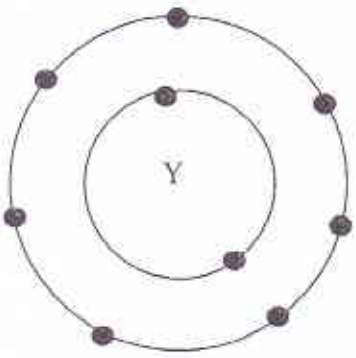
Which is true about the subatomic particles of potassium?

Yang manakah benar tentang zarah subatom bagi kalium?

	Number of proton *Bilangan proton*	Number of neutron *Bilangan neutron*	Number of electron *Bilangan elektron*
A	19	20	19
B	19	39	20
C	39	19	19
D	19	20	39

5 The diagram shows the electron arrangement of atom Y.

Rajah menunjukkan susunan elektron satu atom Y.



What is the number of valence electrons of atom Y?

Apakah bilangan elektron valens bagi atom Y?

A 0

B 1

C 7

D 8

6 What is the uses of isotopes iodine-131?

Apakah kegunaan isotop iodin-131?

A To treat thyroid patients
Merawat pesakit tiroid

B To estimate the age of a fossil
Menganggarkan usia fosil

C To kill microorganisms in food
Membunuh mikroorganisma dalam makanan

D Sterilization of surgical instruments
Mensteril peralatan pembedahan

7 What is the relative formula mass of hydrated magnesium sulphate, $MgSO_4.7H_2O$?
[Relative atomic mass : H=1, O=16, Mg=24, S=32]

Apakah jisim formula relatif bagi magnesium sulfat terhidrat, $MgSO_4.7H_2O$?
[*Jisim atom relatif* : H=1, O=16, Mg=24, S=32]

A 145

B 150

C 239

D 246

8 Which of the following gases has the biggest mass?
[Relative atomic mass : H=1, N=14, Cl=35.5]

Antara gas-gas berikut, yang manakah mempunyai jisim yang terbesar?
[*Jisim atom relatif* : H=1, N=14, Cl=35.5]

A 2 mol of ammonia gas, NH_3
2 *mol gas ammonia,* NH_3

B 1.5 mol of nitrogen gas, N_2
1.5 *mol gas nitrogen,* N_2

C 1 mol of hydrogen chloride gas, HCl
1 *mol gas hidrogen klorida,* HCl

D 0.5 mol of chlorine gas, Cl_2
0.5 *mol gas klorin,* Cl_2

9 Which of the following gases has the same number of atoms?
[Avogadro's constant = 6.02 X 10^{23} mol^{-1}]

Antara gas-gas berikut, yang manakah mempunyai bilangan atom yang sama?
[*Pemalar Avogadro* = 6.02 X 10^{23} mol^{-1}]

I 0.5 mol of oxygen gas, O_2
0.5 *mol gas oksigen* O_2

II 0.5 mol of carbon dioxide gas, CO_2
0.5 *mol gas karbon dioksida gas,* CO_2

III 1.5 mol of helium gas, He
1.5 *mol gas helium,* He

IV 1.5 mol of hydrogen gas, H_2
1.5 *mol gas hidrogen,* H_2

A I and II
I *dan* II

B II and III
II *dan* III

C III and IV
III *dan* IV

D I and IV
I *dan* IV

10 The equation is represents the decomposition of hydrogen peroxide.

Persamaan berikut mewakili tindak balas penguraian hidrogen perosida.

$$2H_2O_2 \rightarrow 2H_2O + O_2$$

How many moles of hydrogen peroxide is required to produce 480 cm^3 of oxygen gas at room condition?
[Molar volume of gas = 24 dm^3mol^{-1} at room condition]

Berapakah bilangan mol hidrogen peroksida, H_2O_2 *yang diperlukan untuk menghasilkan* 480 cm^3 *gas oksigen pada keadaan bilik?*
[*Isipadu molar gas* = 24 dm^3mol^{-1} *pada keadaan bilik*]

A 0.01

B 0.02

C 0.04

D 0.05

11 Which of the following pairs is correct?

Antara pasangan berikut, yang manakah benar?

	Compound *Sebatian*	**Formula** *Formula*
A	Ammonium sulphate *Ammonium sulfat*	NH_4SO_4
B	Phosphoric acid *Asid fosforik*	H_3PO_4
C	Zinc hydroxide *Zink hidroksida*	ZnOH
D	Silver nitrate *Argentum nitrat*	Ag_2NO_3

12 The following shows the properties of element X:

Berikut menunjukkan sifat-sifat unsur X:

- Soft
  Lembut
- Reacts with water to produce X hydroxide
  Bertindak balas dengan air untuk menghasilkan hidroksida X

What is element X?

Apakah unsur X?

A Potassium
Kalium

B Vanadium
Vanadium

C Magnesium
Magnesium

D Aluminium
Aluminium

13 Which of the following is **not** property of transition elements?

*Antara berikut yang manakah **bukan** sifat unsur peralihan?*

A Has high melting and boiling points
Mempunyai takat lebur dan takat didih yang tinggi

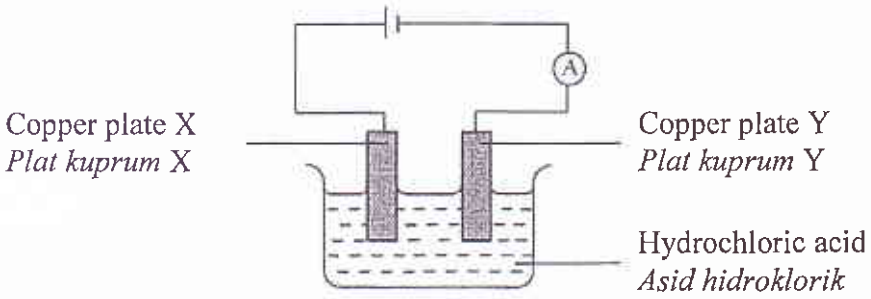
B Formed coloured compound
Membentuk sebatian berwarna

C Ductile and malleable
Mulur dan ditempa

D Has low density
Mempunyai ketumpatan yang rendah

14 The diagram shows an electrolytic cell.

Rajah menunjukkan suatu sel elektrolisis.



Which of the following half equations represent the reaction occurs at copper plate X?

Antara persamaan-persamaan setengah berikut, yang manakah mewakili tindak balas yang berlaku pada plat kuprum X?

A $Cu \rightarrow Cu^{2+} + 2e$

B $Cu^{2+} + 2e \rightarrow Cu$

C $2H^{+} + 2e \rightarrow H_2$

D $4OH^{-} \rightarrow O_2 + 2H_2O + 4e$

15 Which substance is an electrolyte?

Sebatian yang manakah adalah suatu elektrolit?

A Hydrogen chloride gas
Gas hidrogen klorida

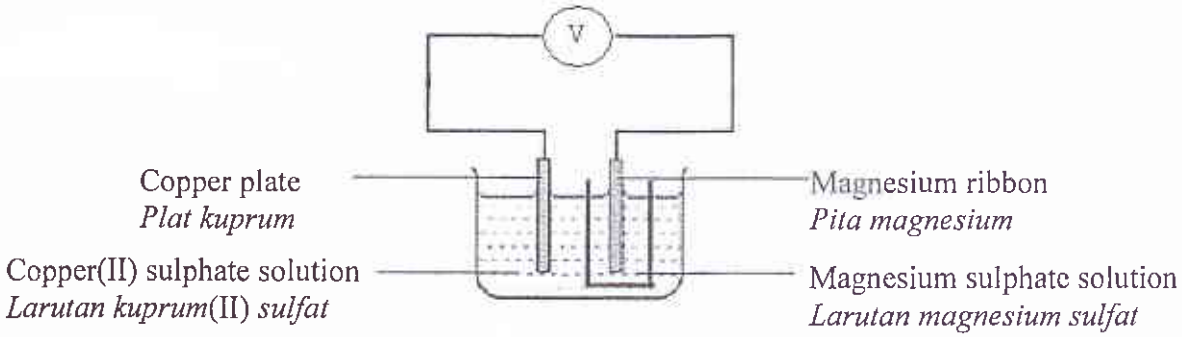
B Ammonia solution
Larutan ammonia

C Bromine liquid
Cecair bromin

D Molten lead
Leburan plumbum

16 The diagram shows a voltaic cell.

Rajah menunjukkan suatu sel kimia.



Which statement is true?

Penyataan manakah benar?

A Electrons flow from magnesium ribbon to copper plate through external circuit
Elektron mengalir dari pita magnesium ke plat kuprum melalui litar luar

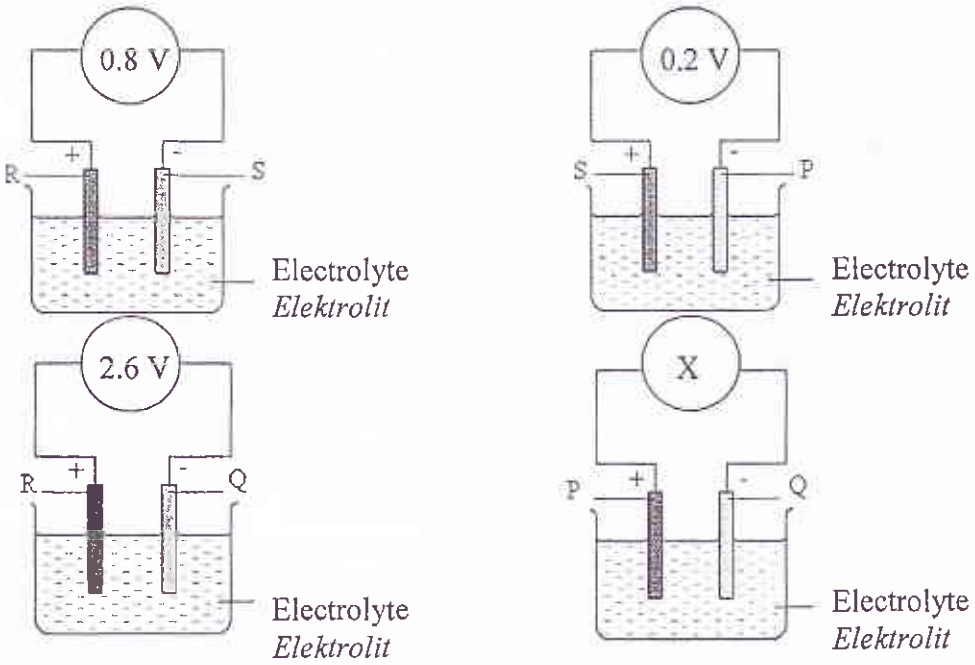
B The half equation for the reaction at magnesium ribbon is $Mg^{2+} + 2e \rightarrow Mg$
Persamaan setengah bagi tindak balas pada pita magnesium ialah
$Mg^{2+} + 2e \rightarrow Mg$

C The colour of copper(II) sulphate solution remains blue
Warna larutan kuprum(II) sulfat kekal biru

D Hydrogen and oxygen gas are produced
Gas hidrogen dan gas oksigen terhasil

17 The diagrams show four voltaic cells, with their voltmeter readings.

Rajah menunjukkan empat sel kimia ringkas dengan bacaan voltmeter.



Referring to the voltmeter readings, what is the value of X?

Merujuk kepada bacaan voltmeter, apakah nilai X?

A 1.6

B 1.8

C 2.4

D 3.6

18 Which property is true about ionic compound?

Yang manakah benar tentang sifat sebatian ion?

A Can conduct electricity
Boleh mengkonduksi elektrik

B Soluble in tetrachloromethane
Larut dalam tetraklorometana

C Exists as a solid at room temperature
Wujud sebagai pepejal pada suhu bilik

D Particles held together by van der Waals forces
Zarah-zarah ditarik bersama oleh daya tarikan van der Waals

19 Which substance is a covalent compound?

Bahan yang manakah satu sebatian kovalen?

A Sodium oxide
Natrium oksida

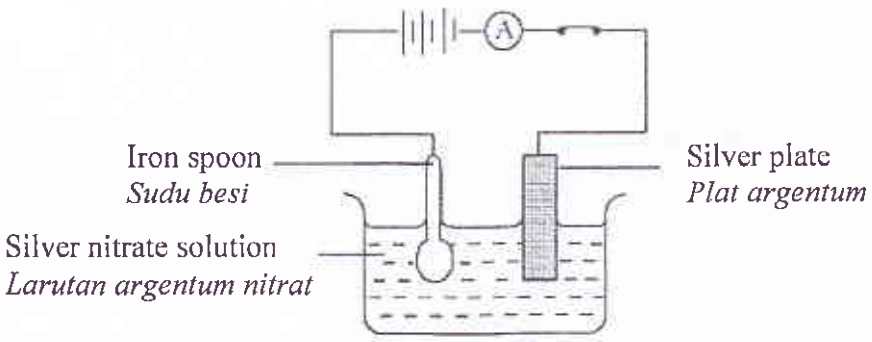
B Lead(II) oxide
Plumbum(II) *oksida*

C Sulphur dioxide
Sulfur dioksida

D Copper(II) oxide
Kuprum(II) *oksida*

20 The diagram shows the apparatus set-up to electroplate an iron spoon with silver.

Rajah menunjukkan susunan radas bagi proses penyaduran sudu besi dengan argentum.



What should be done to the apparatus set-up to enable the electroplating process occurs?

Apakah yang perlu dilakukan ke atas susunan radas tersebut supaya proses penyaduran berlaku?

A Replace silver nitrate solution with iron(II) chloride solution
Menggantikan larutan argentum nitrat dengan larutan ferum(II) klorida

B Reverse the terminal of the batteries
Terbalikkan terminal bateri

C Replace silver plate with carbon rod
Menggantikan plat argentum dengan rod karbon

D Increase the current supply
Meningkatkan bekalan arus

21 The following shows the properties of substance Z.

Berikut menunjukkan sifat-sifat bagi bahan Z.

- Turns moist blue litmus paper to red.
  Menukar kertas litmus biru lembap kepada merah.
- Conducts electricity when dissolves in water.
  Boleh menkonduksikan elektrik apabila larut dalam air.

What is X?

Apakah X?

A Oxygen gas
Gas oksigen

B Nitrogen gas
Gas nitrogen

C Ammonia gas
Gas ammonia

D Hydrogen chloride gas
Gas hidrogen klorida

22 The following solutions have same concentration.
Which solution has the highest pH value?

Larutan yang berikut mempunyai kepekatan yang sama.
Larutan yang manakah mempunyai nilai pH yang paling tinggi?

A Nitric acid
Asid nitrik

B Ethanoic acid
Asid etanoik

C Sulphuric acid
Asid sulfurik

D Hydrochloric acid
Asid hidroklorik

23 Which of the following sodium hydroxide solution can neutralise 20 cm^3 of 0.5 mol dm^{-3} sulphuric acid?

Antara larutan natrium hidroksida berikut, yang manakah akan meneutralkan 20 cm^3 0.5 mol dm^{-3} *asid sulfurik*?

