PERSIDANGAN KEBANGSAAN PENGETUA-PENGETUA
SEKOLAH MENENGAH CAWANGAN NEGERI SEMBILAN

PEPERIKSAAN PERCUBAAN BERSAMA SIJIL PELAJARAN MALAYSIA 2010

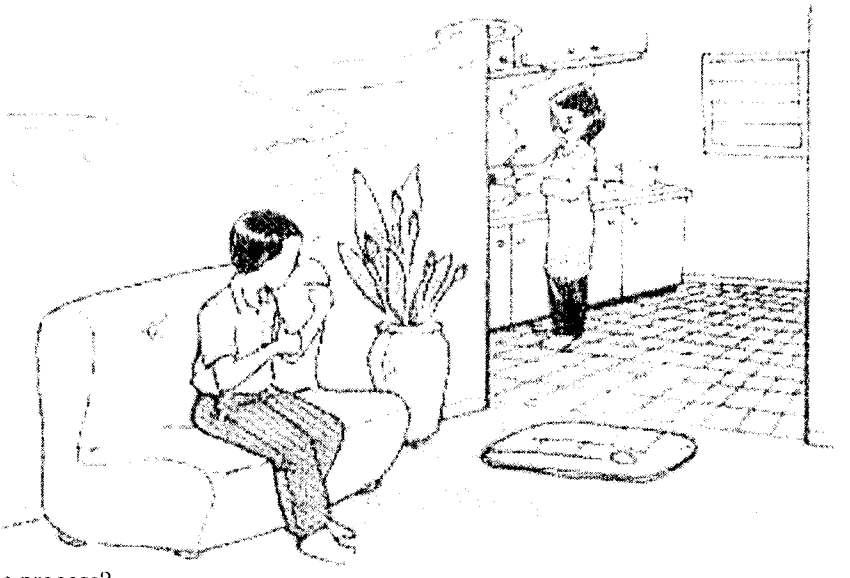
4541/1
CHEMISTRY
Kertas 1
Ogos/ Sep.
$1\frac{1}{4}$ jam **Satu jam lima belas minit**

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 30 halaman bercetak dan 2 halaman tidak bercetak.

1 The diagram shows a process where the smell of food spreads throughout the room.
Rajah menunjukkan satu proses di mana bau makanan menyebar ke seluruh bilik.



What is the process?
Apakah proses itu?

A Sublimation
Pemejalwapan

B Evaporation
Penyejatan

C Hydration
Penghidratan

D Diffusion
Resapan

2 An atom X has seven electrons.

Which of the following is true for atom X?

Satu atom X mempunyai tujuh elektron.

Antara berikut yang manakah benar bagi atom X?

A Electron arrangement is 2 .7

Susunan elektron ialah 2 . 7

B Nucleon number is fourteen

Nombor nukleon ialah empat belas

C Element X is in Group 17

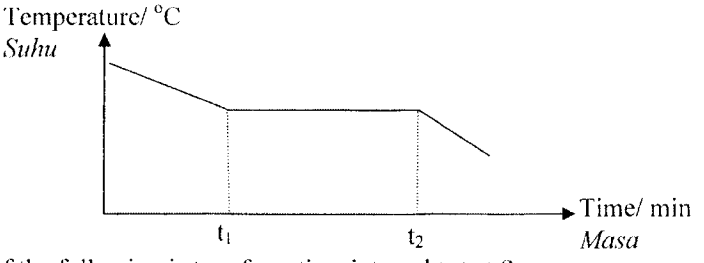
Unsur X ialah dalam kumpulan 17

D Proton number is seven

Nombor proton ialah tujuh

3 The diagram shows a cooling curve when naphthalene is cooled.

Rajah menunjukkan lengkung penyejukkan bila naftalena disejukkan.



Which of the following is true from time interval t_1 to t_2?

Antara berikut yang manakah benar dari selang masa t_1 *sehingga* t_2?

A Particles in naphthalene do not move

Zarah-zarah dalam naftalena tidak bergerak

B Naphthalene changes from liquid to gas

Naftalene berubah daripada cecair kepada gas

C Particles in naphthalene attract one another with loss of heat

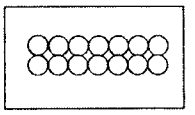
Zarah-zarah dalam naftalena menarik di antara satu sama lain dengan pembebasan haba

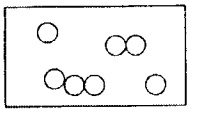
D Naphthalene has cooled to the same temperature as the surroundings

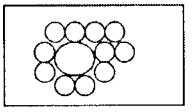
Naftalena disejukkan kepada suhu sama seperti sekeliling

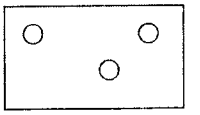
4 Which is the arrangement of particles of water?

Yang manakah merupakan susunan zarah bagi air?

A 

B 

C 

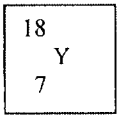
D 

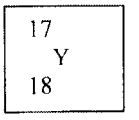
5 An atom Y has 17 protons and 18 neutrons.

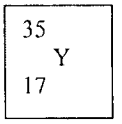
Which of the symbols represent the atom for Y element?

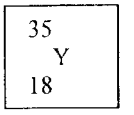
Satu atom Y *mempunyai* 17 *proton dan* 18 *neutron.*

Antara berikut yang manakah merupakan symbol mewakili atom bagi unsur Y?

A 

B 

C 

D 

6 The statement below is a description of an atomic model proposed by a scientist.

Pernyataan di bawah ialah huraian model atom yang dicadangkan oleh seorang saintis.

> Electrons move around the nucleus in fixed orbits. Each orbit forms a circle and has a fixed distance from the nucleus.
> *Elektron bergerak mengeliling nukleus dalam orbit tetap. Setiap orbit membentuk satu bulatan dan mempunyai jarak yang tetap dari nucleus.*

Who proposed it?
Siapakah yang mencadangkannya?

A Niels Bohr

B John Dalton

C J.J Thomson

D James Chadwick

7 Which chemical formula is true for lead(II) nitrate?

Antara formula kimia yang berikut yang manakah benar bagi plumbum(II) *nitrat*?

A $Pb(NO_2)_2$

B $Pb(NO_2)_4$

C $Pb(NO_3)_4$

D $Pb(NO_3)_2$

8 Mass of bromine water is 120 g.

What is the number of moles of bromine water?

[Relative atomic mass : Br = 80]

Jisim bagi air bromine ialah 120 g.
Apakah bilangan mol bagi air bromin?
[*Jisim atom relatif*: Br = 80]

A 0.67

B 0.75

C 1.33

D 1.50

9 How many atoms in 2 moles of hydrogen gas?

[Avogadro's constant = 6.02×10^{23} mol^{-1}]

Berapakah atom yang terdapat dalam 2 mol *gas hydrogen*?

[*Pemalar Avogadro* = 6.02×10^{23} mol^{-1}]

A 1.51×10^{23}

B 3.01×10^{23}

C 1.20×10^{24}

D 2.41×10^{24}

10 The equation for a reaction is shown below

Persamaan bagi satu tindak balas ditunjukkan di bawah

$$2HCl + Mg \longrightarrow MgCl_2 + H_2$$

Mass of magnesium used in the reaction is 12 g.

What is the volume of hydrogen gas produced at room condition?

[Molar volume of gas = 24 dm^3 mol^{-1} at room condition; Relative atomic mass: Mg = 24]

Jisim bagi magnesium digunakan dalam tindak balas ialah 12 g.

Apakah isipadu gas hidrogen dihasilkan pada keadaan bilik?

[*Isi padu molar gas* = 24 dm^3 mol^{-1} *pada keadaan bilik*; *Jisim atom relatif*: Mg = 24]

A 12 dm^3

B 24 dm^3

C 36 dm^3

D 48 dm^3

11 Who arranged the elements in the Periodic Table in order of increasing proton number?

Siapakah yang menyusun unsur-unsur dalam Jadual Berkala Unsur menurut pertambahan nombor proton?

A Dmitri Mendeleev

B Johann Dobereiner

C Henry Moseley

D Lothar Meyer

12 Which of the following properties are true about transition element?

Antara pernyataan berikut, yang manakah benar tentang unsur-unsur peralihan?

I Have low melting point.

Mempunyai takat lebur yang rendah.

II Form coloured compounds.

Membentuk sebatian berwarna.

III Have more than one oxidation numbers.

Mempunyai lebih daripada satu nombor pengoksian.

IV Have catalytic properties.

Mempunyai ciri-ciri pemangkinan.

A I, II and III

B I, III and IV

C I, II and IV

D II, III and IV

13 Which of the equation does **not** represent a redox reaction?

*Antara persamaan berikut yang manakah **tidak** menunjukkan tindak balas redoks*?

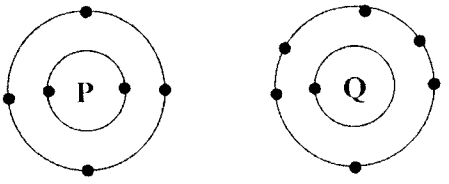
A $Ba^{2+}(aq) + SO_4^{2-}(aq) \rightarrow BaSO_4(s)$

B $Cu^{2+}(aq) + Zn(s) \rightarrow Zn^{2+}(aq) + Cu(s)$

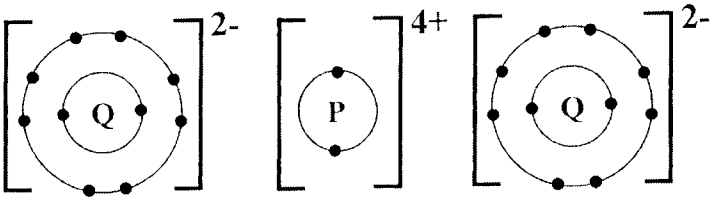
C $2Br^-(aq) + Cl_2(aq) \rightarrow 2Cl^-(aq) + Br_2(aq)$

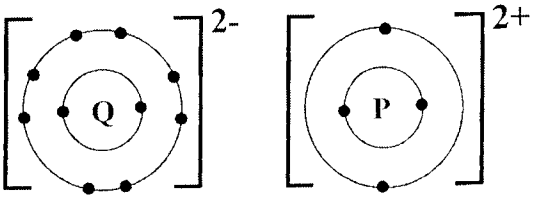
D $2Fe^{3+}(aq) + Mg(s) \rightarrow 2Fe^{2+}(aq) + Mg^{2+}(aq)$

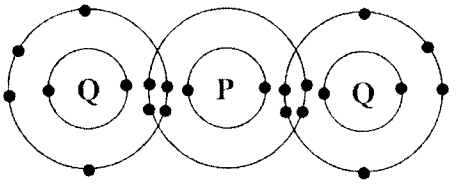
14 The diagram shows the electron arrangement of atoms P and Q.
Rajah menunjukkan susunan elektron atom P *dan* Q.

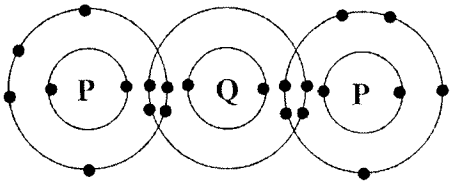


Which of the following shows the electrons arrangement of the compound formed between atoms P and Q?
Antara berikut, yang manakah menunjukkan susunan elektron bagi sebatian yang terbentuk antara atom P dan Q?

A 

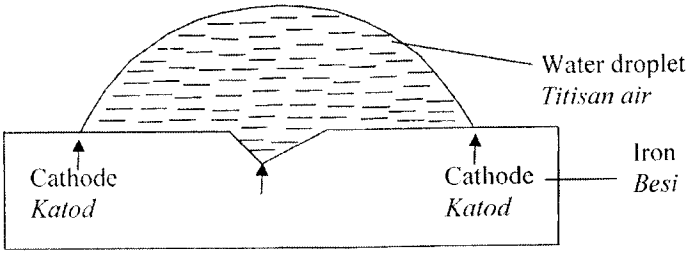
B 

C 

D 

15 The diagram shows the rusting of iron.

Rajah menunjukkan pengaratan besi.



Which of the equation occurs at the anode?

Persamaan yang manakah berlaku pada anode?

A $Fe^{2+} + 2e^- \rightarrow Fe$

B $Fe \rightarrow Fe^{2+} + 2e^-$

C $4OH^- \rightarrow O_2 + 2H_2O + 4e^-$

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

16 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

17 Which of the chemicals can extract iron from iron ore?

Bahan kimia yang manakah boleh mengekstrakan besi daripada bijih besi?

A Carbon dioxide

Karbon dioksida

B Lime stone

Batu kapur

C Coke

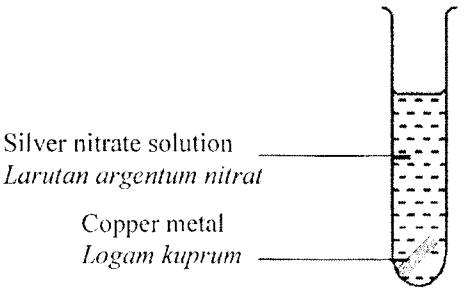
Arang kok

D Tin

Stanum

18 The diagram shows a reaction between copper metal and silver nitrate solution.

Rajah menunjukkan satu tindak balas antara logam kuprum dan larutan argentum nitrat.



Which of the following is true?

Pernyataan berikut yang manakah adalah benar?