A 20 cm^3 of 0.5 mol dm^{-3} sodium hydroxide solution
20 cm^3 0.5 mol dm^{-3} *larutan natrium hidroksida*

B 10 cm^3 of 0.5 mol dm^{-3} sodium hydroxide solution
10 cm^3 0.5 mol dm^{-3} *larutan natrium hidroksida*

C 40 cm^3 of 1.0 mol dm^{-3} sodium hydroxide solution
40 cm^3 1.0 mol dm^{-3} *larutan natrium hidroksida*

D 20 cm^3 of 1.0 mol dm^{-3} sodium hydroxide solution
20 cm^3 1.0 mol dm^{-3} *larutan natrium hidroksida*

24 Which is a soluble salt?

Yang manakah suatu garam terlarut?

A Copper(II) carbonate
Kuprum(II) *karbonat*

B Lead(II) sulphate
Plumbum(II) *sulfat*

C Silver chloride
Argentum klorida

D Iron(II) nirate
Ferum(II) *nitrat*

25 Which reagents can differentiate zinc sulphate and zinc chloride solution?

Reagen yang manakah dapat membezakan larutan zink sulfat and larutan zink klorida?

A Barium nitrate
Barium nitrat

B Lead(II) nitrate
Plumbum(II) *nitrat*

C Potassium nirate
Kalium nitrat

D Copper(II) nitrate
Kuprum(II) *nitrat*

26 The diagram shows the steps involved in manufacturing of sulphuric acid.

Rajah menunjukkan langkah-langkah yang terlibat semasa menghasilkan asid sulfurik.

$S \rightarrow SO_2 \rightarrow SO_3 \rightarrow Y \rightarrow$ Sulphuric Acid

What is Y?

Apakah Y?

A H_2SO_3

B H_2SO_4

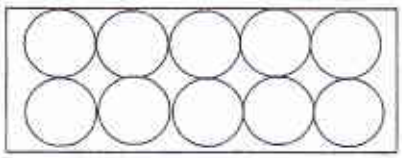
C $H_2S_2O_7$

D $H_2S_2O_3$

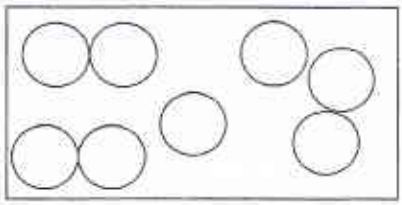
27 Which diagram shows the arrangement of particles in an alloy?

Rajah yang manakah menunjukkan susunan zarah dalam aloi?

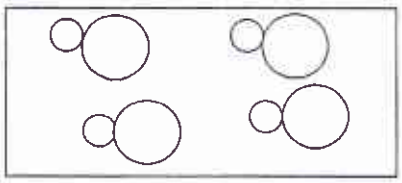
A



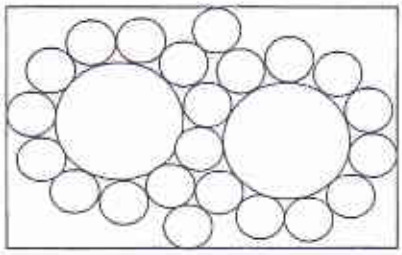
B



C



D



28 The diagram shows a vase made of glass.

Rajah menunjukkan pasu bunga yang diperbuat daripada kaca.

Which type of glass is used ?

Apakah jenis kaca yang digunakan?

A Fused glass
Kaca silika terlakur

B Soda-lime glass
Kaca soda kapur

C Lead crystal glass
Kaca plumbum

D Borosilicate glass
Kaca borosilikat

29 Which substance is a composite material?

Sebatian yang manakah merupakan bahan komposit?

A Ceramic
Seramik

B Polythene
Politena

C Fiber glass
Kaca fiber

D Stainless steel
Keluli nirkarat

30 The table shows the volume and concentration of hydrochloric acids react with an excess of zinc in Experiment P, Q and R.

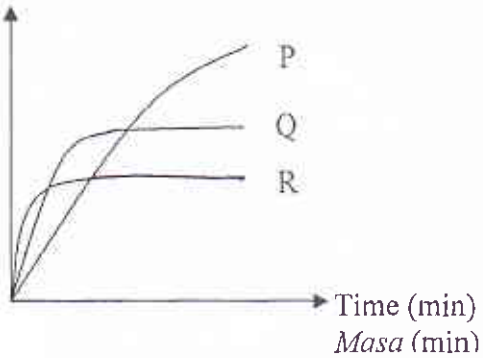
Jadual menunjukkan isipadu dan kepekatan asid hidroklorik yang bertindak balas dengan zink berlebihan dalam Eksperimen P, Q *dan* R.

Experiment *Eksperimen*	**Hydrochloric acid** *Asid hidroklorik*
P	25 cm^3 hydrochloric acid 2.0 mol dm^{-3} 25 cm^3 *asid hidroklorik* 2.0 mol dm^{-3}
Q	50 cm^3 hydrochloric acid 1.5 mol dm^{-3} 50 cm^3 *asid hidroklorik* 1.5 mol dm^{-3}
R	150 cm^3 hydrochloric acid 1.0 mol dm^{-3} 150 cm^3 *asid hidroklorik* 1.0 mol dm^{-3}

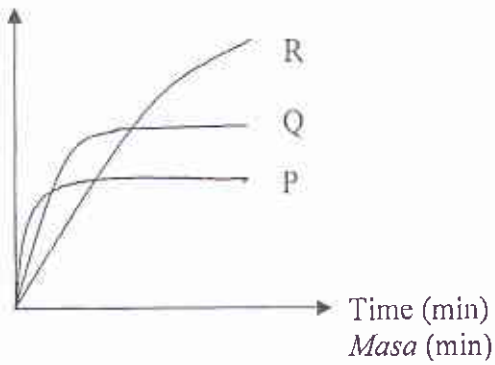
Which graph represents the results of the experiments correctly?

Graf yang manakah mewakili keputusan eksperimen dengan betul?

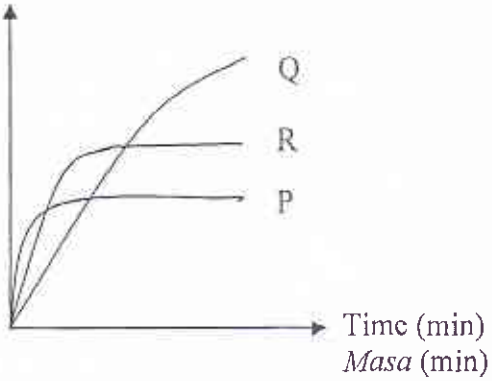
A Volume of carbon dioxide gas (cm^3)
Isipadu gas karbon dioksida (cm^3)



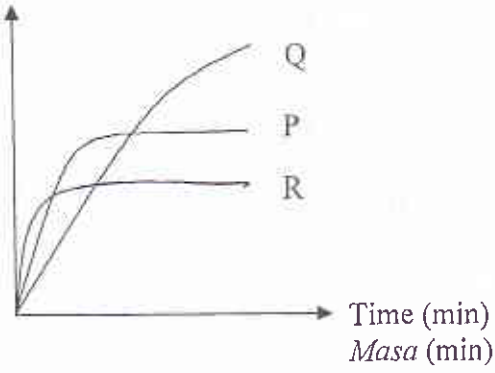
B Volume of carbon dioxide gas (cm^3)
Isipadu gas karbon dioksida (cm^3)



C Volume of carbon dioxide gas (cm^3)
Isipadu gas karbon dioksida (cm^3)



D Volume of carbon dioxide gas (cm^3)
Isipadu gas karbon dioksida (cm^3)



31 Which factor **does not** affect the rate of reaction?

*Faktor yang manakah **tidak** akan mempengaruhi kadar tindak balas?*

A Concentration of the solution
Kepekatan larutan

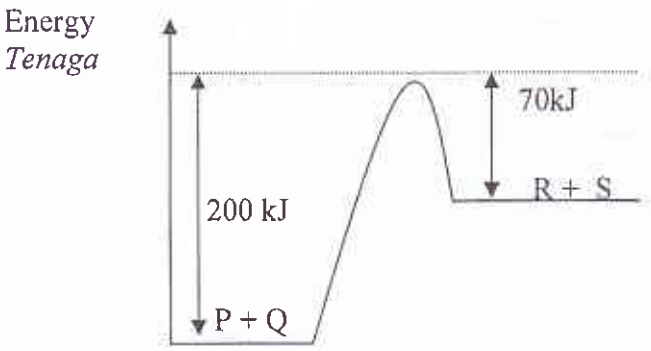
B Size of the solid reactant
Saiz pepejal bahan tindak balas

C The presence of catalyst
Kehadiran mangkin

D Volume of the solution
Isipadu larutan

32 The energy profile diagram is shown below.

Di bawah menunjukkan rajah profil tenaga.



Which statements is true?

Pernyataan manakah yang benar?

A The heat of reaction is 70 kJ
Haba tindak balas ialah 70 kJ

B The activation energy is 200 kJ
Tenaga pengaktifan ialah 200 kJ

C Total energy content in R and S is higher than in P and Q
Jumlah kandungan tenaga di R *dan* S *adalah lebih tinggi daripada di* P *dan* Q

D Heat is released when P reacts with Q to produce R and S
Haba dibebaskan semasa P *bertindak balas dengan* Q *untuk menghasilkan* R *dan* S

33 Which statement is true about the effect on the reacting particles when the temperature is increases, based on the collision theory?

Pernyataan manakah yang benar tentang kesan ke atas zarah-zarah bahan tindak balas apabila suhu bertambah, berdasarkan teori perlanggaran?

A The number of the particles per one unit of volume decreases
Bilangan zarah-zarah per unit isipadu menurun

B The frequency of the collision between particles increases
Frekuensi perlanggaran di antara zarah-zarah meningkat

C The total surface area of the particles increases
Jumlah luas permukaan zarah-zarah meningkat

D The kinetic energy of the particles decreases
Tenaga kinetik zarah-zarah menurun

34 The equation represents fermentation process.

Persamaan berikut mewakili proses penapaian.

$$\mathbf{X} \xrightarrow[\textit{Yis}]{\text{Yeast}} \mathbf{ethanol} + \mathbf{Y}\ (\textit{etanol})$$

What is X and Y?

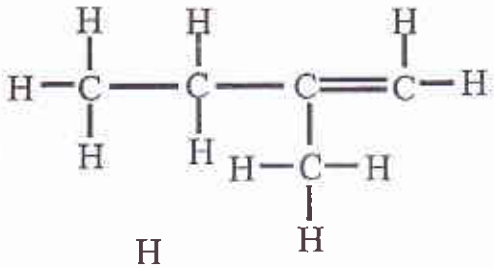
Apakah X *dan* Y?

	Substances fermented ***Bahan yang ditapai***	**Gas evolved during fermentation** ***Gas yang dibebaskan semasa penapaian***
A	Glucose *Glukosa*	Carbon dioxide gas *Gas karbon dioksida*
B	Hydrocarbons *Hidrokarbon*	Oxygen gas *Gas oksigen*
C	Glucose *Glukosa*	Oxygen gas *Gas oksigen*
D	Hydrocarbons *Hidrokarbon*	Carbon dioxide gas *Gas karbon dioksida*

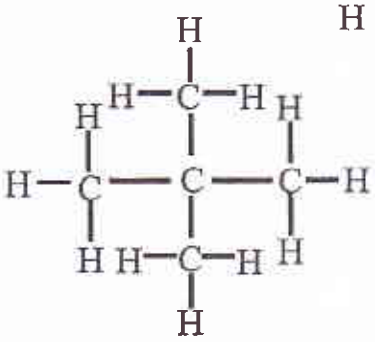
35 Which structural formulae are isomer of pentane?

Formula struktur manakah adalah isomer bagi pentana?

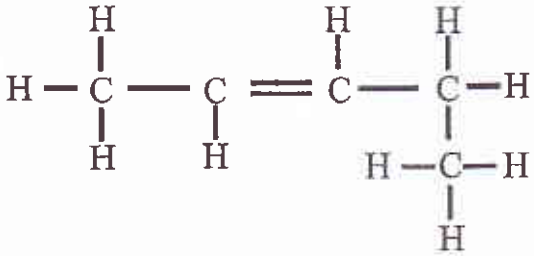
I



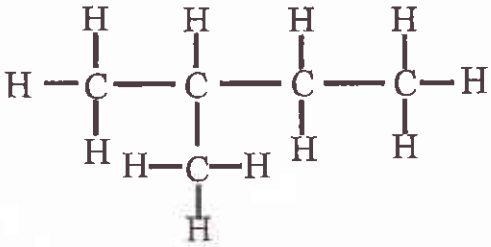
II



III



IV



A I and II
I *dan* II

B I and III
I *dan* III

C II and IV
II *dan* IV

D III and IV
III *dan* IV

36 The table shows four different types of esters produced by reacting certain alcohols with different carboxylic acids.

Jadual menunjukkan empat jenis ester berlainan yang dihasilkan melalui tindak balas antara alkohol tertentu dengan asid karboksilik yang berbeza.

Ester *Ester*	**Alcohol** *Alkohol*	**Carboxylic acid** *Asid karboksilik*
P	Methanol, CH_3OH *Methanol*, CH_3OH	Butanoic acid, C_3H_7COOH *Asid butanoik*, C_3H_7COOH
Q	Ethanol, C_2H_5OH *Etanol*, C_2H_5OH	Methanoic acid, HCOOH *Asid metanoik*, HCOOH
R	Propanol, C_3H_7OH *Propanol*, C_3H_7OH	Ethanoic acid, CH_3COOH *Asid etanoik*, CH_3COOH
S	Butanol, C_4H_9OH *Butanol*, C_4H_9OH	Propanoic acid, C_2H_5COOH *Asid propanoik*, C_2H_5COOH

Which pair of esters has the same molecular formula?

Pasangan ester yang manakah mempunyai formula molekul yang sama?

A P and R
P *dan* R

B R and S
R *dan* S

C P and Q
P *dan* Q

D Q and S
Q *dan* S

37 What is the purpose of adding formic acid in latex?

Apakah tujuan menambah asid formic ke dalam lateks?

A To preserve latex
Untuk mengawet lateks

B To coagulate latex
Untuk menggumpalkan lateks

C To improve the quality of latex
Untuk menambah baik kualiti lateks

D To prevent coagulation of latex
Untuk mencegah penggumpalan lateks

38 Methane gas can cause greenhouse effect.
Which process releases methane gas into the air?

Gas m*etana boleh menyebabkan kesan rumah hijau.*
Proses yang manakah membebaskan gas metana ke udara?

A Combustion of petrol
Pembakaran petrol

B Volcanic activity
Aktiviti gunung berapi

C Decay of plants
Reputan tumbuh-tumbuhan

D Photosynthesis
Fotosintesis

39 The following is a half equation of an oxidation.

Berikut adalah persamaan setengah bagi satu pengoksidaan.

$$2Cl^- \longrightarrow Cl_2 + 2e$$

Based on the equation, which statement is true?

Berdasarkan kepada persamaan itu, pernyataan yang manakah benar?

A Oxidation number of chlorine decreases
Nombor pengoksidaan klorin berkurang

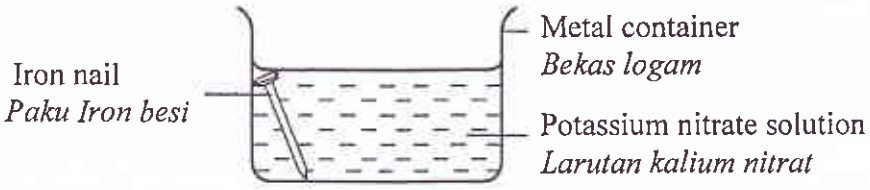
B Chloride ion is an oxidising agent
Ion klorida ialah agen pengoksidaan

C Chlorine atoms receive electrons
Atom klorin menerima elektron

D Chloride ions donate electrons
Ion klorida menderma elektron

40 The diagram shows an apparatus set-up for an experiment to study the corrosion of iron.

Rajah menunjukkan susunan radas bagi satu eksperimen untuk mengkaji kakisan besi.



Which metal container causes iron nail corrodes at the lowest rate?

Bekas logam yang manakah menyebabkan paku besi terkakis pada kadar yang paling rendah?

A Aluminium
Aluminium

B Copper
Kuprum

C Zinc
Zink

D Tin
Stanum

41 Cassiterite is an ore of tin. The main mineral in the ore is tin oxide.
Which substance can be used to extract tin from its ore?

Kasiterit ialah bijih bagi stanum. Bahan mineral utama dalam bijih ini ialah stanum oksida.
Bahan yang manakah boleh digunakan untuk mengekstrak stanum dari bijihnya?

A Iron
Ferum

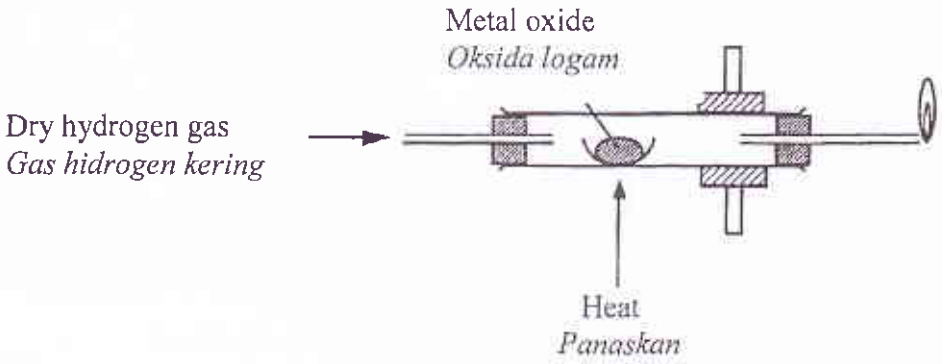
B Coke
Kok

C Carbon dioxide
Karbon dioksida

D Aluminium oxide
Aluminium oksida

42 The diagram shows an apparatus set-up of heating metal oxide in hydrogen gas.

Rajah menunjukkan susunan radas bagi pemanasan oksida logam dalam gas hidrogen.



Which of the following metal oxide **does not** reacts with hydrogen gas?
*Antara oksida logam berikut, yang manakah **tidak** bertindak balas dengan gas hidrogen?*

A Tin oxide
Stanum oksida

B Iron(II) oxide
Ferum(II) *oksida*

C Copper(II) oxide
Kuprum(II) *oksida*

D Aluminium oxide
Aluminium oksida

43 Which of the following solid substances when dissolved in water produced an exothermic reaction?

Antara bahan pepejal berikut, yang manakah akan menghasilkan tindak balas eksotermik apabila larut dalam air?

A Potassium nitrate
Kalium nitrat

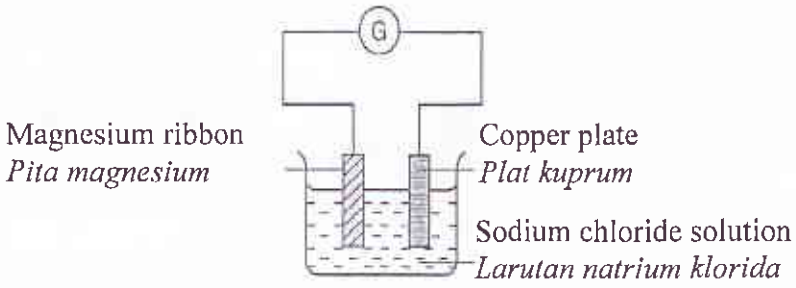
B Ammonium nitrate
Ammonium nitrat

C Sodium hydroxide
Natrium hidroksida

D Ammonium sulphate
Ammonium sulfat

44 The diagram shows a voltaic cell.

Rajah menunjukkan satu sel kimia.



Based on the cell, which statement is true?

Berdasarkan kepada sel ini, pernyataan yang manakah betul?

A Copper undergoes oxidation
Kuprum mengalami pengoksidaan

B Magnesium is a reducing agent
Magnesium ialah agen penurunan

C Oxidation number of sodium decrease
Nombor pengoksidaan natrium berkurangan

D Copper donates electrons to magnesium
Kuprum menderma elektron kepada magnesium

45 Excess of magnesium powder is added into 50 cm^3 of 0.5 mol dm^{-3} iron(II) chloride solution. Temperature increases from 30°C to 54°C.
What is the heat of displacement of iron?
[Specific heat capacity of solution = 4.2 J g^{-1} $°C^{-1}$; Density of solution = 1 g cm^{-3}]

Serbuk magnesium berlebihan ditambah ke dalam 50 cm^3 0.5 mol dm^{-3} *larutan ferum*(II) *klorida. Suhu meningkat dari* 30°C ke 54°C.
Apakah haba penyesaran bagi ferum?
[*Muatan haba tentu larutan* = 4.2 J g^{-1} $°C^{-1}$; *Ketumpatan larutan* = 1 g cm^{-3}]

A - 126.0 kJ mol^{-1}

B - 201.6 kJ mol^{-1}

C - 283.5 kJ mol^{-1}

D - 453.6 kJ mol^{-1}

46 The equation shows the thermochemical equation for a neutralisation.

Persamaan menunjukkan persamaan termokimia bagi suatu peneutralan.

$$NaOH + HCl \rightarrow NaCl + H_2O \qquad \Delta H = -57 \text{ kJ mol}^{-1}$$

100 cm^3 of 2.0 mol dm^{-3} sodium hydroxide solution is added to 100 cm^3 of 2.0 mol dm^{-3} hydrochloric acid.
What is the heat released in the reaction?

100 cm^3 2.0 mol dm^{-3} *larutan natrium hidroksida ditambah ke dalam* 100 cm^3 2.0 mol dm^{-3} *asid hidroklorik.*
Apakah haba yang dihasilkan dalam tindak balas ini?

A 22.80 kJ

B 11.40 kJ

C 7.01 kJ

D 3.50 kJ

47 The fuel value of methanol is 22.75 kJ g^{-1}.
Which statement is true?
[Molar mass of methanol = 32 g mol^{-1}]

Nilai bahan api metanol ialah 22.75 kJ g^{-1}.
Pernyataan yang manakah benar?
[*Jisim molar metanol* = 32 g mol^{-1}]

A Heat combution of methanol is 728 kJ mol^{-1}
Haba pembakaran metanol ialah 728 kJ mol^{-1}

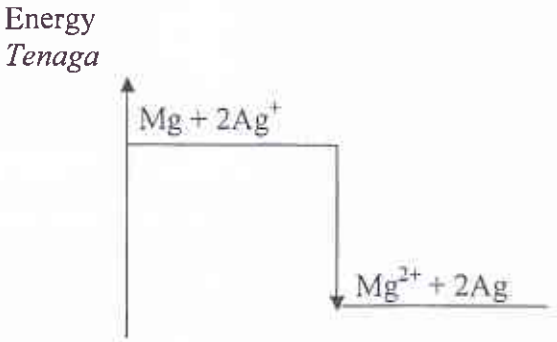
B One gram of methanol releases 728 kJ of heat
Satu gram metanol membebaskan 728 kJ *haba*

C One mole of methanol releases 22.75 kJ of heat
Satu mol metanol membebaskan 22.75 kJ *haba*

D Methanol releases 22.75 kJ of heat when burnt in one gram oxygen.
Metanol menghasilkan 22.75 kJ *haba apabila dibakar dalam satu gram oksigen*

48 The energy level diagram for the reaction between magnesium and silver ion is shown below.

Rajah aras tenaga bagi tindak balas antara magnesium dan ion argentum ditunjukkan di bawah.



Which of following information can be obtained from the energy level diagram?

Antara maklumat berikut, yang manakah boleh diperolehi dari rajah aras tenaga?

A The reaction is endothermic
Tindak balas ini ialah endotermik

B The temperature of mixture decreases.
Suhu campuran itu menurun

C Heat of reaction = (Total energy content of $Mg + 2Ag^+$) – (Total energy content of $Mg^{2+} + 2Ag$)
Haba tindak balas = (*Jumlah kandungan tenaga* $Mg + 2Ag^+$) – (*Jumlah kandungan tenaga* $Mg^{2+} + 2Ag$)

D The total energy content in magnesium and silver ion is higher than the total energy in magnesium ion and silver
Jumlah kandungan tenaga dalam magnesium dan ion argentum adalah lebih tinggi dari jumlah tenaga dalam ion magnesium dan argentum

49 Which of the following diseases can be treated effectively with antibiotics?

Antara penyakit-penyakit berikut, yang manakah boleh dirawat secara berkesan dengan antibiotik?

A Malaria
Malaria

B Hepatitis B
Hepatitis B

C Denggi fever
Demam denggi

D Tuberculosis
Batuk kering

50 Which substances is **not** used for the preparation of soaps?

*Antara bahan berikut, yang manakah **tidak** digunakan untuk penyediaan sabun?*

A Vegetable oil
Minyak sayur-sayuran

B Sodium chloride solution
Larutan natrium klorida

C Concentrated sulphuric acid
Asid sulfurik pekat

D Concentrated sodium hydroxide solution
Larutan natrium hidroksida pekat

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

INFORMATION FOR CANDIDATES
MAKLUMAT UNTUK CALON

1. This question paper consists of **50** questions.

   Kertas soalan ini mengandungi **50** *soalan.*

2. Answer **all** questions.

   Jawab ***semua*** *soalan.*

3. Each question is followed by four alternative answers, **A**, **B**, **C** or **D**. For each question, choose **one** answer only. Blacken your answer on the objective answer sheet provided.

   Tiap-tiap soalan diikuti oleh empat pilihan jawapan, iaitu **A**, **B**, **C** dan **D**. *Bagi setiap soalan, pilih* **satu** *jawapan sahaja. Hitamkan jawapan anda pada kertas jawapan objektif yang disediakan.*

4. If you wish to change your answer, erase the blackened mark that you have made. Then blacken the new answer.

   Jika anda hendak menukar jawapan, padamkan tanda yang telah dibuat. Kemudian hitamkan jawapan yang baru.

5. The diagrams in the questions are not drawn to scale unless stated.

   Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.

6. You may use a scientific calculator.

   Anda dibenarkan menggunakan kalkulator saintifik.

SULIT

Name : ..... Class : .....

4541/2
CHEMISTRY
Kertas 2
Ogos/Sept. **MAJLIS PENGETUA SEKOLAH MENENGAH MALAYSIA**
$2\frac{1}{2}$ jam **CAWANGAN NEGERI SEMBILAN**

PEPERIKSAAN PERCUBAAN BERSAMA
SIJIL PELAJARAN MALAYSIA 2011

CHEMISTRY

Kertas 2

Dua jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

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

Untuk Kegunaan Pemeriksa			
Kod Pemeriksa:			
Bahagian	Soalan	Markah Penuh	Markah Diperoleh
A	1	9	
	2	10	
	3	10	
	4	11	
	5	11	
	6	9	
B	7	20	
	8	20	
C	9	20	
	10	20	
Jumlah			

Kertas soalan ini mengandungi 31 halaman bercetak dan 1 halaman tidak bercetak

Section A
Bahagian A

[60 marks]
[60 *markah*]

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

1 Diagram 1 represents the structure of an atom P of an element.

Rajah 1 *menunjukkan struktur atom* P *bagi satu unsur.*

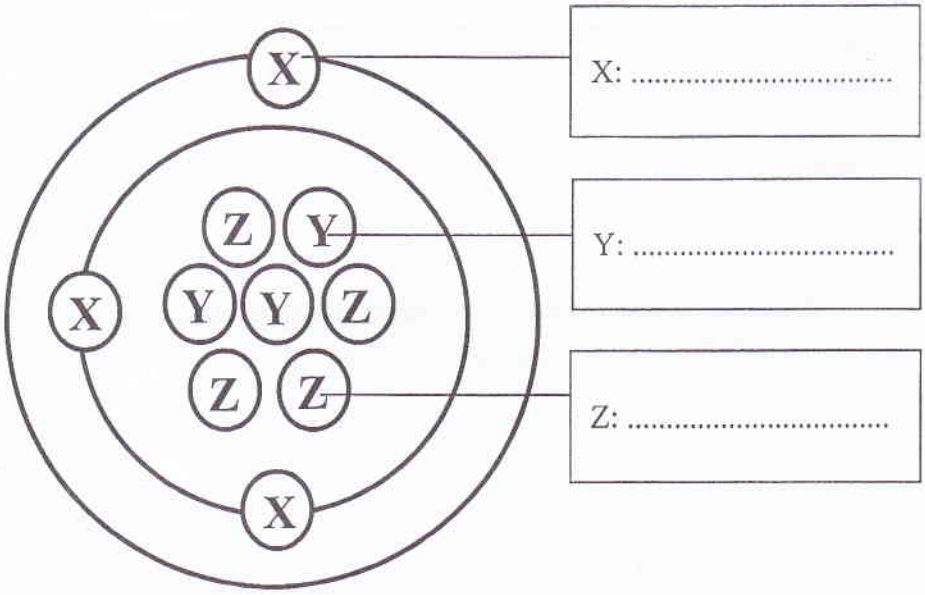


Diagram 1

Rajah 1

(a) (i) Referring to Diagram 1, name the subatomic particles.
Write your answer in the spaces provided.

Merujuk kepada Rajah 1, namakan zarah subatom
Tuliskan jawapan dalam ruang yang disediakan

[3 marks]
[3 *markah*]

(ii) State two subatomic particles that have the same mass.

Nyatakan dua zarah subatom yang mempunyai jisim yang sama.

.....

[1 mark]
[1 *markah*]

(iii) State the proton number and nucleon number of atom P.

Nyatakan nombor proton dan nombor nukleon bagi atom P.

Proton number : .....

Nombor proton

Nucleon number : .....

Nombor nukleon

[2 marks]
[2 *markah*]

(iv) Write the standard representation for an atom of element P.

Tuliskan perwakilan piawai bagi atom unsur P.

.....

[1 mark]
[1 *markah*]

(b) There are two types of isotopes, the radioactive and the non-radioactive isotopes.

Terdapat dua jenis isotop, radioaktif dan bukan radioaktif.

(i) State **one** example of radioactive isotope.

*Nyatakan **satu** contoh isotop yang radioaktif.*

.....

[1 mark]
[1 *markah*]

(ii) Based on your answer in b(i), state one uses of radioactive isotope.

Berdasarkan kepada jawapan anda di (b)(i), nyatakan satu kegunaan isotop yang radioaktif.

.....