A Copper is oxidised

Kuprum diosidaka

B Brown solid deposited on copper

Pepejal perang terenap pada kuprum

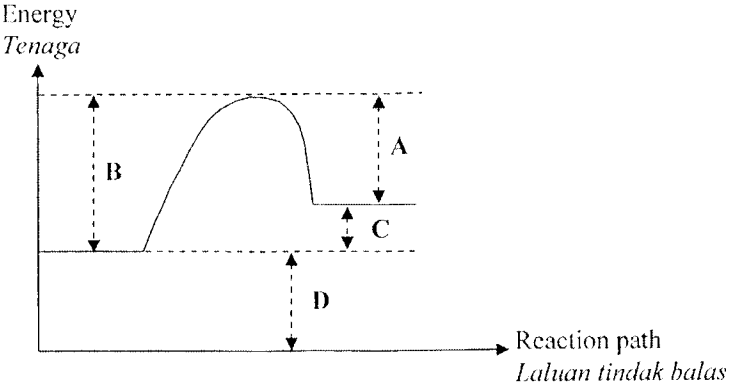
C Blue solution turns to colourless

Larutan biru bertukar menjadi tidak berwarna

D Oxidation number of silver change from 0 to +4

Nombor pengoksidaan bagi argentums bertukar daripada 0 ke +4

19 The energy level diagram below represents an endothermic reaction.
Gambarajah aras tenaga di bawah mewakili satu tindak balas endotermik.



Which of the following **A**, **B**, **C** and **D**, represents the heat change?
Antara **A**, **B**, **C** *dan* **D** *yang manakah menunjukkan perubahan tenaga?*

20 Which of the mixture will produce the highest heat of displacement?
Campuran yang manakah akan menghasilkan haba penyesaran yang tertinggi?

A Magnesium and copper(II) sulphate
Magnesium dan kuprum(II) *sulfat*

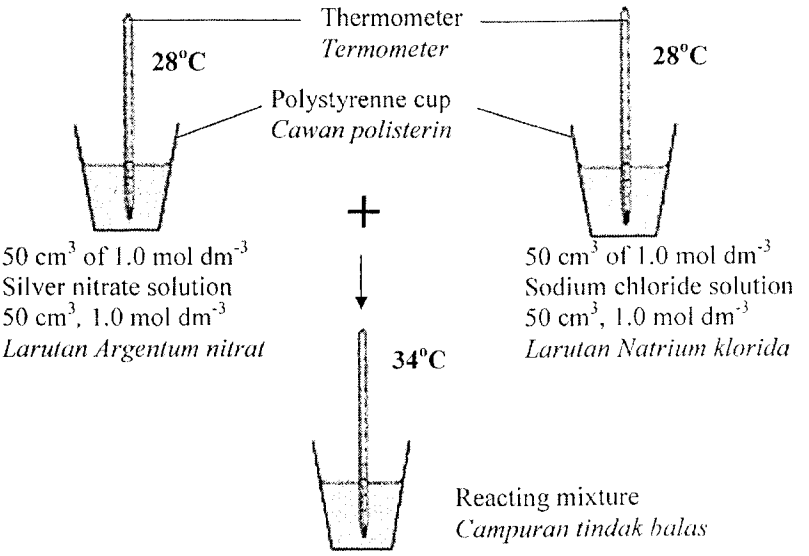
B Zinc and copper(II) sulphate
Zink dan kuprum(II) *sulfat*

C Iron and copper(II) sulphate
Besi dan kuprum(II) *sulfat*

D Tin and copper(II) sulphate
Timah dan kuprum(II) *sulfat*

21 The diagram shows an apparatus set-up to determine the heat of precipitation of silver chloride.

Rajah menunjukkan susunan alat radas untuk menentukan haba pemendakan argentum klorida.



What is the heat of precipitation of silver chloride?

[Density of solution: 1 g cm^{-3}; specific heat capacity of solution: 4.2 J g^{-1} $°C^{-1}$]

Berapakah haba pemendakan argentum klorida?

[*Ketumpatan larutan*= 1 g cm^{-3} ; *muatan haba tentu larutan*= 4.2 J g^{-1} $°C^{-1}$]

A 1.26 kJ mol^{-1}

B 2.52 kJ mol^{-1}

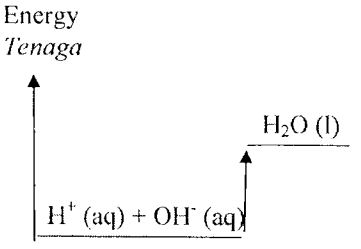
C 25.2 kJ mol^{-1}

D 50.4 kJ mol^{-1}

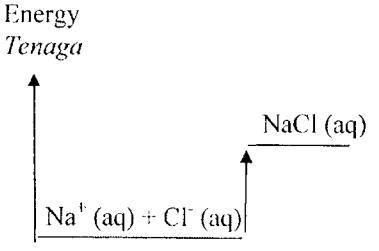
22 Which of the energy level diagram represent the neutralization between hydrochloric acid and sodium hydroxide solution?

Gambarrajah aras tenaga manakah yang mewakili tindak balas peneutralan antara asid hidroklorik dengan larutan natrium hidroksida?

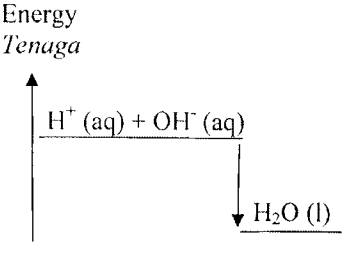
A



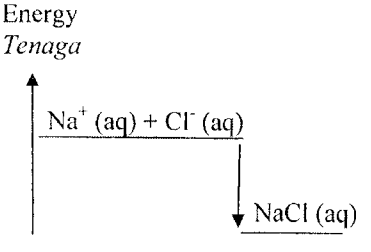
B



C



D



23 The heat of combustion of methanol is 715 kJ mol^{-1}.

What is the heat released when 25.6 g of methanol is burned?

[Relative molecular mass of methanol = 32]

Haba pembakaran bagi metanol ialah 715 kJ mol^{-1}.

Berapakah haba yang dibebaskan apabila 25.6 g *metanol dibakar?*

[*Jisim molekul relatif bagi metanol* = 32]

A 572 kJ

B 894 kJ

C 18304 kJ

D 22880 kJ

24 Which of the food additives and its functions is correctly matched?

Antara padanan berikut yang manakah benar tentang tambahan makanan dan fungsinya?

	Food additives ***Bahan tambahan makanan***	**Function** ***Fungsi***
A	Monosodium glutamate *Mononatrium glutamat*	Slows down the oxidation of food *Melambatkan pengoksidaan makanan*
B	Ascorbic acid *Asid askorbik*	Makes the food tastier *Meningkatkan rasa makanan*
C	Sodium benzoate *Natrium benzoat*	Slows down the spoilage of food *Melambatkan kerosakan makanan*
D	Acacia gam *Gam acacia*	Colours the food *Memberikan warna pada makanan*

25 Which type of medicine does codeine belongs to?

Apakah jenis ubat bagi kodeina?

A Analgesic

Analgesik

B Hormone

Hormon

C Antibiotics

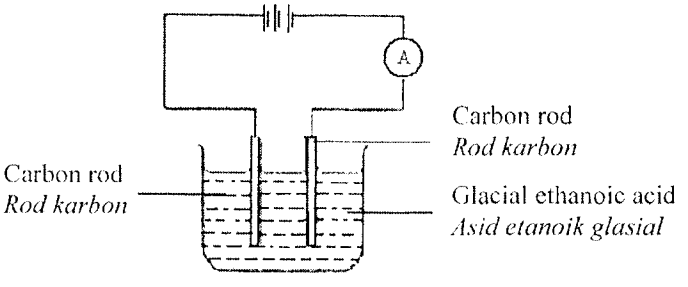
Antibiotik

D Psychotherapeutic drug

Ubat psikoteraputik

26 The diagram shows the apparatus set up of an electrolytic cell.

Rajah menunjukkan susunan radas bagi suatu sel elektrolisis.



Which of the following causes a deflection of the ammeter needle?

Antara berikut yang manakah menyebabkan jarum ammeter terpesong?

A Replace glacial ethanoic acid with terachloromethane

Gantikan asid etanoik glasial dengan tetraklorometana

B Replace the carbon rod with copper rod

Gantikan rod karbon dengan rod kuprum

C Reverse the terminals of the batteries

Terbalikkan kutub-kutub bateri

D Add water into glacial ethanoic acid

Campurkan air ke dalam asid etanoik glasial

27 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-anod untuk elektrolisis bagi larutan natrium nitrat dan larutan kuprum(II) *sulfat dengan mengguna karbon sebagai elektrod*?

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

28 Which of the following processes **cannot** carry out using electrolysis method?

Antara proses berikut, yang manakah ***tidak boleh*** *dilakukan secara elektrolisis*?

A Broken down molten lead(II) bromide into their constituent element

Mengurai plumbum(II) *bromida leburan kepada unsur juzuk masing-masing*

B Extraction of magnesium from its ore

Pengestrakan magnesium daripada bijihnya

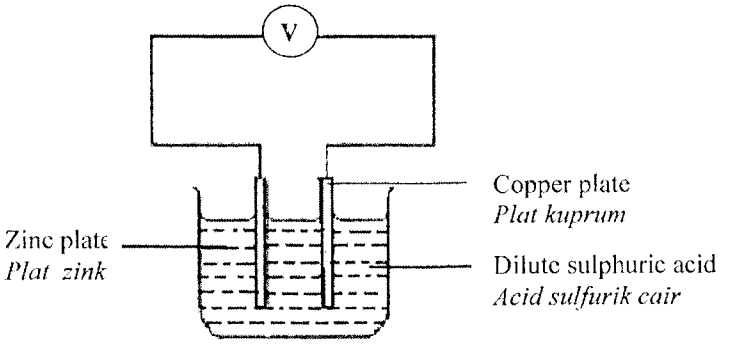
C Recharge lead-acid accumulator

Mengecas semula akumulator asid plumbum

D Making dry cell

Membina sel kering

29 The diagram shows the apparatus set- up of a voltaic cell.
Rajah menunjukkan susunan radas bagi suatu sel kimia.



Which statement is true?
Penyataan yang manakah benar?

A Electrons flow from copper plate to zinc plate through the external circuit
Elektron mengalir dari plat kuprum ke plat zink melalui litar luar

B Zinc plate acts as positive terminal
Plat zink bertindak sebagai terminal positif

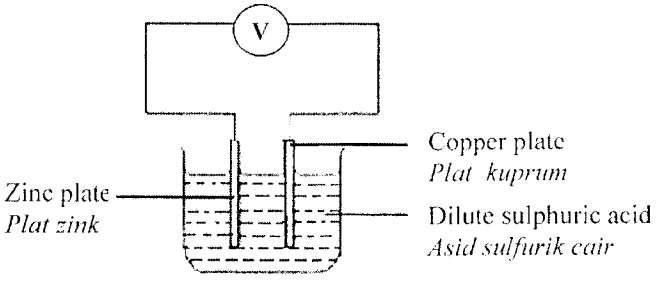
C Copper plate becomes thicker
Plat kuprum menebal

D Zinc plate becomes thinner
Plat zink menipis

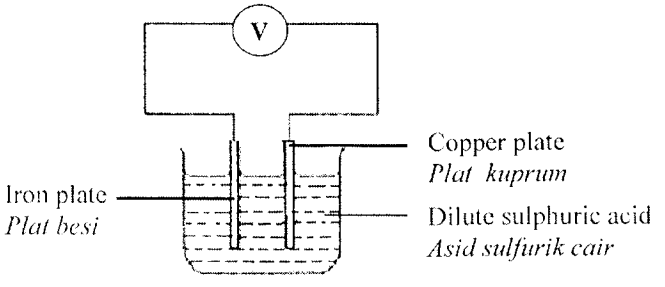
30 Which of the following voltaic cell has the highest voltmeter reading?

Antara berikut yang manakah sel kimia mempunyai bacaan voltmeter yang paling tinggi?

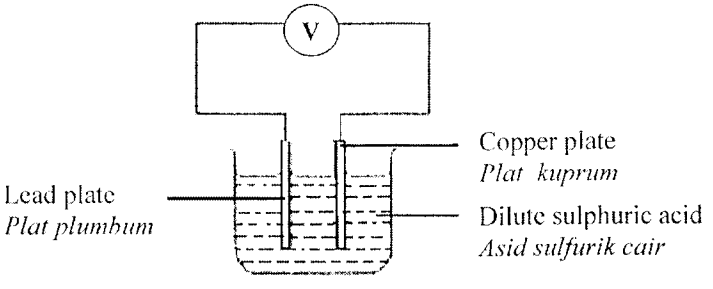
A



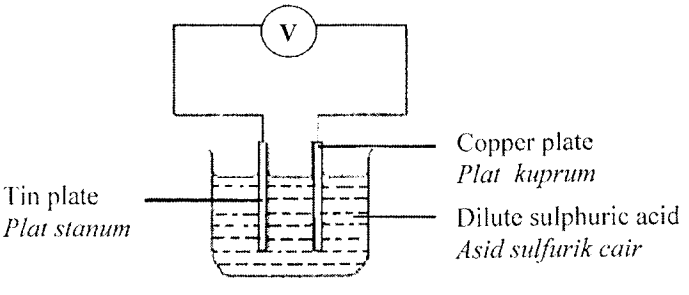
B



C



D



31 Which of the followings is true for one molecule of water, H_2O?

[Relative atomic mass : H=1, O=16 ; Avogadro's constant = 6 x $10^{23}mol^{-1}$]

Antara berikut yang manakah benar bagi satu molekul air, H_2O?