[1 mark]
[1 *markah*]

2 Diagram 2 shows a list of substances.
Rajah 2 menunjukkan satu senarai bahan.

- Hydrochloric acid
  Asid hidroklorik
- Sulphuric acid
  Asid sulfurik
- Ethanoic acid
  Asid etanoik
- Potassium hydroxide
  Kalium hidroksida
- Substance X
  Bahan X

Diagram 2

Rajah 2

(a) State the meaning of acid.

Nyatakan maksud asid.

.....

[1 mark]
[*1 markah*]

(b) Sulphuric acid reacts with potassium hydroxide solution to form Substance X.

Asid sulfurik bertindak balas dengan larutan kalium hidroksida membentuk Bahan X.

(i) Name the reaction.

Namakan tindak balas ini.

.....

[1 mark]
[1 *markah*]

(ii) Name substance X.

Namakan bahan X.

.....

[1 mark]
[1 *markah*]

(iii) Write a balanced chemical equation for this reaction.

Tuliskan persamaan kimia seimbang bagi tindak balas ini.

.....

[2 marks]
[2 *markah*]

(c) Table 2 shows the pH value of 1 mol dm^{-3} of hydrochloric acid and 1 mol dm^{-3} of ethanoic acid.

Jadual 2 *menunjukkan nilai* pH *bagi* 1 mol dm^{-3} *asid hidroklorik dan* 1 mol dm^{-3} *asid etanoik.*

Acid *Asid*	pH Value *Nilai* pH
Hydrochloric acid *Asid hidroklorik*	.....
Ethanoic acid *Asid etanoik*	5

Table 2

Jadual 2

(i) Predict the pH value of hydrochloric acid.
Write your answer in the space provided in Table 2.

Ramalkan nilai pH *bagi asid hidroklorik.*
Tuliskan jawapan anda pada ruangan yang disediakan dalam Jadual 2.

[1 mark]
[1 *markah*]

(ii) Explain why the pH value of hydrochloric acid and ethanoic acid are different.

Terangkan mengapa nilai pH *bagi asid hidroklorik dan asid etanoik adalah berbeza.*

.....

.....

.....

.....

.....

[4 marks]
[4 *markah*]

3 An experiment is carried out to determine the relative position of three metals, P, Q and R, in the electrochemical series. Diagram 3 shows the results of the experiment.

Satu eksperimen dijalankan untuk menentukan kedudukan relatif bagi tiga logam, P, Q *dan* R *dalam siri elektrokimia. Rajah* 3 *menunjukkan keputusan bagi eksperimen tersebut.*

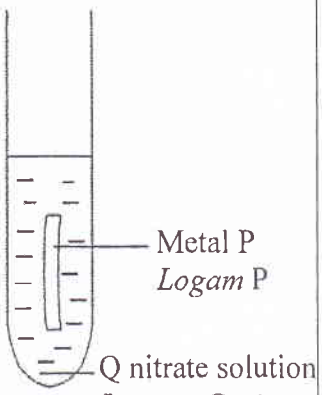
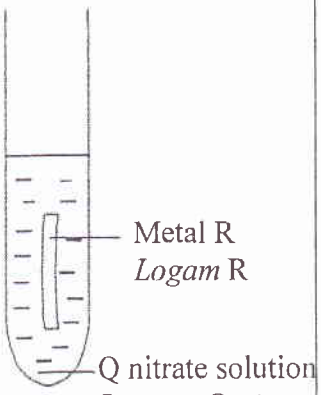
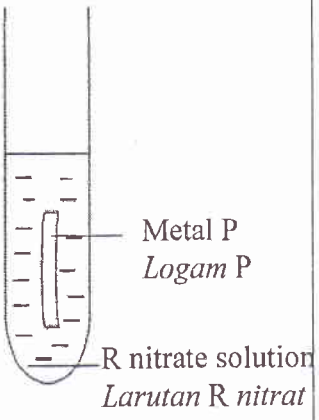
Experiment *Eksperimen*	**I**	**II**	**III**
Apparatus set-up *Susunan radas*			
Reaction *Tindak balas*	**Occurred** *Berlaku*	**Occurred** *Berlaku*	**Does not occur** *Tidak berlaku*

Diagram 3
Rajah 3

(a) Based on the results, arrange the three metals P, Q and R in order of decreasing electropositivity.

Berdasarkan kepada keputusan, susun tiga logam P,Q *dan* R *tersebut mengikut tertib menurun keelektropositifannya.*

.....

[1 mark]
[1 *markah*]

(b) Metal P is copper.
Based on Experiment I,

Logam P *adalah kuprum.*
Berdasarkan Eksperimen I,

(i) name Q nitrate solution.

namakan larutan Q *nitrat.*

.....

[1 mark]
[1 *markah*]

(ii) write the ionic equation for the reaction.

tuliskan persamaan ion bagi tindak balas ini.

.....

[2 marks]
[2 *markah*]

(iii) state **one** observation.

nyatakan ***satu*** *pemerhatian.*

.....

[1 mark]
[1 *markah*]

(c) Explain why there is no reaction occurs in Experiment III.

Terangkan mengapa tiada tindak balas berlaku dalam Eksperimen III.

.....

.....

[2 marks]
[2 *markah*]

(d) (i) Draw a labelled diagram of a simple voltaic cell using metal P and Q as electrode.

Lukiskan satu gambarajah berlabel satu sel kimia ringkas dengan menggunakan logam P *dan* Q *sebagai elektrod.*

[2 marks]
[*2 markah*]

(ii) State the positive terminal of the voltaic cell in (d) (i).

Nyatakan terminal positif bagi sel kimia dalam (d) (i).

.....

[1 mark]
[1 *markah*]

4 Two experiments are carried out to investigate the rate of reaction of magnesium reacts with sulphuric acid.
Table 4 shows the results of Experiment I and II.

Dua eksperimen telah dijalankan untuk mengkaji kadar tindak balas bagi tindak balas antara magnesium dan asid sulfurik.
Jadual 4 menunjukkan keputusan Eksperimen I dan II.

Experiment ***Eksperimen***	**Reactant** ***Bahan tindak balas***	**Temperature/°C** ***Suhu /°C***	**Total volume of gas collected in 2 minutes /cm^3** ***Jumlah isi padu gas yang dikumpulkan dalam 2 minit /cm^3***
I	Excess magnesium powder + 20 cm^3 of 0.1 mol dm^{-3} sulphuric acid *Serbuk magnesium berlebihan* + 20 cm^3 0.1 mol dm^{-3} *asid sulfurik*	30	22.0
II	Excess magnesium powder + 20 cm^3 of 0.1 mol dm^{-3} sulphuric acid *Serbuk magnesium berlebihan* + 20 cm^3 0.1 mol dm^{-3} *asid sulfurik*	40	37.0

Table 4
Jadual 4

(a) Write the ionic equation for the reaction between magnesium and sulphuric acid.
Tuliskan persamaan ion bagi tindak balas magnesium dan asid sulfurik.

.....

[2 marks]
[2 *markah*]

(b) Calculate the average rate of the reaction for the first two minutes in $cm^3\ s^{-1}$.
Hitungkan kadar tindak balas purata bagi dua minit pertama dalam $cm^3\ s^{-1}$.

(i) Experiment I :
Eksperimen I :

(ii) Experiment II :
Eksperimen II :

[2 marks]
[2 *markah*]

(c) Calculate the maximum volume of gas produced in Experiment II.
[1 mol of gas occupies 24 dm^3 at room condition]

Hitungkan isipadu maksimum gas yang dibebaskan dalam Eksperimen II.
[1 mol *gas menempati* 24 dm^3 *pada keadaan bilik*]

[2 marks]
[2 *markah*]

(d) Sketch the graphs of the total volume of gas collected against time for Experiment I and Experiment II on the same axes.

Pada paksi yang sama, lakarkan graf isipadu gas yang terkumpul melawan masa untuk Eksperimen I *dan Eksperimen* II.

[2 marks]
[2 *markah*]

(e) Compare the rate of reaction between Experiment I and Experiment II.
Explain why there is a difference in the rate of reaction based on the collision theory.

Bandingkan kadar tindak balas antara Eksperimen I *dan Eksperimen* II.
Terangkan kenapa terdapat perbezaan kadar tindak balas itu berdasarkan teori perlanggaran.

.....

.....

.....

[3 marks]
[3 *markah*]

5 Diagram 5.1 shows the apparatus set-up for the heating of copper(II) carbonate.

Rajah 5.1 *menunjukkan susunan radas bagi pemanasan kuprum*(II) *karbonat.*

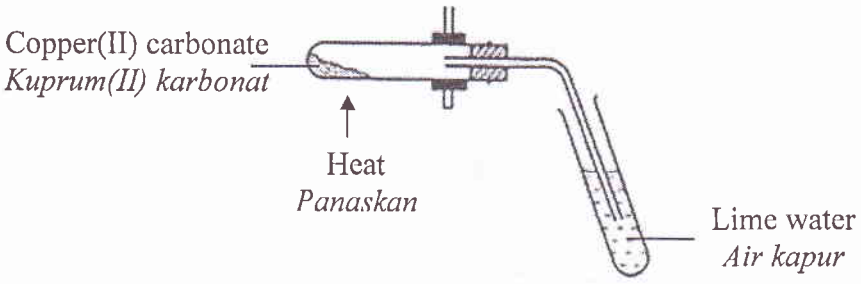


Diagram 5.1
Rajah 5.1

(a) State two changes that can be observed after the heating.

Nyatakan dua perubahan yang boleh diperhatikan selepas pemanasan.

.....

.....

[2 marks]
[2 *markah*]

(b) Write a balanced chemical equation for the heating reaction.

Tulis satu persamaan kimia yang seimbang bagi tindak balas pemanasan itu.

.....

[1 mark]
[1 markah]

(c) The residue of this heating is reacted with substance X to produce copper(II) sulphate solution. Name substance X.

Baki bagi pemanasan ini bertindak balas dengan sebatian X *untuk membentuk larutan kuprum*(II) *sulfat. Namakan sebatian* X.

.....

[1 mark]
[1 *markah*]

(e) Copper(II) sulphate solution produced in reaction (d) is an electrolyte.
Diagram 5.2 shows the apparatus set-up of two electrolytic cells.

Larutan kuprum(II) *sulfat yang dihasilkan dalam tindak balas di* (d) *ialah satu elektrolit.*
Rajah 5.2 *menunjukkan susunan radas bagi dua sel elektrolisis.*

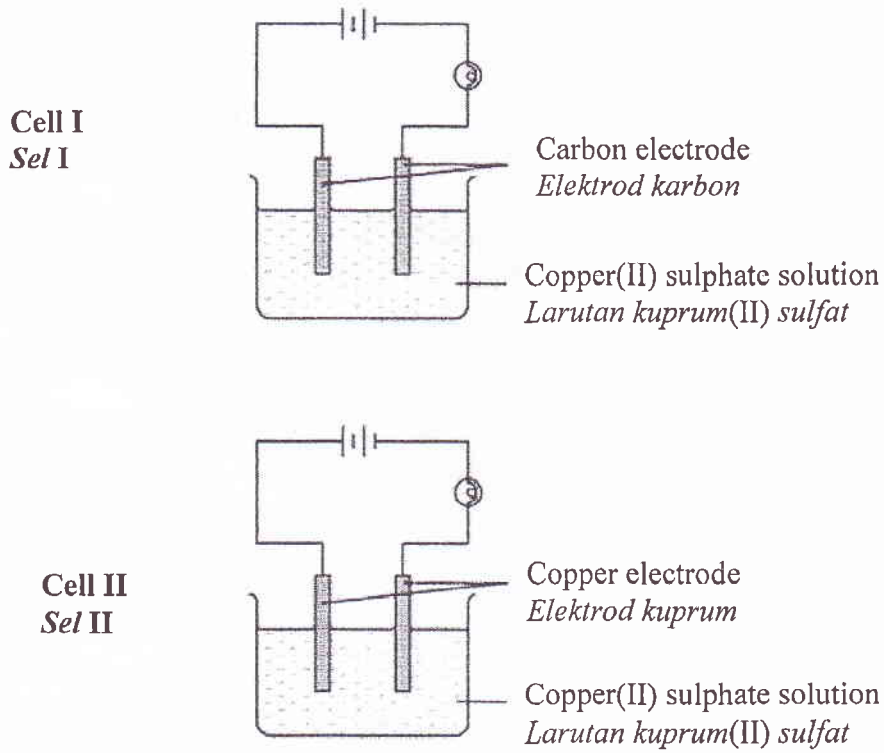


Diagram 5.2
Rajah 5.2

(i) State all the ions present in copper(II) sulphate solution.

Nyatakan semua ion yang hadir dalam larutan kuprum(II) sulfat.

.....

[1 mark]
[1 *markah*]

(ii) Based on the Diagram 5.2, complete Table 5.

Berdasarkan Diagram 5.2, *lengkapkan Jadual* 5.

Cell ***Sel***	**Product formed at the anode** ***Hasil terbentuk di anod***	**Factor affecting the product formed at the anode** ***Faktor yang mempengaruhi hasil terbentuk di anod***
I	.....	.....
II	.....	.....

Table 5
Jadual 5

[4 marks]
[4 *markah*]

(iii) The intensity of blue colour of copper(II) sulphate solution remain unchanged after a few hours.
Explain why.

Keamatan warna biru bagi larutan kuprum(II) sulfat kekal tidak berubah selepas beberapa jam.
Terangkan mengapa.

.....

.....

.....

[2marks]
[2 *markah*]

6 Diagram 6.1 shows the apparatus set-up of an experiment to determine the reactivity series of metals towards oxygen.

Rajah 6.1 menunjukkan susunan radas bagi satu eksperimen untuk menentukan siri kereaktifan logam terhadap oksigen.

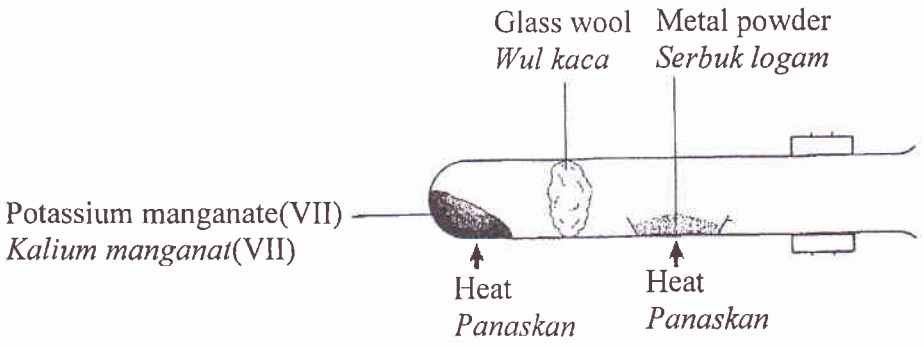


Diagram 6.1
Rajah 6.1

Table 6.1 shows the observation when different metals react with oxygen.
Letters W, X and Y represent three unknown metals.

Jadual 6.1 menunjukkan pemerhatian bagi logam berbeza yang telah bertindak balas dengan gas oksigen. Huruf W, X *dan* Y *mewakili tiga logam yang tidak diketahui.*

Experiment ***Eksperimen***	**Metal powder** ***Serbuk logam***	**Observation** ***Pemerhatian***
I	W	Burn brightly *Menyala terang*
II	X	Glow faintly *Membara malap*
III	Y	Glow brightly *Membara terang*
IV	Zinc *Zink*	Burn slowly *Menyala perlahan*

Table 6.1
Jadual 6.1

(a) State the function of
Nyatakan fungsi

(i) potassium manganate(VII)
kalium manganat(VII)

.....
[1 mark]
[1 *markah*]

(ii) glass wool
wul kaca

.....
[1 mark]
[1 *markah*]

(b) Based on Experiment IV:
Berdasarkan Eksperimen IV:

(i) Write a balanced chemical equation of the reaction.
Tuliskan persamaan kimia bagi tindak balas itu.

.....
[1 mark]
[1 *markah*]

(ii) State the change in oxidation number of zinc.
Nyatakan perubahan nombor pengoksidaan bagi zink.

.....
[1 mark]
[1 *markah*]

(c) Based on the observations in Table 6.1, arrange metals X, Y, Z and zinc in descending order of the reactivity towards oxygen.

Berdasarkan kepada pemerhatian di Jadual 6.1, *susunkan logam-logam* X, Y, Z *dan zink mengikut tertib menurun dalam kereaktifan terhadap oksigen.*

.....

[1 mark]
[1 *markah*]

(d) Carbon is placed between metal X and zinc in the reactivity series of metals.
Which metals can be extracted from their oxides by using carbon when heated together?

Mark (√) in the spaces provided in Table 6.2.

Karbon berada di antara logam X *dan zink dalam siri kereaktifan logam.*
Logam manakah boleh diekstrak daripada oksida logamnya dengan menggunakan karbon apabila dipanaskan bersama.

Tandakan (√) *dalam ruangan yang disediakan dalam Jadual* 6.2.

Metal *logam*			
W	X	Y	Zinc *Zink*

Table 6.2
Jadual 6.2

[1 mark]
[1 *markah*]

(d) Diagram 6.2 shows the extraction of iron in a blast furnace.

Rajah 6.2 *menunjukkan pengekstrakan besi dalam relau bagas.*

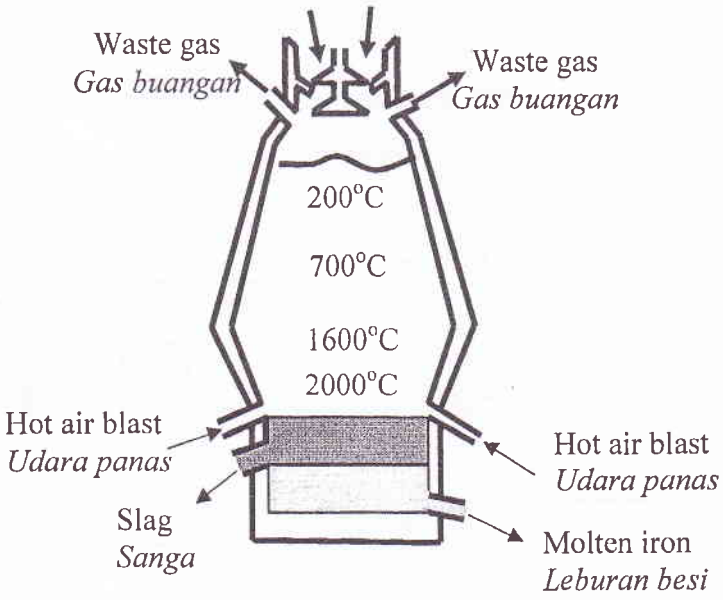


Diagram 6.2
Rajah 6.2

(i) Name substance R .

Namakan bahan R.

.....

[1 mark]
[1 *markah*]

(ii) State why substance R is chosen.

Nyatakan kenapa bahan R *dipilih.*

.....

[1 mark]
[1 *markah*]

(iii) State **one** uses of slag.
Nyatakan ***satu*** *kegunaan sanga.*

.....

[1 mark]
[1 *markah*]

Section B
Bahagian B

[20 marks]
[20 *markah*]

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

7 (a) Diagram 7.1 shows a process of manufacturing ammonia.

Rajah 7.1 *menunjukkan satu proses penghasilan ammonia.*

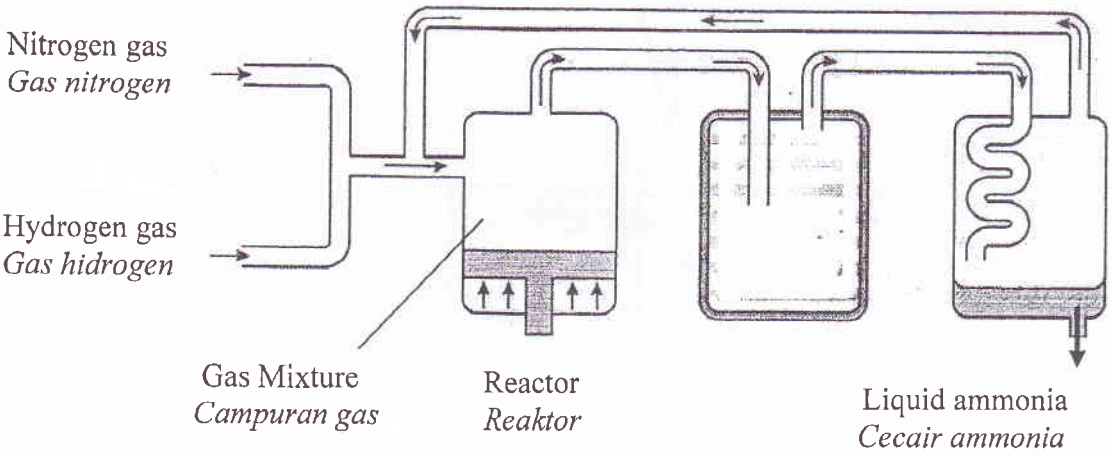


Diagram 7.1

Rajah 7.1

(i) Name the process and write the chemical equation for the reaction involved.
[3 marks]

Namakan proses itu dan tuliskan persamaan kimia bagi tindak balas yang terlibat.

[3 *markah*]

(ii) Based on Diagram 7.1, state all the conditions required for the optimum production of ammonia.

[3 marks]

Berdasarkan Rajah 7.1, *nyatakan semua keadaan yang diperlukan untuk penghasilan ammonia secara optimum.*

[3 *markah*]

(b) (i) Ammonia is used to make fertilizer such as ammonium sulphate.
Describe an experiment to prepare ammonium sulphate in laboratory.

You are given the following materials:

- ammonia solution
- sulphuric acid

[7 marks]

Ammonia digunakan untuk membuat baja seperti ammonium sulfat.
Huraikan satu eksperimen untuk menghasilkan ammonium sulfat di dalam makmal.

Anda dibekalkan bahan-bahan berikut:

- *larutan ammonia*
- *asid sulfurik*

[7 *markah*]

(ii) Ammonium sulphate, $(NH_4)_2SO_4$ and urea, $(NH_2)_2CO$ are two examples of fertilisers.
Determine which is the better fertilizer. Explain your answer.

[Relative atomic mass; H=1, C=12, N=14, O=16, S=32]

[4 marks]

Ammonium sulfat, $(NH_4)_2SO_4$ *dan urea,* $(NH_2)_2CO$ *adalah dua contoh baja.*
Tentukan baja manakah yang lebih baik. Terangkan jawapan anda.

[*Jisim atom relatif*; H=1, C=12, N=14, O=16, S=32]

[4 *markah*]

(c) Diagram 7.2 shows the structural formula of a polymer.
Rajah 7.2 menunjukkan formula struktur satu polimer.

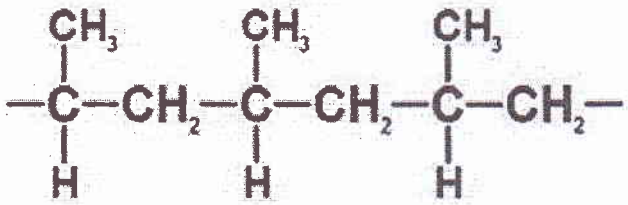


Diagram 7.2
Rajah 7.2

(i) Draw the structural formula of monomer for the polymer.
Lukiskan formula struktur monomer bagi polimer itu.

(ii) Name the monomer.
Namakan monomer itu.

(iii) State one uses of the polymer.
Nyatakan satu kegunaan polimer itu.

[3 marks]
[3 *markah*]

8 (a) Diagram 8.1 shows the foods that contain stabilizers, a type of food additives.

Rajah 8.1 *menunjukkan makanan yang mengandungi penstabil, sejenis bahan tambah makanan.*

Diagram 8.1
Rajah 8.1

(i) Give **one** example of stabilizer and state its function.

[2 marks]

*Beri **satu** contoh penstabil dan nyatakan fungsinya.*

[2 *markah*]

(ii) MSG is an acronym of a type of food additive.

- Name the food additive
- State **two** functions of MSG.

[3 marks]

MSG *adalah akronim bagi sejenis bahan tambah makanan.*

- *Namakan bahan tambah makanan itu.*
- *Nyatakan **dua** fungsi* MSG.

[3 *markah*]

(b)

Salt is a type of food additive. Salt is added to fish and is then dried under sunlight so that it can be kept for longer period of time.

Garam adalah satu jenis bahan tambah makanan. Garam ditambah pada ikan dan kemudian dijemur di bawah matahari supaya ia boleh disimpan dengan lebih lama.

(i) State the type of food additive for salt.

[1 mark]

Nyatakan jenis bahan tambah makanan bagi garam.

[1 *markah*]

(ii) Explain the function of the salt.

[2 marks]

Terangkan fungsi garam ini.

[2 *markah*]

(iii) Name another substance that has the same function as salt.

[1 mark]

Namakan satu bahan lain yang mempunyai fungsi yang sama seperti garam.

[1 *markah*]

(c) Diagram 8.2 shows the cleansing action of soap on a piece of stained cloth.
Rajah 8.2 menunjukkan tindakan pencucian oleh sabun ke atas sehelai kain yang kotor.

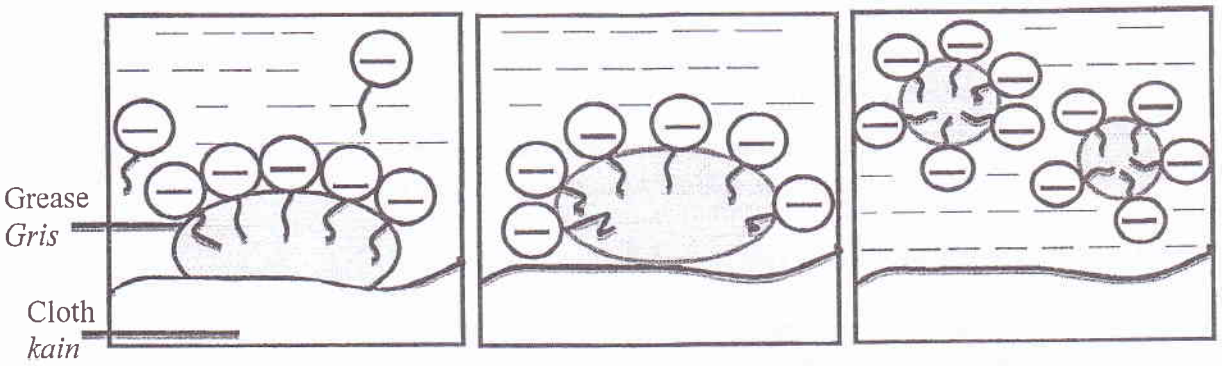


Diagram 8.2
Rajah 8.2

Describe the cleansing action of soap on the stained cloth.
[8 marks]

Huraikan tindakan pencucian oleh sabun ke atas kain yang kotor.
[8 *markah*]

(d) Diagram 8.3 shows a child that having fever.
Rajah 8.3 menunjukkan seorang kanak-kanak yang demam.

Diagram 8.3
Rajah 8.3

(i) Name the modern medicines that can be used to treat the child.
[1 mark]

Namakan ubat moden yang boleh digunakan untuk merawat kanak-kanak ini.
[1 *markah*]

(ii) State **two** correct usage of this medicine.
[2 marks]

*Nyatakan **dua** cara penggunaan yang betul bagi ubat ini.*
[2 *markah*]

Section C
Bahagian C

[20 marks]
[20 *markah*]

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

9 38.4 g of acid Y is dissolved in 100 cm^3 of distilled water.

(a) (i) Determine the concentration of acid Y solution in unit of mol dm^{-3}.
[Relative molecular mass of acid Y = 192]

[2 marks]

38.4 g *asid* Y *dilarutkan dalam* 100 cm^3 *air suling.*
Tentukan kepekatan larutan asid Y *dalam unit* mol dm^{-3}.

[*Jisim molekul relatif asid* Y = 192]

[2 *markah*]

(ii) Describe **two** methods to verify the solution is an acid.
In your answer, include example of an acid and chemical equation for the reactions involved.

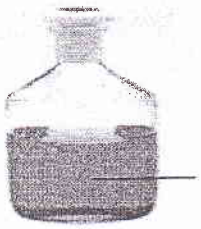
[8 marks]

*Huraikan **dua** cara untuk mengesahkan larutan itu adalah asid.*
Dalam jawapan anda, sertakan contoh satu asid dan persamaan kimia bagi tindak balas yang terlibat.

[8 *markah*]

(b) Diagram 9 shows a reagent bottle contains mixture of zinc nitrate and zinc chloride solutions.

Rajah 9 menunjukkan botol reagen yang mengandungi campuran larutan zink nitrat dan zink klorida.



Mixture of
zinc nitrate and zinc chloride solution
Campuran larutan
zink nitrat dan zink klorida

Diagram 9
Rajah 9

Describe the confirmatory test to determine the presence of cation and anion in the solution.
Your description must include all the materials used, observations and conclusion.

[10 marks]

Huraikan ujian pengesahan untuk menentukan kehadiran kation dan anion dalam larutan tersebut.
Huraian anda mesti mengandungi semua bahan yang digunakan, pemerhatian dan kesimpulan.

[10 *markah*]

10 (a) Table 10 shows the melting point, solubility in water and electrical conductivity of three substances P, Q and R.

Jadual 10 *menunjukkan takat lebur, keterlarutan dalam air dan kekonduksian elektrik bagi tiga bahan iaitu* P, Q *dan* R.

Substance *Bahan*	**Melting point / °C** *Takat lebur / °C*	**Solubility in water** *Keterlarutan dalam air*	**Electrical Conductivity** *Kekonduksian elektrik*	
			In solid state *Dalam keadaan pepejal*	**In molten state** *Dalam keadaan leburan*
P	1536	Insoluble *Tidak larut*	Yes *Ya*	Yes *Ya*
Q	801	Soluble *Larut*	No *Tidak*	Yes *Ya*
R	80	Insoluble *Tidak larut*	No *Tidak*	No *Tidak*

Table 10
Jadual 10

Based on the Table 10:
Berdasarkan Jadual 10:

(i) State the type of chemical bonds in substances P, Q and R.

[3 marks]

Nyatakan jenis ikatan kimia bagi bahan P ,Q *dan* R.

[3 *markah*]

(ii) Explain why substance Q has higher melting points than substance R.

[4 marks]

Terangkan mengapa bahan Q *mempunyai takat lebur yang lebih tinggi daripada bahan* R.