[*Jisim atom relatif: H=1, O=16; Pemalar Avogadro*= 6 x $10^{23}mol^{-1}$]

A Consists of two mole of hydrogen atom and one mole of oxygen atom

Mengandungi dua mol atom hydrogen dan satu mol oksigen atom

B Consists of two atoms of hydrogen and one atom of oxygen

Mengandungi dua atom hydrogen dan satu atom oksigen

C Relative molecular mass is 18 g

Jisim molekul relatif ialah 18 g

D Has 3 x 6 x 10^{23} atoms

Mempunyai 3 x 6 x 10^{23} atom

32 The table shows the pH value of ethanoic acid.

Jadual menunjukkan nilai pH bagi asid etanoik

Substance ***Bahan***	**pH value** ***Nilai pH***
Glacial ethanoic acid	7
Aqueous ethanoic acid	4

Which of the following statements is the best to explain for the different of pH value?

Antara pernyataan berikut yang manakah yang paling tepat menerangkan nilai pH *berlainan?*

A Presence of hydrogen ions in aqueous ethanoic acid

Kehadiran ion hidrogen dalam akueus asid etanoik

B Glacial ethanoic acid does not ionized in water

Asid etanoik glacial tidak mengion dalam air

C Glacial ethanoic acid does not consists water

Asid etanoik glacial tidak mengandungi air

D Presence of water in aqueous ethanoic acid

Kehadiran air dalam akueus asid etanoik

33 The chemical equation shows the dissociation of barium hydroxide in water.

Persamaan kimia menunjukkan penceraian barium hidroksida dalam air.

$$Ba(OH)_2\ (aq) \rightarrow Ba^{2+}(\ aq\ ) + 2\ OH^-(aq)$$

What is the number of moles of hydroxide ion in 250 cm^3 of 0.2 mol dm^{-3} barium hydroxide?

Berapakah bilangan mol ion hidroksida dalam 250 cm^3 0.2 mol dm^{-3} barium hidroksida?

A 0.05 mol

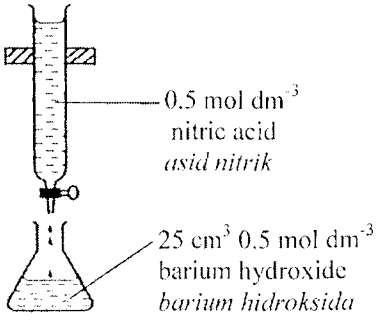
B 0.10 mol

C 0.20 mol

D 0.80 mol

34 The diagram shows the apparatus set -up for the titration between barium hydroxide solution and nitric acid.

Rajah menunjukkan susunan radas bagi pentitratan antara larutan barium hidroksida dan asid nitric.



The equation for the reaction is shown below.

Persamaan bagi tindak balas ditunjukkan di bawah

$$Ba(OH)_2 + 2HNO_3 \rightarrow Ba(NO_3)_2 + 2H_2O$$

What is the volume of nitric acid needed for the titration to reach end point?

Berapakah isipadu asid nitric diperlukan bagi mencapai takat akhir pentitratan?

A 14.5 cm^3

B 25.0 cm^3

C 50.0 cm^3

D 75.0 cm^3

35 Which pairs of the substances is used to prepare $CuSO_4$ salt?

Antara pasangan bahan yang manakah digunakan untuk menyediakan garam $CuSO_4$?

A $Cu(NO_3)_2$ and Na_2SO_4

B CuO and H_2SO_4

C Cu and H_2SO_4

D Cu and $MgSO_4$

36 The table shows the cation test for solution X.

Jadual menunjukkan ujian kation bagi larutan X

Test *Ujian*	**Observation** *Pemerhatian*
Sodium hydroxide solution is added into aqueous solution X until in excess. *Larutan natrium hidroksida ditambahkan ke dalam larutan akueus X sehingga berlebihan.*	White precipitate is formed. White precipitate does not dissolve in excess of sodium hydroxide solution. *Mendakan putih terbentuk. Mendakan putih tidak larut dalam larutan natrium hidroksida berlebihan.*
Ammonia aqueous is added into solution X. *Akueus ammonia ditambah ke dalam larutan X.*	No precipitate. *Tiada mendakan.*

What cation present in solution X?

Apakah kation yang hadir dalam larutan X?

A NH_4^+

B Zn^{2+}

C Mg^{2+}

D Ca^{2+}

37 The chemical equation represents the reaction between magnesium ribbon and sulphuric acid.
Persamaan kimia itu mewakili tindak balas antara pita magnesium dan asid sulfurik.

$$H_2SO_4(aq) + Mg(s) \rightarrow MgSO_4(aq) + H_2(g)$$

Which of the factors increases the rate of reaction of the reaction?
Antara faktor berikut yang manakah meningkatkan kadar tindak balas tindak balas itu?

A Increase the volume of sulphuric acid
Meningkatkan isipadu asid sulfuric

B Use excess of magnesium ribbon
Guna pita magnesium berlebihan

C Add water into the reactants
Tambah air kepada bahan tindak balas

D Use magnesium powder
Guna serbuk magnesium

38 What is the meaning of effective collision?
Apakah yang dimaksudkan dengan perlanggaran berkesan

A Energy of particles have less energy than activation energy
Tenaga zarah mempunyai tenaga lebih rendah daripada tenaga pengaktifan

B Collision takes place before reaction
Perlanggaran berlaku sebelum tindak balas berlaku

C Collision causes reaction to occur
Perlanggaran menyebabkan tindak balas berlaku

D Particles have the highest energy
Zarah mempunyai tenaga yang paling tinggi

39 Which of the conditions applied in the Haber Process to get optimum yield?

Antara keadaan berikut digunakan dalam proses Haber untuk mendapat hasil optimum?

	Temperature/°C ***Suhu***	**Pressure/atm** ***Tekanan***	**Catalyst** ***Mangkin***
A	450	1	Vanadium(V) oxide *Vanadium(V) oksida*
B	500	200	Vanadium(V) oxide *Vanadium(V) oksida*
C	450	1	Iron powder *Serbuk besi*
D	500	200	Iron powder *Serbuk besi*

40 Which of the compounds are hydrocarbon?

Antara sebatian berikut yang manakah ialah hidrokarbon?

I Ethane
Etana

II Ethene
Etena

III Ethanol
Etanol

IV Ethanoic acid
Asid etanoik

A I and II

B I and III

C II and IV

D III and IV

41 Which of the following is isomer for pentane, C_5H_{12}?

Antara berikut yang manakah merupakan isomer bagi pentana?

A 2- methylpropane

2-metilpropana

B 2,2-dimethylpropane

2,2-dimetilpropana

C 2,2-dimethybutane

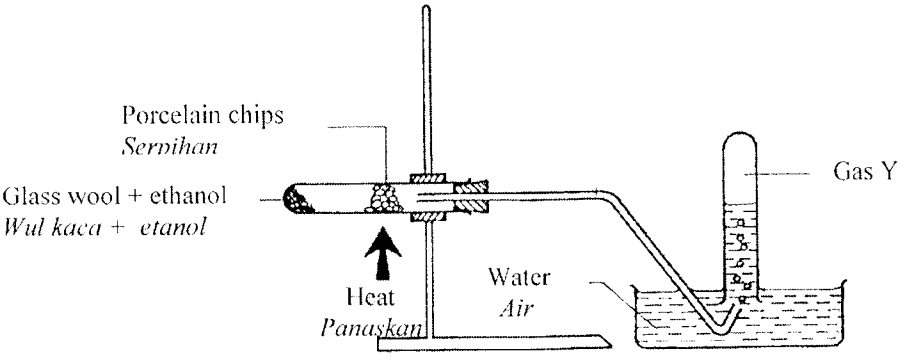
2,2-dimetilbutana

D 2-ethylpropane

2-etilpropana

42 The diagram shows the apparatus set-up in preparing gas Y.

Rajah menuunjukkan susunan radas dalam penyediaan gas Y.



What is gas Y?

Apakah gas Y?

A Ethane

Etana

B Ethene

Etena

C Methane

Metana

D Carbon dioxide

Karbon dioksida

43 Compound Z reacts with magnesium to produce hydrogen gas.

What is Z?

Sebatian Z bertindak balas dengan magnesium untuk menghasilkan gas hydrogen.

Apakah Z?

A Propane , C_3H_8

Propana, C_3H_8

B Propene, C_3H_6

Propena, C_3H_6

C Propanol,C_3H_5OH

Propanol, C_3H_5OH

D Propanoic acid , C_2H_5COOH

Asid propanoik, C_2H_5COOH

44 Which process use sulphuric acid in its production?

Antara proses berikut yang manakah menggunakan asid sulfurik dalam pembuatannya?

A Making explosive

Membuat bahan letupan

B Manufacture detergent

Penghasilan detergen

C Making fungicides

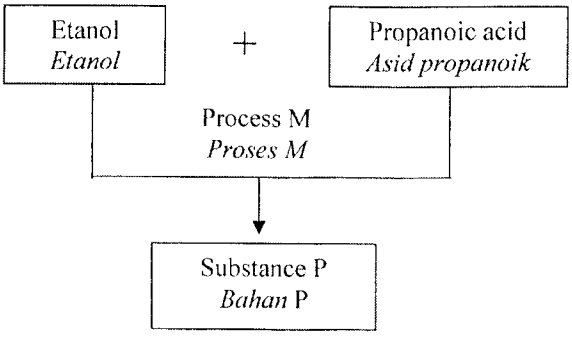
Membuat fungisid

D Manufacture baking powder

Penghasilan serbuk penaik

45 The diagram shows a flow chart of process M in preparing substance P

Rajah menunjukkan carta alir bagi proses M *dalam penyediaan bahan* P.



Which of the following is true?

Antara berikut yang manakah benar?

	Process M ***Proses* M**	**Substance P** ***Bahan* P**
A	Esterification *Pengesteran*	Ethyl propanoate *Etil propanoat*
B	Hydrogenation *Penghidrogenan*	Propyl ethanoate *Propil etanoat*
C	Hydrogenation *Penghidrogenan*	Ethyl propanoate *Etil propanoat*
D	Esterification *Pengesteran*	Propyl ethanoate *Propil etanoat*

46 Steel is an alloy of iron.

Which of the following is **not** the property of steel?

Keluli merupakan aloi bagi besi.

*Antara berikut yang manakah **bukan** sifat keluli?*

A Harder

Lebih keras

B Malleable

Mulur

C Higher melting point

Takat lebur yang lebih tinggi

D More resistance to rusting

Lebih tahan terhadap pengaratan

47 Which of the properties is true for glass?

Antara sifat berikut yang manakah benar bagi kaca?

A Ductile

Ketempaan

B Transparent

Lutsinar

C Good heat conductor

Pengalir haba yang baik

D Can react with chemical

Boleh bertindak balas dengan bahan kimia

48 Cooking food using pressure cooker is faster than a cooking pot.

Which of the following explain the statement above?

Memasak makanan menggunakan periuk tekanan lebih cepat berbanding dengan periuk masak.

Antara berikut yang manakah menerangkan pernyataan di atas?

A Less water is used in cooking

Kurang air digunakandalam masakan

B Temperature of food decreases

Suhu makanan berkurangan

C The boiling point of water increases

Takat didih air meningkat

D Total surface area of food increases

Jumlah luas permukaan makanan meningkat

49 Which pair is correctly matched?

Pasangan manakah dipadankan dengan betul?

	Property *Sifat*	**Potassium bromide** *Kalium bromida*	**Tetrachloromethane** *Tetraklorometana*
A	Melting and boiling point *Takat lebur dan takat didih*	High *Tinggi*	High *Tinggi*
B	Electrical conductivity *Kekonduksian Elektrik*	Conducts electricity in a molten state *Mengkonduksikan elektrik dalam keadaan leburan*	Does not conduct electricity *Tidak mengkonduksikan elektrik*
C	Solubility in water *Kelarutan dalam air*	Insoluble *Tidak larut*	Soluble *Larut*
D	Physical state at room temperature *Keadaan fizikal pada suhu bilik*	Liquid *cecair*	Gas *Gas*

50 The list shows the properties of a body of F1 racing car.

Senarai menunjukkan sifat-sifat bagi badan kereta lumba F1.

- Strong
  Kuat
- Light
  Ringan
- Can withstand high temperature
  Boleh tahan haba tinggi
- Durable
  Tahan lasak

Which substances has the properties?

Antara bahan berikut yang manakah mempunyai sifat-sifat itu?

A Composite material

Bahan komposit

B Concrete

Konkrit

C Plastic

Plastik

D Ceramic

Seramik

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 dikuti 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 provided are not drawn to scale unless stated.
   Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.

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

Name : .....

Class : .....

PERSIDANGAN KEBANGSAAN PENGETUA-PENGETUA
SEKOLAH MENENGAH CAWANGAN NEGERI SEMBILAN

PEPERIKSAAN PERCUBAAN BERSAMA SIJIL PELAJARAN MALAYSIA 2010

4541/2

CHEMISTRY

Kertas 2

Ogos/Sept.

$2\frac{1}{2}$ **jam**

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	10	
	2	10	
	3	10	
	4	10	
	5	11	
	6	9	
B	7	20	
	8	20	
C	9	20	
	10	20	
Jumlah			

Kertas soalan ini mengandungi 28 halaman bercetak

Section A
Bahagian A
[60 marks]
[60 *markah*]
Answer **all** the questions in this section.
*Jawab **semua** soalan dalam bahagian ini.*

1 (a) Diagram 1.1 shows a process occurs on iodine in a gas jar.
Rajah 1.1 *menunjukkan satu proses berlaku pada iodin di dalam balang gas.*

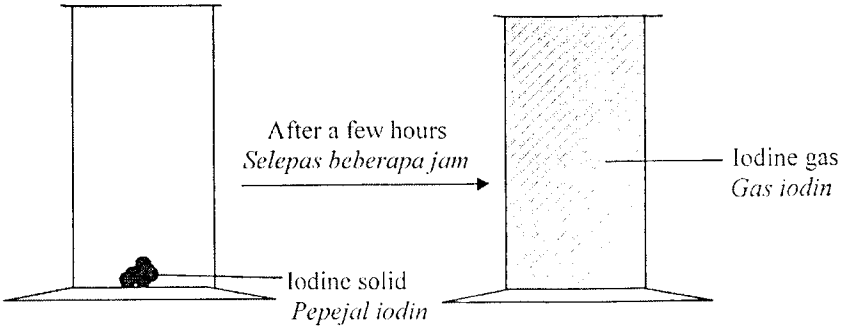


Diagram 1.1
Rajah 1.1

(i) Name the process.
Namakan proses itu.

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

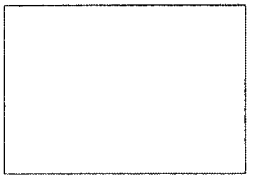
(ii) State the type of particle in iodine.
Nyatakan jenis zarah dalam iodin.

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

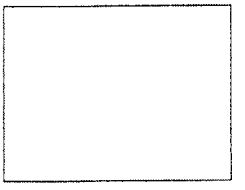
(iii) Write the chemical formula for iodine.
Tulis formula kimia bagi iodin.

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

(iv) Draw the arrangement of iodine particles in solid state and gaseous state.
Lukis susunan zarah-zarah iodin dalam keadaan pepejal dan keadaan gas.



Solid
Pepejal



Gas
Gas

[2 marks]
[2 *markah*]

(b) (i) The gas jar contains iodine solid is immersed in hot water.
State the rate of physical change of iodine.
Balang gas mengandungi pepejal iodin direndamkan dalam air panas.
Nyatakan kadar perubahan fizikal bagi iodin.

.....

[1 mark]
[1 *markah*]

(ii) Explain your answer in b(i) by using kinetic theory of matter.
Terangkan jawapan anda di b(i) *dengan menggunakan teori kinetik jirim.*

.....

.....

[2 marks]
[2 *markah*]

(c) Diagram 1.2 shows diffusion occurs when the cover is removed.
Rajah 1.2 menunjukkan resapan berlaku bila penutup dialihkan.

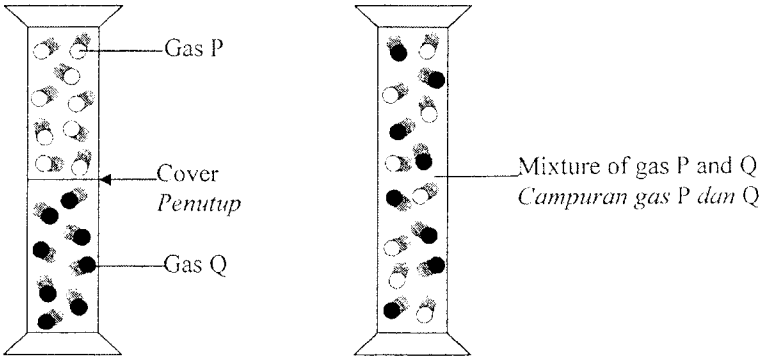


Diagram 1.2
Rajah 1.2

(i) State the meaning of diffusion.
Nyatakan maksud resapan.

.....

....

[1 mark]
[1 *markah*]

(ii) The colour of gas Q is brown while gas P is colourless.
Mixture of gas P and Q is produced when the cover is removed.
State the colour of the mixture.
Warna gas Q ialah perang manakala gas P tak berwarna.
Campuran gas P dan Q dihasilkan apabila penutup dialihkan.
Nyatakan warna bagi campuran itu.

.....

[1 mark]
[1 *markah*]

2 Diagram 2 shows the electron arrangement of a compound formed between elements X and Y.
Rajah 2 menunjukkan susunan elektron bagi satu sebatian terbentuk antara unsur X *dan unsur* Y.

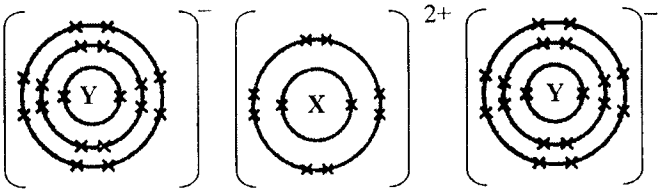


Diagram 2
Rajah 2

(a) State the type of compound.
Nyatakan jenis sebatian itu.

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

(b) Write the formula of the compound.
Tulis formula bagi sebatian itu.

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

(c) Write the electron arrangement for
Tulis susunan elektron bagi

(i) atom X: .....
atom X

(ii) atom Y : .....
atom Y

[2 marks]
[2 *markah*]

(d) Two atoms Y share electrons to form a substance.
Dua atom Y *berkongsi elektron untuk membentuk satu bahan.*

(i) Draw the electron arrangement of the substance.
Lukiskan susunan elektron bagi bahan itu.

[2 marks]
[2 *markah*]

(ii) Name the type of bond formed in (d) (i).
Namakan jenis ikatan terbentuk dalam (d) (i).

.....

[1 mark]
[1 *markah*]

(e) Compare the melting point of compound in (a) and substance in (d).
Explain your answer.
Bandingkan takat lebur bagi sebatian dalam (a) *dan bahan dalam* (d).
Terangkan jawapan anda.

.....

.....

.....

[3 marks]
[3*markah*]

3 Table 3 shows the pH values of four solutions P, Q, R and S with a concentration of 0.1 mol dm^{-3}.
Jadual 3 menunjukkan nilai-nilai pH *bagi larutan-larutan* P, Q, R *dan* S *yang mempunyai kepekatan* 0.1 mol dm^{-3}.

pH value *Nilai* **pH**	1	7	10	14
Solution ***Larutan***	P	Q	R	S

Table 3
Jadual 3

(a) (i) Which solution is the strongest alkaline. Mark (√) for your answer in the box provided in Table 3.
Larutan manakah merupakan alkali paling kuat. Tandakan (√) jawapan anda dalam petak yang dibekalkan dalam Jadual 3.

[1 mark]
[1 *markah*]

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

.....

.....

.....

[2 marks]
[2 *markah*]

(b) Diagram 3 shows the apparatus set-up for a titration.
Rajah 3 menunjukkan susunan radas bagi suatu pentitratan.

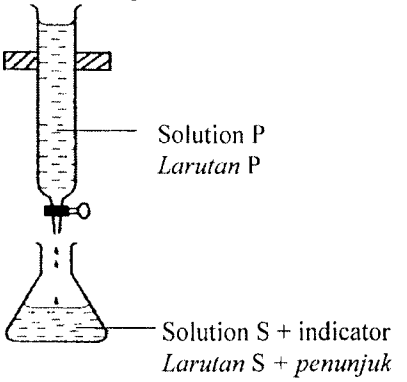


Diagram 3
Rajah 3

(i) Name the reaction.
Namakan tindak balas tersebut.

.....

[1 mark]
[1 *markah*]

(ii) Name a suitable indicator.
Namakan satu penunjuk yang sesuai.

.....

[1 mark]
[1 *markah*]

(iii) Based on your answer in (b) (ii), state the colour change at the end point.
Berdasarkan jawapan anda dalam (b) (ii), *nyatakan perubahan warna pada takat akhir.*

.....

[1 mark]
[1 *markah*]

(iv) Write the ionic equation for the reaction.
Tuliskan persamaan ion bagi tindak balas tersebut.

.....

[1 mark]
[1 *markah*]

(c) Concentration of solution P is 0.1 mol dm^{-3}.
5.0 cm^3 of solution P is added with water until its volume is 20.0 cm^3.
Kepekatan larutan P ialah 0.1 mol dm^{-3}.
5.0 cm^3 *larutan P ditambah dengan air sehingga isi padunya menjadi* 20.0 cm^3.

(i) Calculate the new concentration of solution P.
Hitung kepekatan baru bagi larutan P.

[2 marks]
[2 *markah*]

(ii) Compare the number of ions present in solution P before and after dilution.
Bandingkan bilangan ion-ion yang hadir dalam larutan P *sebelum dan selepas dicairkan.*

.....

[1 mark]
[1 *markah*]

4 The equation below represents the reaction between excess of calcium carbonate and hydrochloric acid.
Persamaan di bawah menunjukkan tindak balas antara kalsium karbonat berlebihan dan asid hidroklorik.

$$CaCO_3(s) + 2HCl(aq) \rightarrow CaCl_2(aq) + CO_2(g) + H_2O(l)$$

Carbon dioxide gas is collected in a burette and the total volume of carbon dioxide gas is recorded at an interval of 30 seconds.
Table 4 shows the results obtained.
Gas karbon dioksida dikumpulkan dalam suatu buret dan jumlah isipadu gas karbon dioksida dicatatkan pada setiap selang masa 30 *saat.*
Jadual 4 *menunjukkan keputusan-keputusan yang diperolehi.*

Time / s ***Masa***	0	30	60	90	120	150	180
Total volume of CO_2 gas collected / cm^3 ***Jumlah isipadu* gas CO_2 *dikumpul***	0	23.00	35.00	42.00	44.00	44.00	44.00

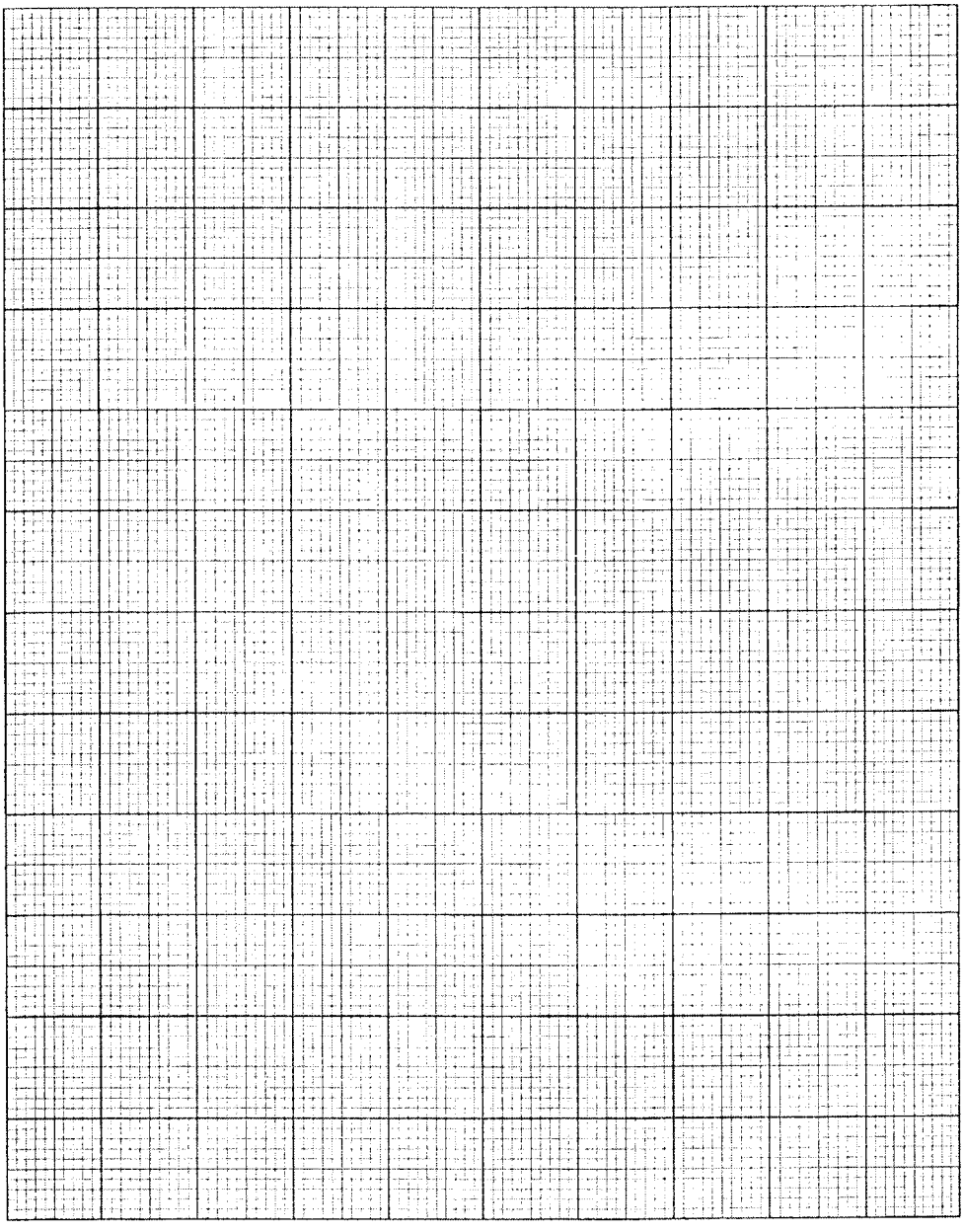
Table 4
Jadual 4

(a) Draw a labelled diagram to show the apparatus set-up and materials used to carry out the experiment in the laboratory.
Lukis satu gambarajah berlabel untuk menunjukkan susunan radas dan bahan-bahan diguna untuk menjalankan experiment itu dalam makmal.