[4 *markah*]

(iii) Describe an experiment to show the electrical conductivity for substance Q and R.

Your answer should include the following:

- The labelled diagram showing the apparatus set-up
- Procedure of experiment
- Explanation of observation

[9 marks]

Huraikan satu eksperimen untuk menunjukkan kekonduksian elektrik bagi bahan Q *dan bahan* R.
Jawapan anda hendaklah mengandungi perkara berikut:

- *Gambarajah yang menunjukkan susunan radas dan berlabel*
- *Prosedur eksperimen*
- *Penjelasan bagi pemerhatian*

[9 *markah*]

(b) (i) State **one** physical property of Group 1 elements.
(ii) Describe and explain the changes of the physical property stated in (b) (i) when going down the group.

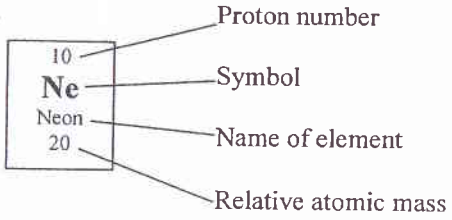
[4 marks]

(i) *Nyatakan* ***satu*** *sifat fizik unsur Kumpulan* 1.
(ii) Hurai dan terangkan perubahan sifat fizik yang dinyatakan di (b) (i) *apabila menuruni kumpulan itu.*

[4 *markah*]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

THE PERIODIC TABLE OF THE ELEMENTS



1 H Hydrogen 1																	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 Aluminium 27	14 Si Silicon 28	15 P Phosphorus 31	16 S Sulphur 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 Caesium 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 Unnil-quadium 257	105 Unp Unnil-pentium 260	106 Unh Unnil-hexium 263	107 Uns Unnilseptium 262	108 Uno Unniloctium 265	109 Une Unnilennium 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 167	66 Dy Dyprosium 163	67 Ho Holmium 165	68 Er Erbium 167	69 Tm Thulium 169	70 Yb Ytterbium 173	71 Lu Lutetium 175
90 Th Thorium 232	91 Pa Protactinium 231	92 U Uranium 238	93 Np Neptunium 237	94 Pu Plutonium 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

Reference: Chang, Raymond (1991). Chemistry. McGraw-Hill, Inc.

Name : ..... Class : .....

CHEMISTRY
Kertas 3
Ogos/ Sep.
$1\frac{1}{2}$ jam

MAJLIS PENGETUA SEKOLAH MENENGAH MALAYSIA
CAWANGAN NEGERI SEMBILAN

PEPERIKSAAN PERCUBAAN BERSAMA
SIJIL PELAJARAN MALAYSIA 2011

CHEMISTRY

Kertas 3

Satu jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

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

Untuk Kegunaan Pemeriksa		
Kod Pemeriksa :		
Soalan	Markah Penuh	Markah Diperoleh
1	24	
2	9	
3	17	
Jumlah	50	

Kertas soalan ini mengandungi 11 halaman bercetak dan 1 halaman tidak bercetak

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

1 Diagram 1.1 shows the set-up of two experiments to determine the heat of displacement of copper from its salt solution. Excess of magnesium powder and zinc powder are added to copper(II) sulphate solution in two separate containers.
Rajah 1.1 *menunjukkan susunan radas bagi dua eksperimen untuk menentukan haba penyesaran kuprum daripada larutan garamnya. Serbuk magnesium dan serbuk zink ditambah secara berlebihan ke dalam dua bekas berlainan yang mengandungi larutan kuprum*(II) *sulfat.*

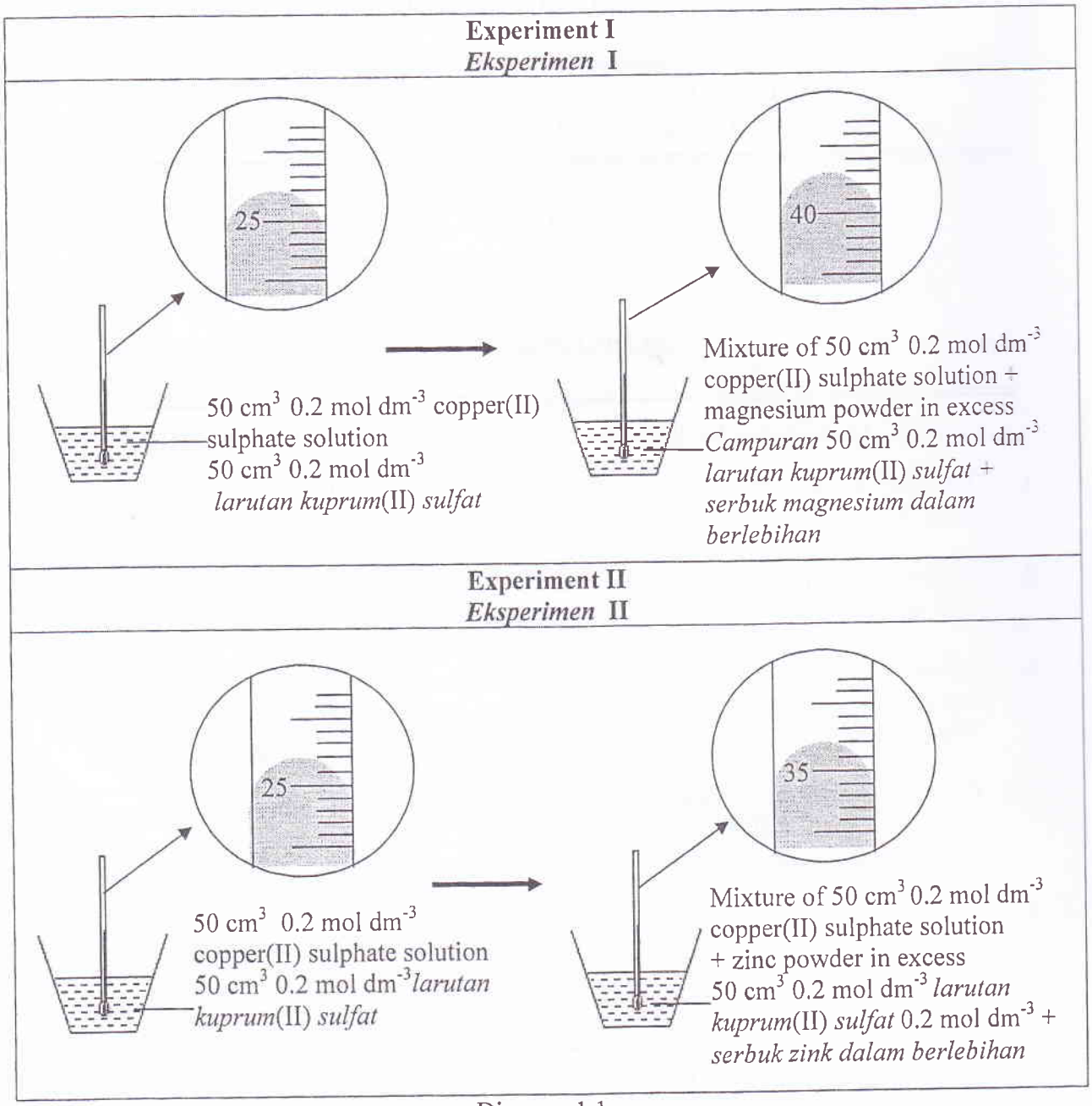


Diagram 1.1
Rajah 1.1

(a)(i) Based on Diagram 1.1, compare the observations in Experiment 1 and II.
Berdasarkan kepada Rajah 1.1, *bandingkan pemerhatian dalam Eksperimen* I *dan* II.

.....

.....

[3 marks]
[3 *markah*]

(ii) State **one** inference based on the observations.
Nyatakan ***satu*** *inferens berdasarkan kepada pemerhatian itu.*

.....

.....

[3 marks]
[3 *markah*]

(b) Based on Diagram 1.1, complete the table below.
Berdasarkan kepada Rajah 1.1, *lengkapkan jadual berikut.*

Particular ***Butiran***	**Experiment I** ***Eksperimen* I**	**Experiment II** ***Eksperimen* II**
Highest temperature of the mixture/ °C *Suhu tertinggi bagi campuran/* °C		
Initial temperature of copper(II) sulphate solution/ °C *Suhu awal larutan kuprum*(II) *sulfat/* °C		
Change in temperature/ °C *Perubahan suhu/* °C		

[3 marks]
[3 *markah*]

(c) State the variables in this experiment:
Nyatakan pembolehubah dalam eksperimen ini:

(i) The manipulated variable:
Pembolehubah dimanipulasi:

.....

(ii) The responding variable:
Pembolehubah bergerak balas:

.....

(iii) The fixed variable:
Pembolehubah dimalarkan:

.....

[3 marks]
[3 *markah*]

(d) State **one** hypothesis for both experiments.
Nyatakan ***satu*** *hipotesis bagi kedua-dua ekperimen ini.*

.....

.....

.....

[3 marks]
[3 *markah*]

(e) Diagram 1.2 shows the calculations to determine the heat of displacement for the reaction in Experiment I and II.
Write appropriate values in the spaces provided in Diagram 1.2.
Rajah 1.2 *menunjukkan pengiraan untuk menentukan haba penyesaran untuk tindak balas dalam Eksperimen* I *dan* II.
Tuliskan nilai yang bersesuaian dalam ruang yang disediakan dalam Rajah 1.2.

Experiment I ***Eksperimen* I**	**Experiment II** ***Eksperimen* II**
Heat released *Haba yang dibebaskan* $= mc\Theta$ $= 50 \times 4.2\ J\ g^{-1}\ °C^{-1} \times \ldots\ldots °C$ $= \ldots\ldots J$	Heat released *Haba yang dibebaskan* $= mc\Theta$ $= 50 \times 4.2\ J\ g^{-1}\ °C^{-1} \times \ldots\ldots °C$ $= \ldots\ldots J$
Number of mole of 50 cm^3 0.2 mol dm^{-3} copper(II) sulphate solution *Bilangan mol* 50 cm^3 0.2 mol dm^{-3} *larutan kuprum*(II) *sulfat* $= \frac{50 \times 0.2}{1000}$ $= 0.01$	Number of mole of 50 cm^3 1.0 mol dm^{-3} copper(II) sulphate solution *Bilangan mol* 50 cm^3 0.2 mol dm^{-3} *larutan kuprum*(II) *sulfat* $= \frac{50 \times 0.2}{1000}$ $= 0.01$
Heat of displacement of copper by magnesium *Haba penyesaran kuprum oleh magnesium* $= \frac{\qquad\qquad}{0.01}$ $= \ldots\ldots kJ\ mol^{-1}$	Heat of displacement of copper by zinc *Haba penyesaran kuprum oleh zink* $= \frac{\qquad\qquad}{0.01}$ $= \ldots\ldots kJ\ mol^{-1}$

Diagram 1.2
Rajah 1.2

[3 marks]
[3 markah]

(f) Based on Diagram 1.2, the values of heat of displacement in Experiment 1 and II are different.
Explain why.

Berdasarkan Rajah 1.2, *nilai haba penyesaran dalam Eksperimen* I *dan* II *adalah berbeza.*
Terangkan mengapa.

.....

.....

.....

[3 marks]
[3 *markah*]

(g) State the operational definition for heat of displacement in Experiment I.
Nyatakan definisi secara operasi bagi haba penyesaran dalam Eksperimen I.

.....

.....

.....

[3 marks]
[3 *markah*]

2 An experiment is carried out to study the relationship between the concentration of hydroxide ions and the pH value of ammonia solution.
The pH value of different concentration of ammonia solutions was measured using a pH meter. Table 2 shows the concentrations of ammonia solution and their respective pH values.

Satu eksperimen telah dijalankan untuk mengkaji hubungan antara kepekatan ion hidroksida dan nilai pH *larutan ammonia. Jadual* 2 *menunjukkan kepekatan larutan ammonia dan nilai* pH *masing-masing.*

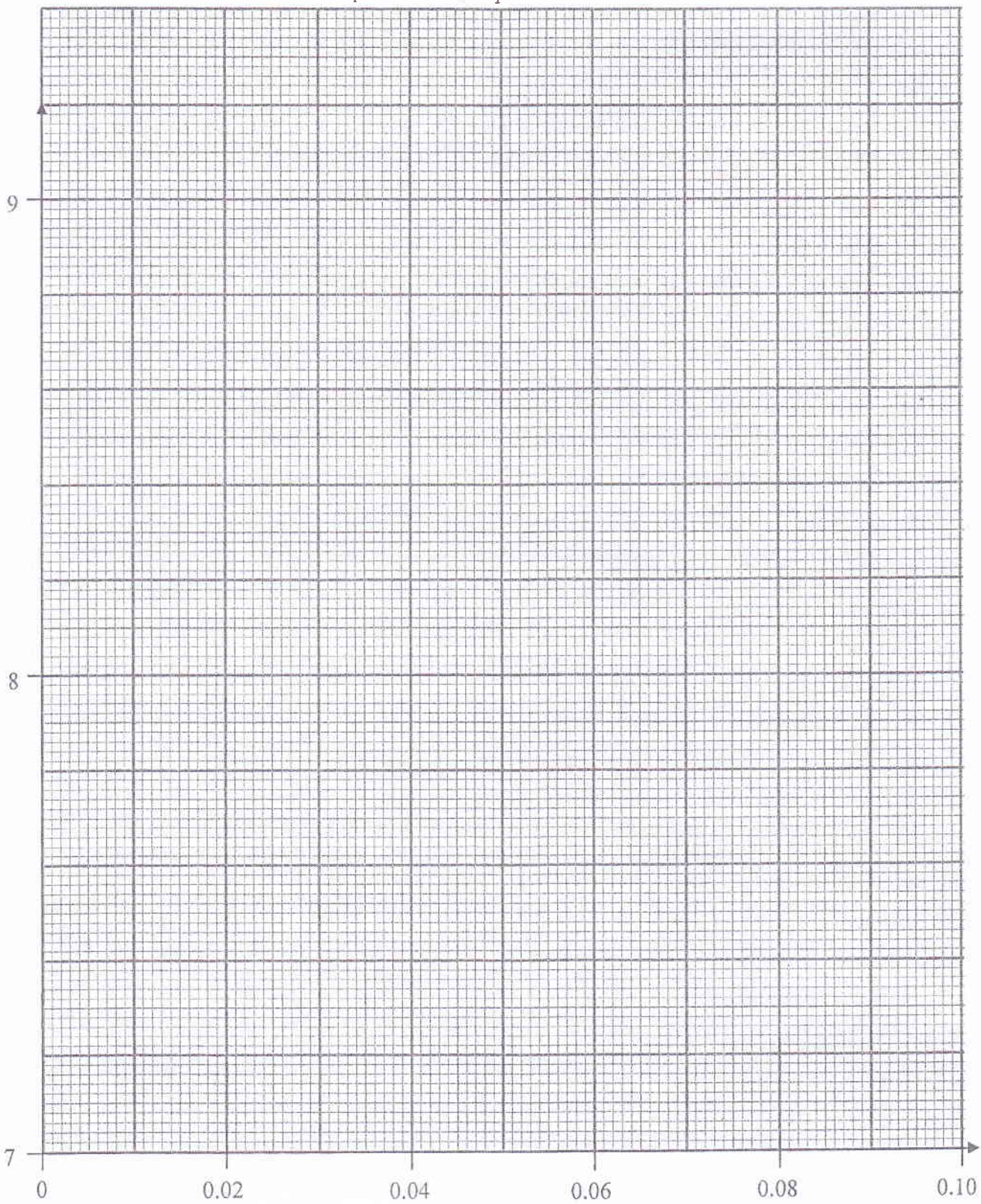
Beaker *Bikar*	**Concentration of ammonia solution(mol dm^{-3})** *Kepekatan larutan ammonia* **(mol dm^{-3})**	**pH value** *Nilai* **pH**
1	0.060	8.8
2	0.040	8.6
3	0.025	8.4
4	0.015	8.2
5	0.010	8.0

Table 2
Jadual 2

(a) Based on Table 2, plot a graph pH value against concentration of ammonia solution.
Berdasarkan kepada Jadual 2, *plotkan graf nilai* pH *melawan kepekatan larutan ammonia.*

[3 marks]
[3 *markah*]

Graph pH value against concentration of ammonia solution
Graf *nilai* pH *melawan kepekatan larutan ammonia*



(b) State the relationship between concentration of hydroxide ions and the pH value of ammonia solution.
Nyatakan hubungan antara kepekatan ion hidroksida dan nilai pH *bagi larutan ammonia.*

.....