[2 marks]
[2 *markah*]

(b) Draw a graph of total volume of carbon dioxide gas collected against time.
Lukis satu graf jumlah isipadu gas karbon dioksida dikumpul melawan masa.

[4 marks]
[4 *markah*]



(c) (i) By using the graph you have drawn in (b), determine the rate of reaction at 90 seconds.
Dengan menggunakan graf yang telah diplotkan di (b), *tentukan kadar tindak balas pada* 90 *saat.*

[2 marks]
[2 *markah*]

(ii) Predict the rate of reaction at 105 seconds.
Ramalkan kadar tindak balas pada 105 *saat.*

.....

[1 mark]
[1 *markah*]

(iii) Explain the difference rate of reaction in (c) (i) and (ii).
Jelaskan perbezaan kadar tindak balas dalam (c) (i) *dan* (ii).

.....

[1mark]
[1 *markah*]

5 (a) Diagram 5.1 shows the apparatus set-up to study the reaction involving the transfer of electron at a distance.
Rajah 5.1 *menunjukkan susunan radas untuk mengkaji tindak balas yang melibatkan pemindahan elektron pada satu jarak.*

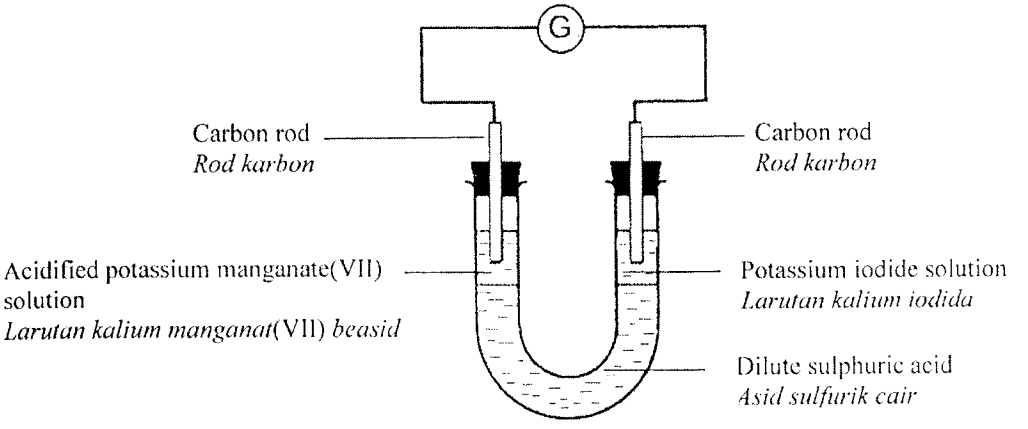


Diagram 5.1
Rajah 5.1

(i) What is the function of dilute sulphuric acid?
Apakah fungsi asid sulfurik cair?

.....

[1 mark]
[1 *markah*]

(ii) In Diagram 5.1, indicate the direction of electron flow by using an arrow.
Dalam Rajah 5.1, *tunjukkan arah pengaliran elektron dengan menggunakan satu anak panah.*

[1 mark]
[1 *markah*]

(iii) State the colour change for acidified potassium manganate(VII) solution.
Nyatakan perubahan warna bagi larutan kalium manganat(VII) *berasid.*

.....

[1 mark]
[1 *markah*]

(iv) Name the reducing agent for the reaction.
Namakan agen penurunan bagi tindak balas tersebut.

.....

[1 mark]
[1 *markah*]

(v) Write the half-equation for substance named in (a) (iv).
Tuliskan persamaan setengah bagi bahan yang dinamakan dalam (a) (iv).

.....

[1 mark]
[1 *markah*]

(b) Diagram 5.2 shows a redox reaction between bromine water and iron(II) sulphate solution.
Rajah 5.2 *menunjukkan satu tindak balas redoks antara air bromin dan larutan ferum*(II) *sulfat.*

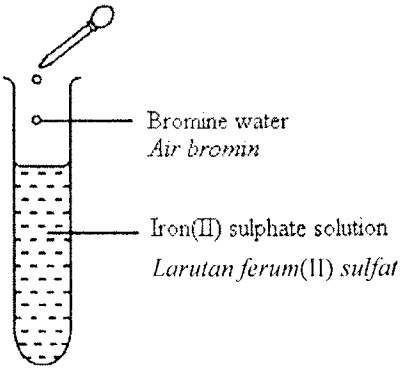


Diagram 5.2
Rajah 5.2

(i) State observation for the reaction.
Nyatakan pemerhatian bagi tindak balas tersebut.

.....

[1 mark]
[1 *markah*]

(ii) What is the change in the oxidation number of bromine?
Apakah perubahan nombor pengosidaan bagi bromin?

.....

[1 mark]
[1 *markah*]

(iii) Write the ionic equation for the reaction.
Tuliskan persamaan ion bagi tindak balas tersebut.

.....

[2 marks]
[2 *markah*]

(iv) Describe a test to confirm the cation produced.
Huraikan satu ujian untuk mengenal kation yang terhasil.

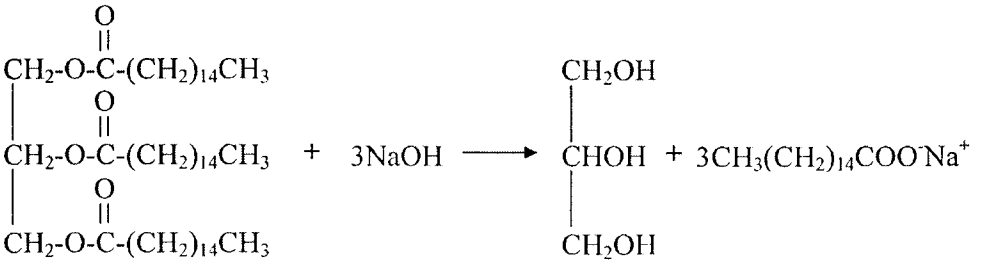
.....

.....

.....

[2 marks]
[2 *markah*]

6 The following equation shows a reaction in the preparation of sodium palmitate soap.
Persamaan berikut menunjukkan tindak balas penyediaan sabun natrium palmitat.



Palm oil *Minyak sawit*	Concentrated sodium hydroxide solution *Larutan natrium hidroksida pekat*	Glycerol *Gliserol*	Soap molecule *Molekul sabun*

(a) (i) Name the reaction.
Namakan tindak balas.

.....

[1 mark]
[1 *markah*]

(ii) Sodium chloride is added to the mixture to complete the reaction.
Explain why?
Natrium klorida ditambah kepada campuran untuk melengkapkan tindak balas.
Terangkan kenapa?

.....

[1 mark]
[1 *markah*]

(iii) A student wants to prepare a potassium palmitate soap.
Name the alkali used.
Seorang pelajar ingin menyediakan sejenis sabun kalium palmitat.
Namakan jenis alkali yang digunakan.

.....

[1 mark]
[1 *markah*]

(b) Additives in detergent increase the effectiveness of detergent as a cleaning agent. Table 6.1 shows the function of detergent additives.
Bahan tambah dalam detergen dapat meningkatkan kuasa pembersihannya. Jadual 6.1 menunjukkan fungsi bagi bahan tambah bagi detergen.

Detergent additives *Bahan tambah dalam detergen*	**Function** *Fungsi*
Drying agent *Agen pengering*	Maintains the detergent powder in dry form *Memastikan serbuk detergen sentiasa dalam keadaan kering*
Biological enzyme *Enzim biologi*	.....
Whitening agent *Agen peluntur*	.....

Table 6.1
Jadual 6.1

Complete Table 6.1.
Lengkapkan Jadual 6.1.

[2 marks]
[2 *markah*]

(c) (i) Table 6.2 shows the functions of three examples of medicine.
Jadual 6.2 menunjukkan fungsi bagi tiga jenis contoh ubat.

Example of medicine *Contoh jenis ubat*	**Function** *Fungsi*
Aspirin	Relieves pain *Melegakan rasa sakit*
Streptomycin	.....
Tranquilizer	.....

Table 6.2
Jadual 6.2

Complete Table 6.2.
Lengkapkan Jadual 6.2.

[2 marks]
[2 *markah*]

(ii) State **one** side effect if aspirin is taken frequently.
*Nyatakan **satu** kesan sampingan jika aspirin digunakan selalu.*

.....

[1 mark]
[1 *markah*]

(iii) A doctor advises a patient to consume all the streptomycin prescribed.
Give **one** reason.
Doktor menasihatkan seorang pesakitnya supaya menghabiskan semua streptomisin yang telah diberikan.
*Berikan **satu** sebab.*

.....

[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) The statement below is about a reaction.
Pernyataan di bawah ialah tentang suatu tindak balas.

0.01 mol of hydrogen chloride gas reacts with 0.01 mol of ammonia gas produces 0.01 mol of ammonium chloride solid 0.01 mol *gas hydrogen klorida bertindak balas dengan* 0.01 mol *gas ammonia menghasilkan* 0.01 mol *pepejal ammonium klorida*

(i) What is the meaning of a mole?
Apakah yang dimaksudkan dengan satu mol?

[1 mark]
[1 *markah*]

(ii) Calculate the numbers of particles in 0.01 mol of ammonium chloride.
[Avogadro constant = 6.02×10^{23} mol^{-1}]
Hitungkan bilangan zarah-zarah dalam 0.01 mol *ammonium klorida.*
[*Pemalar Avogadro* = 6.02×10^{23} mol^{-1}]

[1 mark]
[1 *markah*]

(iii) Write the molecular formulae of hydrogen chloride and ammonia.
Calculate their relative molecular mass.
[Relative atomic mass: H = 1, N = 14, Cl = 35.5]
Tuliskan formula molekul bagi hydrogen klorida dan ammonia.
Hitungkan jisim molekul mereka.
[*Jisim atom relative*: H = 1, N = 14, Cl = 35.5]

[4 marks]
[4 *markah*]

(b) Below is a chemical equation for a reaction.
Di bawah ialah persamaan kimia bagi suatu tindak balas.

$$2KI(aq) + Pb(NO_3)_2(aq) \longrightarrow 2KNO_3(aq) + PbI_2(s)$$

(i) Name the reaction and state **one** observation for the reaction.
*Namakan tindak balas itu dan nyatakan **satu** permerhatian bagi tindak balas itu.*

[2 marks]
[2 *markah*]

(ii) Based on the chemical equation, interpret the equation qualitatively and quantitatively.
Berdasarkan kepada persamaan kimia itu, tafsirkan persamaan itu secara kualitatif dan kuantitatif.

[4 marks]
[4 *markah*]

(c) The statement below describe an activity in laboratory.
Pernyataan di bawah menghuraikan satu aktiviti dalam makmal.

An activity is carried out as follows: Copper (II) carbonate is heated in a test tube. Gas produced is passed in lime water through a delivery tube. *Suatu aktiviti dijalankan seperti berikut:* *Kuprum(II) karbonat dipanaskan dalam sebuah tabung uji. Gas yang terhasil dihasilkan dilalukan ke dalam air kapur melalui tiub penghantar.*

(i) Draw the apparatus set-up for the activity.
Lukis susunan radas bagi aktiviti itu.

[2 marks]
[2 *markah*]

(ii) Write the chemical equation for the reaction.
Tulis persamaan kimia bagi tindak balas itu.

[2 marks]
[2 *markah*]

(iii) 6.2 g of copper(II) carbonate is used in the reaction.
Calculate the volume of carbon dioxide gas produced at room condition.
[Relative atomic mass: C = 12, O = 16, Cu = 64.
Molar volume at room condition = 24 dm^3 mol^{-1}]
6.2 g *kuprum*(II) *karbonat digunakan dalam tindak balas ini.*
Hitungkan isipadu gas karbon dioksida dihasilkan pada keadaan bilik.
[Jisim atom relatif: C = 12, O = 16, Cu = 64.
Isipadu molar pada keadaan bilik = 24 dm^3 mol^{-1}]

[4 marks]
[4 *markah*]

8 (a) Neutralisation is an exothermic reaction. The thermochemical equation is shown below:
Peneutralan ialah suatu tindak balas eksotermik. Persamaan termokimia ditunjukkan di bawah:

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

Based on the equation,
Berdasarkan persamaan tersebut,

(i) draw the energy level diagram
lukis rajah aras tenaga

[3 marks]
[3 *markah*]

(ii) state **one** observation
*nyatakan **satu** permerhatian*

[1 mark]
[1 *markah*]

(b) A student carried out an experiment to determine the heat of precipitation of silver chloride by using 25 cm^3 of 0.5 mol dm^{-3} silver nitrate solution and 25 cm^3 of 0.5 mol dm^{-3} sodium chloride solution. Table 8 shows the results of the experiment.
Seorang pelajar telah menjalankan satu eksperimen untuk menentukan haba pemendakan argentum klorida dengan mengguna 25 cm^3 0.5 mol dm^{-3} *larutan argentum nitrat dan* 25 cm^3 0.5 mol dm^{-3} *larutan natrium klorida. Jadual* 8 *menunjukkan keputusan eksperimen tersebut.*

Initial temperature of silver nitrate solution / °C *Suhu awal larutan argentum nitrat*	29.0
Initial temperature of sodium chloride solution / °C *Suhu awal larutan natrium klorida*	28.0
Highest temperature of the reaction mixture / °C *Suhu tertinggi campuran tindak balas*	34.0

Table 8
Jadual 8

(i) State the meaning of heat of precipitation.
Nyatakan maksud haba pemendakan.