.....

[3 marks]
[3 *markah*]

(c) By using the graph, predict the pH value when concentration of ammonia solution is 0.1 mol dm^{-3}.
Dengan menggunakan graf itu, ramalkan nilai pH *larutan ammonia yang mempunyai kepekatan* 0.1 mol dm^{-3}.

.....

[3 marks]
[3 *markah*]

3 Diagram 3 shows two bottles containing hexane and hexene.
Rajah 3 menunjukkan dua botol yang mengandungi heksana dan heksena.

Diagram 3
Rajah 3

You are given bromine water as a reagent. Plan a laboratory experiment to differentiate the two hydrocarbons.
Your planning should include the following aspects:

Anda dibekalkan reagen air bromin. Rancang satu eksperimen makmal untuk membezakan dua hidrokarbon itu.
Perancangan anda mestilah mengandungi perkara-perkara berikut:

(a) Problem statement
Pernyataan masalah

(b) All the variables
Semua pembolehubah

(c) Statement of hypothesis
Pernyataan hipotesis

(d) List of substances and apparatus
Senarai bahan dan alat radas

(e) Procedure of the experiment
Prosedur eksperimen

(f) Tabulation of data
Penjadualan data

[17 marks]
[17 *markah*]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

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HALAMAN KOSONG

INFORMATION FOR CANDIDATES
MAKLUMAT UNTUK CALON

1. This question paper consists of two questions: **Question 1, Question 2** and **Question 3.**
*Kertas soalan ini mengandungi dua soalan: **Soalan 1**, **Soalan 2** dan **Soalan 3.***

2. Answer **all** questions. Write your answers for **Question 1** *and* **Question 2** in the spaces provided in this question paper.
*Jawab **semua** soalan. Tulis jawapan anda bagi **Soalan 1** dan **Soalan 2** pada ruang yang disediakan dalam kertas soalan ini.*

3. Write your answers for **Question 3** on the 'helaian tambahan' provided by the invigilators. You may use equations, diagrams, tables, graphs and other suitable methods to explain your answers.
*Tulis jawapan anda bagi **Soalan 3** dalam helaian tambahan yang dibekalkan oleh pengawas peperiksaan. Anda boleh menggunakan persamaan, rajah, jadual, graf dan cara lain sesuai untuk menjelaskan jawapan anda.*

4. Show your working, it may help you to get marks.
Tunjukkan kerja mengira, ini membantu anda mendapatkan markah.

5. The diagrams in the questions are not drawn to scale unless stated.
Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.

6. The marks allocated for each question or sub-part of a question is shown in brackets.
Markah yang diperuntukkan bagi setiap soalan atau ceraian soalan ditunjukkan dalam kurungan.

7. If you wish to change your answer, cross out the answer that you have done. Then write down the new answer.
Jika anda hendak menukar jawapan, batalkan jawapan yang telah dibuat. Kemudian tulis jawapan yang baru.

8. You may use non-programmable scientific calculator.
Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.

9. You are advised to spend 1 hour to answer **Question 1** and **Question 2** and 30 minutes for **Question 3.**
*Anda dinasihati supaya mengambil masa 1 jam untuk menjawab **Soalan 1** dan **Soalan 2** dan 30 minit untuk **Soalan 3.***

10. Tie the 'helaian tambahan' together with this question paper and hand in to the invigilator at the end of the examination.
Ceraikan Soalan 3 daripada kertas soalan ini. Ikat helaian tambahan bersama-sama kertas soalan ini dan serahkan kepada pengawas peperiksaan pada akhir peperiksaan.

MAJLIS PENGETUA SEKOLAH MENENGAH MALAYSIA
CAWANGAN NEGERI SEMBILAN

PEPERIKSAAN PERCUBAAN BERSAMA
SIJIL PELAJARAN MALAYSIA 2011
CHEMISTRY KERTAS 1

No.	Key	No.	Key
1	A	26	C
2	C	27	D
3	D	28	C
4	A	29	C
5	C	30	B
6	A	31	D
7	D	32	C
8	B	33	B
9	B	34	A
10	C	35	C
11	B	36	A
12	A	37	B
13	D	38	C
14	A	39	D
15	B	40	A
16	A	41	B
17	A	42	D
18	C	43	C
19	C	44	B
20	B	45	B
21	D	46	B
22	B	47	A
23	D	48	D
24	D	49	D
25	A	50	C

4541/ 2 (PP)
Chemitry
Kertas 2
Peraturan
Pemarkahan
2011

MAJLIS PENGETUA SEKOLAH MENENGAH MALAYSIA
CAWANGAN NEGERI SEMBILAN

PEPERIKSAAN PERCUBAAN BERSAMA
SIJIL PELAJARAN MALAYSIA 2011

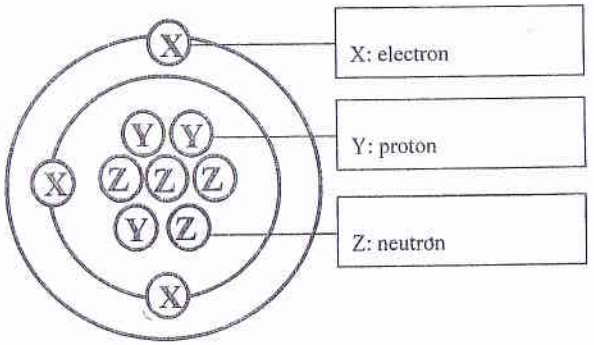
CHEMISTRY

Kertas 2

PERATURAN PEMARKAHAN

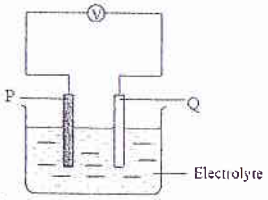
UNTUK KEGUNAAN PEMERIKSA SAHAJA

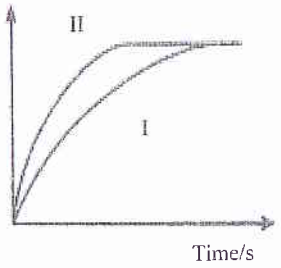
Peraturan pemarkahan ini mengandungi 16 halaman bercetak

No 1	Explanation	Mark	Σ Mark
(a)(i)	*Able to name the subatomic particles correctly.* Answer:  	1 1 1	3
(ii)	*Able to state two subatomic particles with same mass correctly* Answer: Proton and neutron// Y and Z	1	1
(iii)	*Able to state the proton number and nucleon number of atom P.* Answer: Proton number: 3 Nucleon number: 7	1 1	2
(iv)	*Able to write the standard representation of P correctly.* Sample Answer: $^{7}_{3}P$ / $^{7}_{3}Li$	1	1

(b) (i)	*Able to state one radioactive isotope correctly.* Sample Answer: Cobalt-60// Carbon-14// Phosphorus-32// Iodine-131// Ceasium-137	1	1
(ii)	*Able to state one uses of radioactive isotope correctly.* Sample Answer: - Cobalt-60 is used in radiotherapy for the treatment of cancer.// - Gamma rays of cobalt-60 are used to destroy bacteria in food without changing the quality of food.// - Carbon dating uses carbon -14 to estimate the age of fossils and artefacts.// - The metabolism of phosphorus in plants can be studied using phosphate fertilisers that contain phosphorus-32. Answer b(ii) must corresponding to b(i)	1	1
	Total		9

No 2	Explanation	Mark	Σ Mark
(a)	*Able to state the meaning of acid* Answer: A substance that ionises in water to produce hydrogen ions / H^+	1	1
(b)(i)	*Able to name the reaction* Answer: Neutralization	1	1
(b)(ii)	*Able to name the substance X* Answer: Potassium sulphate // water	1	1
(b) (iii)	*Able to write the balance chemical equation* Answer: $H_2SO_4 + 2KOH \rightarrow K_2SO_4 + 2H_2O$ 1. Correct formulae of reactants & products 2. Balanced the equation with correct coefficient	1 1	2
(c)(i)	*Able to predict the pH value of hydrochloric acid* Answer: 1	1	1
(c) (ii)	*Able to Explain the difference in pH value of hydrochloric acid and ethanoic acid* Sample Answer: 1. Hydrochloric acid / HCl is a strong acid // ethanoic acid / CH_3COOH is a weak acid. 2. Hydrochloric acid / HCl dissociates / ionises completely in water // ethanoic acid / CH_3COOH dissociates / ionises partially in water 3. Hydrochloric acid / HCl produces higher concentration of hydrogen ions / H^+ // ethanoic acid produces lower concentration of hydrogen ions / H^+ 4. Higher concentration of H^+ ions, lower pH value // Lower concentration of H^+ ions, higher pH value	1 1 1 1	4
	Total		10

No. 3	Explanation	Mark	Σ Mark
(a)	*Able to arrange the metals in the order of decreasing electropositivity.* Answer R, P, Q	1	1
(b)(i)	*Able to name the Q nitrate solution* Answer Silver nitrate	1	1
(ii)	*Able to write ionic equation.* Answer $2Ag^+ + Cu \rightarrow Cu^{2+} + 2Ag$ 1. correct formulae of reactants and products 2. balanced equation	1 1	2
(iii)	*Able to write the corresponding observation* Answer Colorless solution turns blue/ light blue // brown metal/copper/P dissolve/ thinner // grey deposit formed.	1	1
(c)	*Able to explain why there is no reaction occurs in experiment III.* Answer 1. R is more electropositive than P // the position of R is higher than P in electrochemical series. 2. R cannot displace P from its nitrate/ salt solution	1 1	2
(d)(i)	*Able to draw a labelled diagram.*  Answer 1. functional apparatus 2. label: metal P, Q and any suitable electrolyte	1 1	2
(f)	*Able to state the positive terminal.* Answer Q	1	1
	Total		**10**

No. 4	Explanation	Mark	
(a)	*Able to write the ionic equation* Answer: $Mg + 2H^+ \rightarrow Mg^{2+} + H_2$ 1 correct formulae of reactants and products 2 balanced equation	1 1	2
(b)	*Able to Calculate the average rate of the reaction* Answer: Experiment I : Rate of reaction = $\frac{22}{2\times60} = 0.183\ cm^3\ s^{-1}$ Experiment II : Rate of reaction = $\frac{37}{2\times60} = 0.308\ cm^3\ s^{-1}$	1 1	2
(c)	*Able to Calculate the maximum volume of gas produced* Answer: Number of moles of $H_2SO_4 = \frac{0.1x20}{1000} = 0.002$ mol 1 mol of H_2SO_4 produce 1 mol of H_2 // 0.002 mol of H_2SO_4 produce 0.002 mol of H_2 Maximum volume of H_2 = 0.002 x 24 000 // 48 cm^3	1 1	2
(d)	*Able to Sketch the graphs* Volume of H_2/ cm^3  1. Axes are labelled correctly and have correct unit 2. Correct curves and curves are labelled	1 1	2

(e)	*Able to Compare the rate of reaction* Answer: 1. The rate of reaction in experiment II is higher 2. Experiment II has higher temperature 3. Frequency of **effective collisions** between hydrogen ions and magnesium higher in experiment II.	1 1 1	3
	Total		**11**

No.5	Explanation	Mark	Σ Mark
(a)	*Able to state two changes.* Answer 1. Green solid change to black 2. Lime water turns chalky/milky/cloudy	 1 1	 2
(b)	*Able to write a balanced chemical equation.* Answer $CuCO_3 \longrightarrow CuO + CO_2$	 1	 1
(c)	*Able to name substance X.* Answer Sulphuric acid	 1	 1
(d)(i)	*Able to state all the ions present in copper(II) sulphate solution* Answer Cu^{2+}, SO_4^{2-}, H^+, OH^- // Copper (II) ion, sulphate ion, hydrogen ion, hydroxide ion.	 1	 1
(ii)	*Able to state the products formed at anode in both cells and state the factors affecting the products fotrmed* Answer		
	Cell I: Product formed at anode: Oxygen gas//O_2	1+1	
	Cell I: Factor affecting the product formed at anode: Position of ion in electrochemical series		
	Cell II: Product formed at anode: Copper (II) ion// Cu^{2+}	1+1	4
	Cell II: Factor affecting the product formed at anode: Type of electrode		
(iii)	*Able to explain the intensity of blue solution remains unchanged.* Answer 1. The rate of copper (ii) ion discharge at cathode same as the rate of copper atom dissolves at anode. 2. The concentration of copper (ii) ion remain unchanged.	 1 1	 2
	Total		11

No 6	Explanation	Mark	Σ Mark
(a)	*Able to state the function of* (i) potassium manganate(VII) (ii) glass wool Answer: (i) To provide/supply oxygen (ii) To separate $KMnO_4$ and metal // $KMnO_4$ and metal do not mix	 1 1	 2
(b)(i)	*Able to balance chemical equation.* Answer $2\ Zn + O_2 \rightarrow 2\ ZnO$	 1	
(ii)	*Able to state the change in oxidation number.* Answer: 0 to +2	 1	 2
(c)	*Able to* arrange the elements *correctly* Answer: W , Zn, Y, X	 1	 1
(d)	*Able to tick the correct elements* Answer: Metal: W, X, Y, Zinc *Zink* X √, Y √, Zinc √	 1	 1
(e)(i)	*Able to name substance R correctly.* Sample answer: Carbon// Coke	 1	
(ii)	*Able to state why substance R is choose.* Sample answer: Cheap// widely available// produced non-poisonous gas, carbon dioxide	 1	
(iii)	*Able to state the uses of slag* Sample answer: Building material// manufacture of cement	 1	 3
	Total		**9**