[1 mark]
[1 *markah*]

(ii) Calculate:
Hitungkan:

- the heat change during the reaction
[Specific heat capacity of a solution = 4.2J g^{-1} $°C^{-1}$;
Density of solution = 1 g cm^{-3}]
perubahan haba semasa tindak balas
[*Muatan haba tentu bagi larutan* = 4.2J g^{-1} $°C^{-1}$;
Ketumpatan larutan = 1 g cm^{-3}]

- the number of moles of silver chloride formed
bilangan mol argentum klorida terbentuk

- the heat of precipitation for this reaction
haba pemendakan bagi tindak balas tersebut

[3 marks]
[3 *markah*]

(iii) The experiment is repeated using 50 cm^3 of 0.5 mol dm^{-3} silver nitrate solution and 50 cm^3 of 0.5 mol dm^{-3} sodium chloride solution.
Predict the temperature change and give your reason.
Experimen diulangi dengan menggunakan 50 cm^3 0.5 mol dm^{-3} *larutan argentum nitrat dan* 50 cm^3 0.5 mol dm^{-3} *larutan natrium klorida.*
Ramalkan perubahan suhu dan berikan alasan anda.

[2 marks]
[2 *markah*]

(c) Diagram 8 shows graph of the value of heat of combustion of alcohol versus the number of carbon atoms per molecule of alcohol.
Rajah 8 menunjukkan graf nilai haba pembakaran alkohol melawan bilangan atom karbon per molekul alkohol.

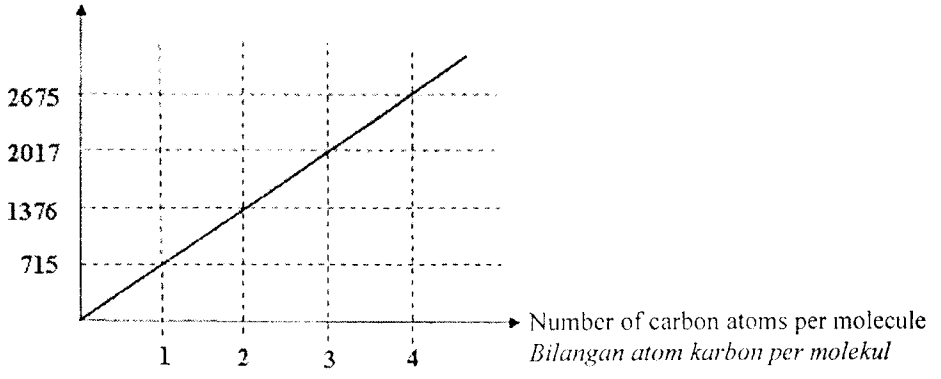


Diagram 8
Rajah 8

(i) Based on the graph in Diagram 8, state the relationship between the number of carbon atoms and the heat of combustion.
Explain your answer.
Berdasarkan graf dalam Rajah 8, nyatakan perhubungan antara bilangan atom karbon dengan haba pembakaran.
Jelaskan jawapan anda.

[3 marks]
[3 *markah*]

(ii) Calculate the heat released when 3.0 g of propanol is completely burn in air.
[Relative atomic mass: C = 12, H = 1, O = 16]
Hitungkan haba yang dibebaskan apabila 3.0 g *propanol terbakar lengkap dalam udara.*
[*Jisim atom relatif*: C = 12, H = 1, O = 16]

[2 marks]
[2 *markah*]

(iii) Draw the structural formula for isomers of propanol.
Lukiskan formula struktur bagi isomer-isomer bagi propanol.

[2 marks]
[2 *markah*]

(d) The statement below is about a reaction.
Pernyataan di bawah ialah tentang suatu tindak balas.

When a mixture of propanol and methanoic acid heated with a fews drops of concentrated sulpuhuric acid, an organic compound X is formed. *Apabila satu campuran propanol dan asid metanoik dipanas dengan beberapa titik asid sulfurik pekat, satu sebatian organik* X *terbentuk.*

(i) Name compound X.
Namakan sebatian X.

(ii) Draw structural formula of compound X.
Lukiskan formula struktur sebatian X.

(iii) State one special characteristic of compound X.
Nyatakan satu sifat istimewa bagi sebatian X.

[3 marks]
[3 *markah*]

Section C
Bahagian C
[20 marks]
[20 *markah*]
Answer **one** question from this section.
*Jawab **satu** soalan daripada bahagian ini.*

9 (a) Diagram 9 shows the examples of saturated and unsaturated fats.
Rajah 9 menunjukkan contoh-contoh lemak tepu dan lemak tak tepu.

Diagram 9
Rajah 9

(i) What is the meaning of *fat*?
Apakah yang dimaksudkan dengan lemak?

[1 mark]
[1 *markah*]

(ii) Compare between the saturated and unsaturated fats.
Bandingkan lemak tepu dan lemak tak tepu.

[4 marks]
[4 *markah*]

(iii) State **two** importances of fats to our body.
*Nyatakan **dua** kepentingan lemak kepada badan kita.*

[2 marks]
[2 *markah*]

(iv) Describe briefly the effect of fats on our health.
Huraikan secara ringkas kesan lemak terhadap kesihatan kita.

[3 marks]
[3 *markah*]

(b) Palm oil can be converted to margarine by catalytic hydrogenation.
Minyak kelapa sawit boleh ditukarkan kepada majerin oleh penghidrogenan bermangkin.

Based on the statement above,
Berdasarkan kepada pernyataan di atas,

(i) state the meaning of hydrogenation.
nyatakan maksud penghidrogenan.

[1 mark]
[1 *markah*]

(ii) describe the conversion of palm oil to margarine.
huraikan penukaran minyak kelapa sawit kepada majerin.

[4 marks]
[4 *markah*]

(c) Fresh latex coagulates when exposed to air for a few hours.
Explain why.
Susu getah segar tergumpal bila terdedah kepada udara selama beberapa jam.
Terangkan mengapa.

[5 marks]
[5 *markah*]

10 (a) Diagram 10 shows the conversion of sulphur to sulphuric acid through contact process.
Rajah 10 menunjukkan penukaran sulfur kepada asid sulfurik melalui proses sentuh.

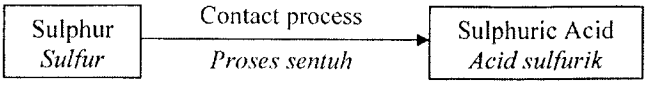


Diagram 10
Rajah 10

Describe the contact process.
Huraikan proses sentuh tersebut.
Your answer should include these following aspects:
Jawapan anda perlu mengandungi aspek-aspek berikut:

- Chemical equations for all stages
  Persamaan-persamaan kimia untuk semua peringkat.
- Optimum conditions required
  Keadaan-keaadaan optimum yang diperlukan

[10 marks]
[10 *markah*]

(b) By using **one** suitable example of pure metal and its alloy, describe a laboratory experiment to show the hardness of the alloy compared to its pure metal.
*Dengan menggunakan **satu** contoh yang sesuai bagi logam tulen dan aloinya, huraikan satu eksperimen untuk menunjukkan kekerasan aloi berbanding dengan logam tulennya.*

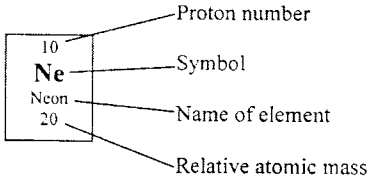
(i) Your description should include the following:
Huraian anda perlu mengandungi pekara berikut:
- Apparatus set-up
  Susunan radas
- Procedure
  Prosedur
- Tabulation of data
  Penjadualan data

(ii) Explain the difference in hardness of the metal and its alloy based on the atomic arrangement.
Jelaskan perbezaan dari segi kekerasan bagi logam dan aloinya berdasarkan susunan atom.

[10 marks]
[10 *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 Unnilquadium 257	105 Unp Unnilpentium 260	106 Unh Unnilhexium 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 Dysprosium 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.

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 answer 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 disediakan dalam kertas soalan ini.*

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 dalam ***Bahagian B*** *dan 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 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 is shown in brackets.
Markah yang diperuntukkan bagi setiap soalan atau ceraian soalan ditunjukkan dalam kurungan.

6. Show your working. It may help you to get marks.
Tunjukkan kerja mengira. Ini membantu anda mendapatkan markah.

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

8. The Periodic Table of Elements is provided on page 27.
Jadual Berkala Unsur disediakan di halaman 27.

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

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 dalam* ***Bahagian B*** *dan* 30 *minit untuk* ***Bahagian C.***

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

SULIT

Name : .....

Class : .....

PERSIDANGAN KEBANGSAAN PENGETUA-PENGETUA
SEKOLAH MENENGAH CAWANGAN NEGERI SEMBILAN

PEPERIKSAAN PERCUBAAN BERSAMA SIJIL PELAJARAN MALAYSIA 2010

4541/3

CHEMISTRY

Kertas 3
Ogos/ Sep.

$1\frac{1}{2}$ jam **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 10 halaman bercetak dan 2 halaman tidak bercetak

1 Diagram 1.1 shows the apparatus set-up to construct the electrochemical series by measuring the voltage produced by dipping the copper and W electrodes into the solution. The experiment is repeated by replacing metal W with metals X, Y and Z.
Rajah 1.1 *menunjukkan susunan radas yang digunakan untuk membina siri elektrokimia dengan mengukur voltan yang dihasilkan dengan mencelup elektrod kuprum dan* W. *Eksperimen itu diulangi dengan menggantikan logam* W *dengan logam* X, Y *dan* Z.

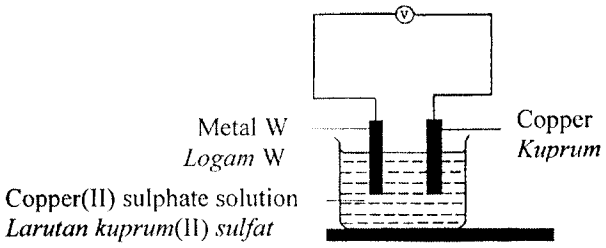
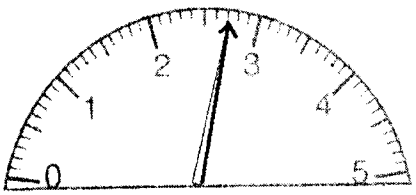
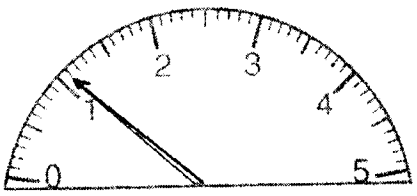


Diagram 1.1
Rajah 1.1

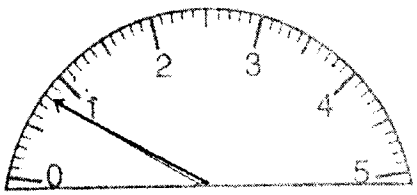
Diagram 1.2 shows the readings of four voltmeters each using different metals pair with copper.
Rajah 1.2 menunjukkan empat bacaan voltmeter yang menggunakan logam berlainan berpasangan dengan kuprum.



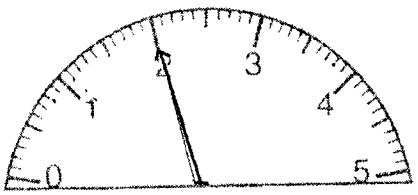
Copper and W
***Kuprum dan* W**



Copper and X
***Kuprum dan* X**



Copper and Y
***Kuprum dan* Y**



Copper and Z
***Kuprum dan* Z**

Diagram 1.2
Rajah 1.2

(a) Based on Diagram 1.2, record the voltmeter readings in Table 1.
Berdasarkan kepada Rajah 1.2, rekodkan bacaan volmeter dalam Jadual 1.

Pair of metals *Pasangan logam*	**Negative Terminal** *Terminal negatif*	**Voltage/ V** *Voltan /V*
Cu and W	W	
Cu and X	X	
Cu and Y	Cu	
Cu and Z	Z	

Table 1
Jadual 1

[3 marks]
[3 *markah*]

(b) State all the variables for the experiment.
Nyatakan semua pembolehubah eksperimen.

Manipulated variable : .....
Pembolehubah dimanipulasikan

Responding variable : .....
Pembolehubah bergerak balas

Fixed variable : .....
Pembolehubah dimalarkan

[3 marks]
[3 *markah*]

(c) Suggest a hypothesis for this experiment.
Cadangkan satu hipotesis bagi eksperimen ini.

.....

.....

[3 marks]
[3 *markah*]

(d) Based on the voltmeter readings, arrange the metals Cu, W, X , Y and Z in ascending order of their reactivity.
Berdasarkan bacaan voltmeter, susunkan logam-logam Cu, W, X, Y *dan* Z *mengikut urutan menaik bagi kereaktifan mereka*

.....

[3 marks]
[3 *markah*]

(e) The experiment is repeated using the pair of metals X and Y.
Predict the voltage.
Eksperimen ini diulangi dengan menggunakan pasangan logam X *dan* Y. *Ramalkan voltan itu.*

.....

[3 marks]
[3 *markah*]

(f) Diagram 1.3 shows a voltaic cell.
Rajah 1.3 menunjukkan satu sel kimia.

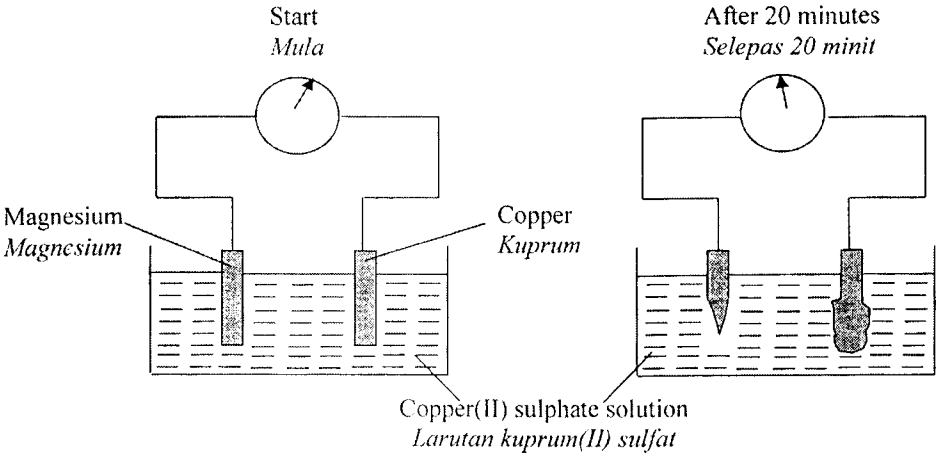


Diagram 1.3
Rajah 1.3

Based on Diagram 1.3 state **three** observations and the corresponding inferences .
Berdasarkan Rajah 1.3 nyatakan tiga pemerhatian dan inferens yang sepadan .

Observation *Pemerhatian*	**Inference** *Inferens*
1.....	1.....
2.....	2.....
3.....	3.....

[6 marks]
[6 *markah*]

(g) Based on Diagram 1.3, state the operational definition for the oxidation and reduction processes.
*Berdasarkan kepada Rajah*1.3, *nyatakan definisi secara operasi bagi proses pengoksidaan dan penurunan.*

.....

.....

.....

.....

[3 marks]
[3 *markah*]

2 Diagram 2 shows a titration method used to determine the concentration of potassium hydroxide solution.
Rajah 2 menunjukkan kaedah pentitratan yang digunakan untuk menentukan kepekatan larutan kalium hidroksida.

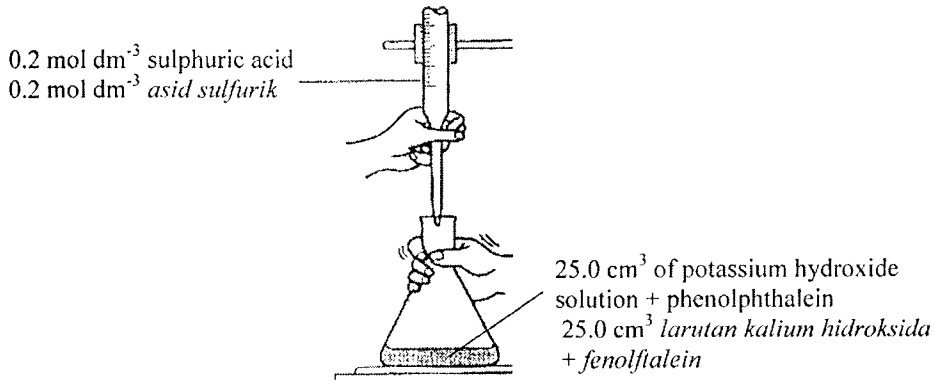


Diagram 2
Rajah 2

(a) (i) Based on Diagram 2, sulphuric acid is added gradually to potassium hydroxide solution while swirling until the mixture in the conical flask change colour.
State the colour change.
Berdasarkan kepada Rajah 2, asid sulfurik ditambah secara perlahan-lahan ke dalam larutan kalium hidroksida sambil menggoncang kelalang kon sehingga campuran bertukar warna.
Nyatakan perubahan warna itu.

.....

[3 marks]
[3 *markah*]

(ii) Classify **all** the ions present in the mixture into cations and anions.
*Kelaskan **semua** ion yang hadir dalam campuran kepada kation dan anion.*

[3 marks]
[3 *markah*]

(b) Table 2 shows the volume of sulphuric acid used in the titration
Jadual 2 menunjukkan isi padu asid sulfurik yang digunakan dalam pentitratan

Titration ***Pentitratan***	**1**	**2**	**3**
Volume of sulphuric acid/ cm^3 ***Isi padu asid sulfurik / cm^3***	20.30	20.40	20.20

The chemical equation for the reaction is shown below.
Persamaan kimia bagi tindak balas itu ditunjukkan di bawah.

$$2KOH_{(aq)} + H_2SO_{4(aq)} \longrightarrow K_2SO_{4(aq)} + 2H_2O_{(l)}$$

Calculate the
Hitungkan

(i) average volume of sulphuric acid used.
purata isi padu asid sulfurik yang digunakan.

(ii) concentration of potassium hydroxide solution
kepekatan larutan kalium hidroksida

[3 marks]
[3 *markah*]

3

Ionic compound can conduct electricity in the molten and aqueous states but covalent compound cannot conduct electricity in all state.

Sebatian ion boleh mengkonduksi elektrik dalam leburan dan akueus tetapi sebatian kovalen tidak boleh mengkonduksi elektrik dalam semua keadaan.

Based on the statement above, plan a laboratory experiment to investigate the electrical conductivity of lead(II) bromide and naphthalene.

Berdasarkan pernyataan di atas, rancangkan satu eksperimen untuk menyiasat kekonduksian elektrik bagi plumbum(II) *bromida dan naftalena.*

Your planning should include the following aspects:
Perancangan anda hendaklah mengandungi aspek-aspek berikut:

(a) Statement of the problem
Pernyataan masalah

(b) All the variables
Semua pembolehubah

(c) Statement of the hypothesis
Pernyataan hipotesis

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

(e) Procedure of the experiment
Prosedur eksperimen

(f) Tabulation of data
Penjadualan data

[17 marks]
[17 *markah*]

END OF QUESTION PAPER

KERTAS SOALAN TAMAT

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.

PERSIDANGAN KEBANGSAAN PENGETUA-PENGETUA
SEKOLAH MENENGAH CAWANGANNEGERI SEMBILAN

PEPERIKSAAN PERCUBAAN BERSAMA
SIJIL PELAJARAN MALAYSIA 2010
CHEMISTRY PAPER 1

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

4541/ 2 (PP)
Kimia
Kertas 2
Peraturan
Pemarkahan
2010

PERSIDANGAN KEBANGSAAN PENGETUA-PENGETUA
SEKOLAH MENENGAH CAWANGAN NEGERI SEMBILAN

PEPERIKSAAN PERCUBAAN BERSAMA
SIJIL PELAJARAN MALAYSIA 2010

KIMIA

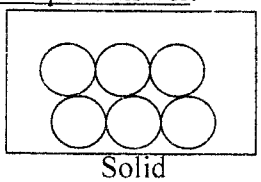
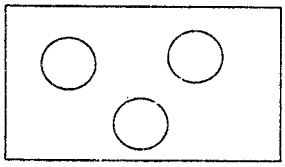
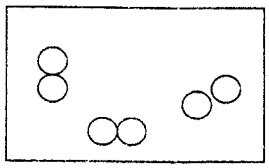
Kertas 2

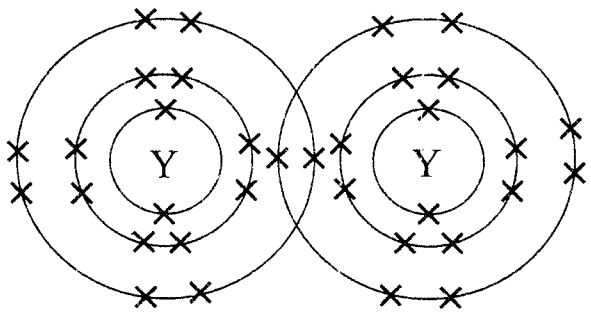
PERATURAN PEMARKAHAN

UNTUK KEGUNAAN PEMERIKSA SAHAJA

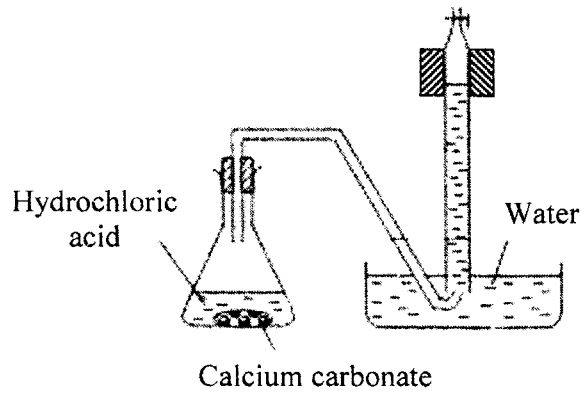
Peraturan pemarkahan ini mengandungi 15 halaman bercetak

SPM TRIAL CHEMISTRY 2010 PAPER 2
Marking Scheme

No 1	Explanation	Mark	Σ Mark
(a)(i)	*Able to name the process correctly* Answer: Sublimation / diffusion r: solid to gas	1	1
(ii)	*Able to state the type of particle correctly* Answer: Molecule	1	1
(iii)	*Able to write the formula correctly* Answer: I_2	1	1
(iv)	*Able to draw the particles arrangement correctly* Sample Answer:  Solid 1. At least 6 particles[3x2] 2. Same sizes 3. Do not overlap  or  Gas	1 1	2
(b)(i)	*Able to state the rate correctly* Sample answer: Higher r: faster	1	1
(ii)	*Able to explain the process correctly* Sample Answer: Iodine particles/molecules absorb energy(heat) Kinetic energy of particles increase // Particles move faster	1 1	2
(c)(i)	*Able to state the meaning of diffusion* Sample answer: A process when particles of a substance /gas P/Q move between the particles of another substance/gas Q/P	1	1
(ii)	*Able to state the colour correctly* Answer: Brown // Light brown	1	1
	Total		**10**

No 2	Explanation	Mark	Σ Mark
(a)	*Able to state the type of compound correctly* Sample answer: Ionic / salt / inorganic	1	1
(b)	*Able to write the formula correctly* Sample Answer: XY_2 / $MgCl_2$	1	1
(c)(i)	*Able to write the electron arrangement correctly* Answer: 2. 8 . 2 / 2 , 8 , 2	1	
(ii)	2 . 7 / 2 , 7	1	2
(d)(i)	*Able to show:* *1. nucleus for both atoms & all shells filled with correct number of electrons.* *2. sharing one pair of electrons*  	1 1	2
(ii)	*Able to state the bond correctly* Answer: Covalent	1	1
(e)	*Able to compare both melting points correctly.* Sample answer: Compound/(a) is higher than substance/(d) *Able to give reasons correctly* Sample Answer: 1.(Electrostatic) forces between particles/ ions is stronger. 2. more heat/energy required to overcome the forces	1 1 1	3
	Total		**10**

No 3	Explanation	Mark	Σ Mark
(a)(i)	*Able to mark the strongest alkaline solution* Answer Solution / *Larutan*: P | Q | R | S √	1	1
(ii)	*Able to explain why S is the strongest alkaline solution* Sample answer 1. S ionized / dissociate completely / fully in water 2. Produced higher/highest concentration of hydroxide ion	1 1	2
(b)(i)	*Able to name neutralisation process* Answer Neutralisation	1	1
(ii)	*Able to name a suitable indicator for the reaction* Sample answer Phenolphthalein // methyl orange // universal indicator	1	1
(iii)	*Able to state the colour changes based on the named indicator* Sample answer Pink to colourless // red to orange // purple to green	1	1
(iv)	*Able to write the ionic equation for neutralization process* Answer $H^+ + OH^- \rightarrow H_2O$	1	1
(c)(i)	*Able to calculate to water needed for dilution* Answer $0.1(5.0) = M\ (20)$ $M = 0.025$ mol dm^{-3}	1 1	2
(ii)	*Able to state the number of ion in the solution after dilution* Same	1	1
	Total		**10**

No 4	Explanation	Mark	Σ Mark
(a)	*Able to draw a complete, functional and label the apparatus set-up*  1. Functional of apparatus: Clamp the burette, dotted line for water and hydrochloric acid, end of delivery tube below water level in the basin. 2. Label: Hydrochloric acid/ HCl, calcium carbonate/ $CaCO_3$, water	1 1	2
(b)	*Able to draw the graph with these criterion:* 1 Labelled axis with correct unit 2 Uniform scale for X and Y axis & size of the graph is at least half of the graph paper 3 All points are marked 4 Correct shape, Curve is smooth and start from origin point	1 1 1 1	4
(c)(i)	*Able to draw the tangent and show the working and correct unit* 1 Correct tangent at 90 second on the graph 2 Show calculation of the tangent with correct answer and unit Range (0.10 – 0.17) cm^3s^{-1}	1 1	2
(ii)	Lower // accept one value than answer in c (i)	1	1
(iii)	The concentration of the acid decreases	1	1
	Total		**10**