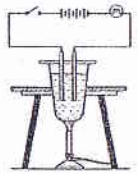
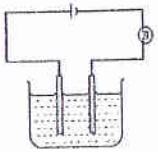
No 7	Explanation	Mark	Σ Mark
(a)(i)	*Able to name the process and* *Able to write correct formula for reactant, product and balance balanced equation correctly* Sample answer: Haber $N_2 + 3H_2 \rightleftharpoons 2NH_3$ [a: $\longrightarrow$]	 1 2	 3
(ii)	*Able to state all the conditions correctly* Answer 1. Pressure at 200 atm 2. Temperature at (450 -500)°C 3. Catalyst : iron	 1 1 1	 3
(b)(i)	*Able to describe the preparation correctly.* Sample answer 1. Pour H_2SO_4 into a beaker 2. Add NH_4OH into H_2SO_4 3. Until NH_3 can be smelt 4. Heat the solution/mixture remains one third of its original volume /saturated 5. The solution/mixture is cooled 6. Filter the solution/mixture 7. Crystal formed is dried by pressing with dry filter paper.	 1 1 1 1 1 1 1 1	 7
(b)(ii)	*Able to* 1.*calculate % of nitrogen in* $(NH_4)_2SO_4$ *and* $(NH_2)_2CO$ *correctly* 2.*state which fertilizer has higher % of nitrogen* 3.*explain why the fertilizer is picked.* Answer: 1. Urea is better fertilizer 2. % of N in $(NH_4)_2SO_4$ = 28/132 x 100% // 21.2% % of N in $(NH_2)_2CO$ = 28/60 x 100% // 46.6% 3. Urea has higher percentage of nitrogen	 1 1 1 1	 4

(c)(i)	*Able to draw the structure formula of monomer* Answer : CH_3 H | | C = C | | H H	1	1
(c)(ii)	*Able to name the monomer* Answer : Propene	1	1
(c)(iii)	*Able to state the uses of the polymer* Sample answer : To manufacture piping / bottle crates / carpets / car batteries / ropes	1	1
	Total		**20**

No 8	Explanation	Mark	Σ Mark
(a)(i)	*Able to explain why and the uses of stabilisers as food additives.* Sample answer: 1. Example of stabilisers are lecithin/ mono- and – di- glycerides of fatty acid. 2 stabilisers prevent an emulsion from separating out.	1 1	2
(ii)	*Able to give the name of MSG* *Able to state the functions and uses of MSG.* Sample answer 1 MSG is monosodium glutamate, The function of MSG: 2 To improve the taste of food. 3 To restore loss because of processing.	1 1 1	3
(b)(i)	*Able to state the function of salt.* Answer Preservative	1	1
(ii)	*Able to explain how the salt works as preservative.* Answer 1 salts draws the water out the cells of microorganisms. 2 it retards the growth of microorganisms.	1 1	2
(iii)	*Able to name another substance that has the same function as salt.* Sample answer Sugar/ sodium benzoate/ sodium nitrate/ vinegar.	1	1
(c)(i)	*Able to explain the cleansing action of soap on the stained cloth.* Sample answer 1 Soap molecules consist of hydrophilic and hydrophobic parts. 2 Soap decreases the water surface tension. 3 Increase the wetting ability of water. 4 Hydrophilic part is soluble in water. 5 Hydrophobic part is soluble in grease. 6 Scrubbing breaks the grease into small droplets. 7 Droplets suspended in water to form an emulsion. 8 Rinsing washes away the droplets.	1 1 1 1 1 1 1 1	8

d (i)	*Able to name the modern medicines that can used to treat the child.* Sample answer Paracetamol	1	1
(ii)	*Able to state two correct usage of the medicine.* Sample answer 1 Proper dosage 2 Take after food 3 Taken with doctor's prescription	1 1	2
	Total		**20**

No 9	Explanation	Mark	Σ Mark
(a)(i)	***Determine the concentration of acid Y solution*** Answer 1 No of mole = 38.4 / 192 = 0.2 mol 2 Molarity = 0.2 / 0.1 = 2.0 mol dm^{-3}	 1 1	 2
(ii)	***Describe two methods to verify a solution is an acid*** Sample answer 1 Pour hydrochloric acid/ [named acid] in a test tube. Add zinc/ [any suitable metal] in the test tube 2 Near/place a lighted splinter at the mouth of the test tube, 'pop'sound produced. Equation: $Zn + 2HCl \rightarrow ZnCl_2 + H_2$ 3 correct formulae of reactants & products 4 balanced equation 5 Put acid in another test tube. Add calcium carbonate in the acid. 6 Pass through the gas released into lime water.Turn chalky/ cloudy Equation: $CaCO_3 + 2HCl \rightarrow CaCl_2 + CO_2 + H_2O$ 7 correct formulae of reactants & products 8 balanced equation	 1 1 1 1 1 1 1 1 1	 8
(b)	**Able to describe the confirmatory test for cation and anion in the solution** Sample answer **Cation test : Zn^{2+}** 1 Pour the solution in the test tube 2 Add NaOH solution little by little until excess. 3 Observation : White precipitate formed and dissolve in excess of NaOH. Shows the presence of Zn^{2+} *Note: point 3 – observation + conclusion* **Anion Test : NO_3^-** 4 Add sulphuric acid 5 Add $FeSO_4$ solution 6 Add slowly / drop concentrated H_2SO_4 7 Brown ring formed , shows NO_3^- present. **Anion Test : Cl^-** 8 Add HNO_3 9 Add $AgNO_3$ / $Pb(NO_3)_2$ solution 10 White precipitate, shows the presence of Cl^- ions.	 1 1 1 1 1 1 1 1 1 1	 Max= 10
	Total		**20**

No 10	Explanation	Marks	
(a) (i)	*Able to name three chemical bonds* Answer: P- metallic Q- ionic R- covalent	 1 1 1	 3
(ii)	*Able to explain the idea of high melting point with the forces between particles* Answer: 1 Q is an ionic compound has positive ions and negative ions held together by strong electrostatic forces. 2 Higher heat energy is needed to overcome the forces. 3 R is a simple covalent molecule has weak van der Waals / intermolecular forces between molecules. 4 Lower heat energy is needed to overcome the forces.	 1 1 1 1	 4
(iii)	*Able to describe the experiment*  OR  1 Functional diagram : battery, complete circuit and bulb/ammeter/voltmeter 2 Label : heat , molten ionic compound / aqueous ionic compound 3 Heat substance Q // dissolve substance Q 4 Dipped / immerse carbon electrodes into the solution 5 Complete the circuit / turn on the switch 6 Record the observation 7 Repeat by replace substance Q with R 8 Molten Q / solution Q can conduct electricity because has free moving ions 9 Molten R / solution R can not conduct electricity because exist as Molecule	 1 1 1 1 1 1 1 1	 9

(b)	[*Able to state one physical properties and explain the changes when going down the Group 1*] Sample Answer :		

Physical Property	Description (when going down the group)	Explanation	
1 melting / boiling point	Decreases	1 The forces of attraction decreases 2 Less heat energy needed to overcome the forces	1+1 +2
2 Atomic size	Increases	1 Number of electrons Increases 2 Number of shell filled electrons increases	1+1 +2
3 Density	Decreases	1 Mass and atomic size / volume of element increases when going down the group 2. The atomic size/ volume increase more than mass	1+1 +2

4

Total 20

END OF MARK SCHEME

MAJLIS PENGETUA SEKOLAH MENENGAH MALAYSIA
CAWANGAN NEGERI SEMBILAN

PEPERIKSAAN PERCUBAAN BERSAMA
SIJIL PELAJARAN MALAYSIA 2011

CHEMISTRY

KERTAS 3

PERATURAN PEMARKAHAN

UNTUK KEGUNAAN PEMERIKSA SAHAJA

Peraturan pemarkahan ini mengandungi halaman 13 bercetak

1(a)(i)

Score	Rubric
3	[Able to compare the observations correctly] Sample answer : Temperature change in Experiment I is higher than in Experiment II
2	[Able to compare the observation] Sample answer : Temperature change in Experiment I is high
1	[Able to state the change of temperature] Sample answer : Temperature change
0	No response or wrong response

1(a)(ii)

Score	Rubric
3	[Able to state an inference correctly] Sample answer : Heat produced in Experiment I is more than in Experiment II
2	[Able to state an inference] Sample answer : Heat produced in Experiment I and in Experiment II
1	[Able to state the idea of inference] Sample answer : Exothermic
0	No response or wrong response

(b)

Score	Rubric
3	[Able to write all temperatures with one decimal place correctly] Answer : 43.0 37.0 27.0 27.0 16.0 10.0
2	[Able to write all the temperature without one decimal place]
1	[Able to at least two readings correctly]
0	No response or wrong response

(c)

Score	Rubric
3	[Able to state the variables correctly] Sample answer : (i) The manipulated variable: zinc and magnesium powder (ii) The responding variable: Initial temperature and highest temperature// change in temperature (iii) The fixed variable: Volume and concentration of copper(II) sulphate solution
2	[Able to state **two** variables correctly].
1	[Able to state **one** variable correctly].
0	No response or wrong response

(d)

Score	Rubric
3	[Able to give the hypothesis accurately by stating the following three aspects] -The manipulated variable: zinc and magnesium powder -effect that is related to the responding variable: heat of displacement of copper -direction of the effect greater or smaller Sample answer : Magnesium reacts with copper(II) sulphate solution produce more heat than in zinc reacts with copper(II) sulphate solution
2	[[Able to give the hypothesis accurately by stating any two of the aspects] Sample answer : More heat produced in magnesium
1	[Able to give an idea] Sample answer : Heat is produced
0	No response or wrong response

(e)

Score	Rubric
3	[Able to write all **eight** values correctly in the calculation] **Answer :** Experiment I Heat released = mcθ = 50 x 4.2 J g^{-1} °C^{-1} x **16** °C =**3360** J Heat of displacement of copper = **3.36** /0.01kJ = **336** kJ mol^{-1} **Experiment II** Heat released = mcθ = 50 x 4.2 J g^{-1} °C^{-1} x **10** °C =**2100** J Heat of displacement of copper = **2.1**/0.01 kJ =**210** kJ mol^{-1}
2	[Able to write **4** to 7 values correctly in the calculation]
1	[Able to write **3** values correctly in the calculation]
0	No response or wrong response

(f)

Score	Rubric
3	[Able to state a correct reason of why the value of heat of displacement of copper are different based on the electrochemical series] Sample answer : Heat of displacement in Experiment I is higher because magnesium is higher than copper in electrochemical series.
2	[Able to state a reason of why the value of heat of displacement of copper are different based on the electrochemical series] Sample answer : Magnesium is higher than copper in electrochemical series.
1	[Able to give an idea] Sample answer : Heat of displacement in Experiment I is higher
0	No response or wrong response

(g)

Score	Rubric
3	[Able to state the operational definition correctly 1. how to operate the experiment 2. observation 3. state the mole of the substance replaced Sample answer : Temperature change is 16^0C // Temperature rises when excess of magnesium powder is added to copper(II) sulphate solution to displace 1 mole of copper.
2	[Able to state the operational definition] 1.how to operate the experiment 2.observation Sample answer : Temperature change is 16^0C // Temperature rises when excess of magnesium powder is added to copper(II) sulphate solution
1	[Able to state the operational definition] 1.how to operate the experiment or 2.observation Sample answer : Temperature rises
0	No response or wrong response

2 (a)

Score	Rubric
3	[Able to draw a graph correctly] 1 Both axes are labelled with units. 2 Tranfer all the points correctly. 3 Plot a correct curve.
2	[Able to draw a graph] 1 Both axes are labelled without units. 2 Tranfer 4 points correctly. 3 Plot a correct curve.
1	[Have an idea to draw a graph] 1 Plot a correct curve.
0	No response or wrong response

(b)

Score	Rubric
3	[Able to state the relationship correctly] Sample answer : The higher the concentration of hydroxide ions, the higher the pH value.
2	[Able to give incomplete relationship] Sample answer : The concentration of hydroxide ions is directly proportionally to the pH value.
1	[Able to give an idea] Sample answer : The concentration of hydroxide ions affect the pH value
0	No response or wrong response

(c)

Score	Rubric
3	[Able to predict the pH value accurately] 1 Extrapolate the graph. 2 State the pH value. Answer: 8.9
2	[Able to predict the pH value] 1 State the pH value. Sample answer: 8.9 to 9.0
1	[Have an idea to predict the pH value] Sample Answer : More than 8.8
0	No response or wrong response

3 (a) - Problem statement

Score	Rubric
3	[Able to give the problem statement correctly] Sample answer : Does hexene decolouried bromine water?
2	[Able to give the statement of problem incorrectly] Sample answer: Does unsaturated hydrocarbon decolouried bromine water?
1	[Able to state an idea the statement of problem] Sample answer: Does hexane/ unsaturated hydrocarbon changes bromine water colour?
0	[No response or wrong response]

3 (b) - Variables

Score	Rubric
3	[Able to state **all** variables correctly] Sample answer: Manipulated variable : Types of hydrocarbon/ Hexane and Hexene Responding variable : colour changes Constant variable : volume of bromine water// volume of hydrocarbons
2	[Able to state any **two** variables correctly]
1	[Able to state any **one** variables correctly]
0	[No response or wrong response]

3 (c) - Hypothesis

Score	Rubric
3	[Able to give the hypothesis accurately] Sample answer: Hexene decolourised brown bromine water/ changes brown bromine water to colourless but Hexane does not decolourised brown bromine water/ brown bromine water remains unchanged.
2	[Able to give the hypothesis almost accurately] Sample answer: Unsaturated hydrocarbon decolourised brown bromine water/ changes brown bromine water to colourless but saturated hydrocarbon does not decolourised brown bromine water/ brown bromine water remains unchanged.
1	[Able to state an idea of hypothesis] Sample answer: Hexene /Unsaturated hydrocarbon decolourised brown bromine water/ changes brown bromine water to colourless // Hexane /saturated hydrocarbon does not decolourised brown bromine water/ brown bromine water remains unchanged.// Different hydrocarbon give different observation.
0	No response or wrong response

3(d) - Apparatus and materials

Score	Rubric
3	[Able to give the list of the apparatus and substances correctly and completely] Answer: *Apparatus* : **1.** test tube **2.** dropper **3.** Measuring cylinder *Materials* : Bromine water, Hexane and Hexene.
2	[Able to give the list of the apparatus and substances correctly and but not completely] Answer: Apparatus : **1 and 2.** Materials : At least one named hydrocarbon and bromine water.
1	[Able to give an idea about the list of the apparatus and materials correctly] Answer: Test tube, bromine water and one named hydrocarbon.
0	[No response or wrong response]

3 (e) - Procedure of the experiment

Score	Rubric
3	[Able to state **all** procedures correctly] Sample answer : 1. Add / pour / place [2 cm^3 – 5 cm^3] of Hexane into a test tube. 2. Add 3 drops of bromine water. 3. Observe and record the colour changes. 4. Repeat steps 1 to 3 using Hexene.
2	[Able to state 3 steps of procedures correctly] Sample answer: Steps **1,2,3.**
1	[Able to state 2 steps of procedures correctly] Sample answer: Steps **1,2.**
0	[No response or wrong response]

3 (f) - Tabulation of data

Score	Rubric
2	[Able to exhibit the tabulation of data correctly] Sample answer: **Hydrocarbon** | **observation** Hexane | Hexene |
1	[Able to exhibit the tabulation of data less accurately] Tabulation of data has 2 columns and 3 rows Sample answer: **Hydrocarbon** | **observation**
0	[No response or wrong response]

Total (3 × 5) + 2 = 17

END OF MARK SCHEME