No 5	Explanation	Mark	Σ mark
(a)(i)	*Able to state the function of hydrochloric acid* Answer To allow the flow of ions	1	1
(ii)	*Able to mark the electron flow; from KI to $KMnO_4$ through external circuit*	1	1
(iii)	*Able to State the colour change* Answer Purple to colourless	1	1
(iv)	*Able to Name the reducing agent* Answer Iodide ion / potassium iodide	1	1
(v)	*Able to Write the half equation* Answer $2I^- \rightarrow I_2 + 2e$	1	1
(b)(i)	*Able to State the observation* Answer Green to brown	1	1
(ii)	*Able to state the change in the oxidation number of bromine* Answer 0 to -1	1	1
(iii)	*Able to Write the ionic equation* Answer $Br_2 + 2Fe^{2+} \rightarrow 2Br^- + 2Fe^{3+}$ 1 Correct formulae of reactants & products 2 Balance the equation	 1 1	 2
(iv)	*Able to Describe a test to confirm the product formed* 1 Correct procedure 2 Correct corresponding observation Sample Answer 1 Add sodium hydroxide solution // potassium hexacyanoferrate(II) solution // potassium thiocyanate solution // ammonia solution 2 Brown precipitate // dark blue precipitate // blood red colouration // Brown precipitate	1+1	2
	Total		**11**

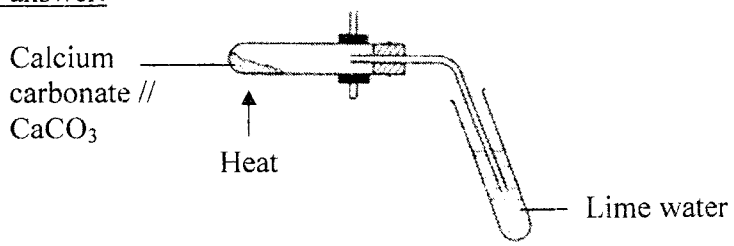
No 6	Explanation	Mark	∑ mark
(a)(i)	*Able to name the reaction* Answer: Saponification	1	1
(ii)	*Able to explain why sodium chloride is added to the mixture* Answer: To precipitate the soap// to solidified the soap// to reduce the solubility of soap	1	1
(iii)	*Able to name the concentrated alkali correctly* Answer: Concentrated/ 5M potassium hydroxide	1	1
(b)(i)	*Able to state the function of detergent additives* Answer: To remove protein stains such as blood. To convert stains into colourless substances	1 1	2
(c)(i)	*Able to state the function of streptomycin* Answer: Kills or prevents bacteria reproduction.// used to treat tuberculosis/ whooping cough/ and some forms of pneumonia *Able to state the function of tranquilizer* Answer: To reduce tension and anxiety	1 1	2
(ii)	*Able to state one side effect of aspirin* Answer: Gastric and stomach ulcers// internal bleeding	1	1
(iii)	*Able to explain why streptomycin must be finished* Answer: It develops a resistant strains of bacteria// to make sure all the bacteria are killed// higher doses will be use if not complete	1	1
	Total		**9**

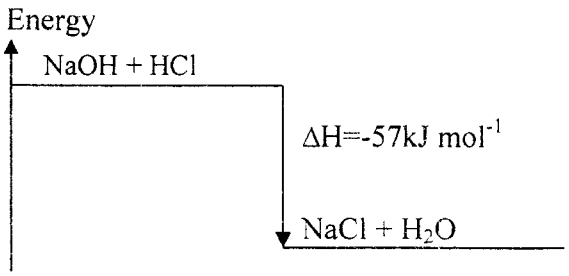
<table>
<tr><th>No
7</th><th>Explanation</th><th>Mark</th><th>∑ Mark</th></tr>
<tr><td>(a)(i)</td><td>Able to state the meaning of a mole
Sample answer:
Amount of substance that contain as many particle as the number of atoms is exactly 12g of carbon-12 //
6 X 10^{23} of particles in a substance</td><td>1</td><td>1</td></tr>
<tr><td>(ii)</td><td>Able to calculate the amount of particle in ammonium chloride
Answer:
0.01 X 6.02 X 10^{23} / 6.02 X 10^{21}</td><td>1</td><td>1</td></tr>
<tr><td>(iii)</td><td>Able to:
1 write the molecular formulae for the substances
2 calculate RMM for both substances
Answer:
<table><tr><td>Molecular formula</td><td>RMM</td></tr><tr><td>HCl</td><td>1+35.5 //36.5</td></tr><tr><td>NH_3</td><td>14 +3(1) //17</td></tr></table></td><td>1 + 1
1 + 1</td><td>4</td></tr>
<tr><td>(b)(i)</td><td>Able to name the reaction and state the observation correctly
Sample answer:
Double decomposition // precipitation
Yellow precipitate</td><td>1
1</td><td>2</td></tr>
<tr><td>(ii)</td><td>Able to interpret the equation correctly
1 names of reactants
2 names of products
3 physical states
4 moles of reactants and products

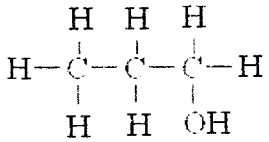
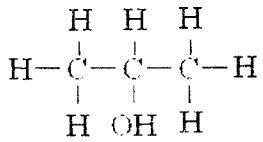
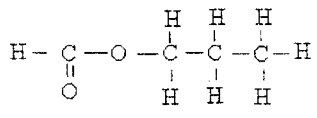
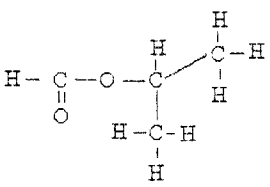
Sample answer:
2 mol / formula units of potassium iodide aqueous reacts with 1 mol / formula units lead(II) nitrate aqueous produces 2 mol / formula units of potassium nitrate aqueous and 1 mol / formula units lead(II) iodide solid</td><td>4</td><td>4</td></tr>
<tr><td>(c)(i)</td><td>Able to draw the functional apparatus set-up & label

1 Functional diagram:
Test tube with clamp, no leakage in stopper & delivery tube inside lime water
2 Label:
heat with arrow / /draw Bunsen burner, lime water and copper(II) carbonate</td><td>1

1</td><td></td></tr>
</table>

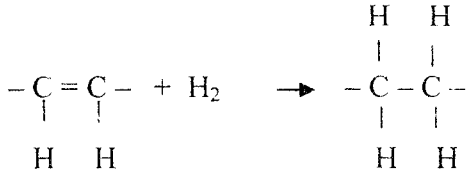
	Sample answer:  		2
(ii)	*Able to write the chemical equation* 1 correct reactant 2 correct products Answer: $CuCO_3 \rightarrow CuO + CO_2$	 1 1	2
	Able to show the calculation Answer 1 Number of mol of $CuCO_3$ = $\frac{6.2}{124}$ // 0.05 2 1 mol of $CuCO_3$ produces 1 mol of CO_2 // 0.05 mol of $CuCO_3$ produces 0.05 mol of CO_2 3 Volume of CO_2 = 0.05 X 24 4 1.2 dm^3 // 1200 cm^3	 1 1 1 1	4
	Total		**20**

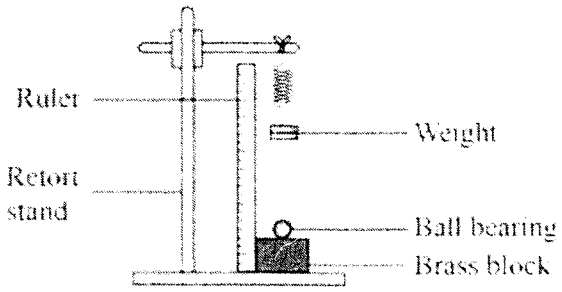
No 8	Explanation	Mark	∑ Mark
(a)(i)	*Able to draw energy level diagram* Sample answer  1 Vertical axis with arrow and labeled energy and with 2 energy levels 2 Reactants and products are written on the correct energy level 3 ΔH = - 57 kJ mol^{-1} (correct value, negative sign and correct unit)	1 1 1	3
(ii)	*Able to state a correct observation* Sample answer The mixture/container becomes hot // temperature increases / rise / higher	1	1
(b)(i)	*Able to state the meaning of heat of precipitation* Answer Heat change when one mole of a precipitate is formed from their ions in aqueous solution	1	1
(ii)	*Able to calculate heat change in the reaction* Answer Heat change = (50 X 4.2 X 5.5) // (50 x 4.2 x 5.5)J // 1155 J // 1.155 kJ *Able to calculate number of moles of silver chloride formed* Answer No of moles = $\frac{25 \times 0.5}{1000}$ // 0 .0125 *Able to calculate heat of precipitation of silver chloride* Answer Heat of precipitation = $-\frac{1155}{0.0125}$ $Jmol^{-1}$ // $-\frac{1.155}{0.0125}$ $kJmol^{-1}$ // -92400 $Jmol^{-1}$ // -92.40 $kJmol^{-1}$ Note: Ecf from calculation of heat released and number of moles Must have correct unit & negative sign	1 1 1	3

(iii)	*Able to predict the temperature change and give reason* Sample answer Temperature change = 5.5°C Reason = concentration of solution remain unchanged	 1 1	 2
(c)(i)	*Able to state the relationship between the number of carbon atoms and the heat of combustion and give reason* Sample answer 1 As the number of carbon atoms increase, heat of combustion of alcohol increase. 2 More carbon dioxide gas and water produced. 3 More bonds are formed	 1 1 1	 3
(ii)	Able to calculate the heat released Answer Number of mole of propanol = $\frac{3.0}{60}$ / 0.05 Heat released = $\frac{3.0}{60}$ X 2017kJ / 0.05 X 2017kJ / 100.85kJ / 100850J	 1 1	 2
(iii)	*Able to draw the structural formula for isomers of propanol.* Sample answer  	 1 1	 2
(d)(i)	Able to name compound X Sample answer Propyl methanoate	 1	
(ii)	Able to draw the structural formula of X Answer  **OR** 	1	

(iii)	*Able to state on physical properties of compound X* Sample answer Sweet / fruity / pleasant smell	1	3
	Total		**20**

No 9	Explanation	Mark	Σ Mark
(a)(i)	*Able to state the meaning of fat* Sample answer: Esters of glycerol and fatty acids	1	1
(ii)	*Able to compare between the saturated and unsaturated fat correctly* Sample answer:		
	Saturated fat / Unsaturated fat Has carbon-carbon single bond / Has carbon-carbon double bond	1	
	Sources from animals / Sources from plants	1	
	Has high melting point / Has low melting point	1	
	Solid at room temperature / Liquid at room temperature	1	4
(iii)	*Able to state two importances of fats to our body* Sample answer: 1. Fats surround and protect vital organs. 2. Fats molecules form the protective membrane of cells. 3. Fats store energy as body fat. 4. Fats release energy during cell respiration. 5. Fats under the skin is to keep our body warm 6. Fats help to carry fat-soluble vitamins which are essential for good health. [Any 2]		2

(iv)	*Able to describe the effect of fats to our health* Sample answer: 1. Raise the cholesterol level 2. Fats deposited on arteries/veins 3. Cause heart attack // Cause high blood pressure OR 1. Fats deposited in body tissues 2. Obesity 3 Cause heart attack // Cause high blood pressure	 1 1 1 OR 1 1 1	 3
(b)(i)	*Able to state the meaning hydrogenation* Sample answer: Hydrogen / H_2 reacts with unsaturated fats to produce saturated fats. // Hydrogen / H_2 reacts with unsaturated fats to convert C = C to C - C	 1	 1
(ii)	*Able to describe the process* Sample answer: 1. Hydrogen pass over oil/fat 2. presence of nickel/platinum and hot / 180^{0}C / high temperature oil 3. Carbon-carbon double bond in palm oil becomes carbon-carbon single bond //  4. Solid formed// margarine formed	 1 1 1 1	 4
(c)	*Able to explain why the latex coagulates* Sample answer: 1. Bacteria/microorganism produce lactic acid/hydrogen ions in latex. r: [acid is added into latex] 2. Lactic acid/hydrogen ions neutralise the negative charged membrane. 3. Rubber particles collide with each other. 4. Membrane breaks 5. Rubber molecule combine with one another	 1 1 1 1 1	 5
	Total		**20**

No 10	Explanation	Mark	Σ Mark
(a)	*Able describe how sulphuric acid is produced*		
	1 Sulphur is burnt in the air to form sulphur dioxide	1	
	2 $S + O_2 \rightarrow SO_2$	1	
	3 Sulphur dioxide is burnt in the air to form sulphur trioxide	1	
	4 $2SO_2 + O_2 \rightarrow 2SO_3$	1	
	5 Temperature : 450 – 550 °C Pressure: 1 atm	1	
	6 Catalyst used: vanadium(V) oxide, V_2O_5	1	
	7 Sulphur trioxide is dissolved in concentrated sulphuric acid to form oleum.	1	
	8 $2SO_3 + H_2SO_4 \rightarrow H_2S_2O_7$	1	
	9 Oleum is diluted with distilled water to form sulphuric acid	1	
	10 $H_2S_2O_7 + H_2O \rightarrow 2\ H_2SO_4$	1	10
(b)(i)	*Able to draw the functional diagram of apparatus set-up and label*		
	1 *Functional diagram* 2 *Label* [weight, steel ball, block, meter ruler]	1 1	
			
	Able to name a suitable metal & its alloy		
	3 *Name of metal (can refer to diagram)* Sample answer: copper	1	
	4 *Name the alloy(can refer to diagram)* Sample answer: brass	1	

<table>
<tr><td></td><td>Able to describe the experiment.

5 Tape a steel ball bearing to the brass [block]
6 Hang a weight of 1 kg above the ball bearing. (can refer to diagram)
7 Drop the weight and allow it to hit the steel bearing
8 Record the diameter of the dent made on the brass block
9 Repeat the experiment using copper block to replace the brass block.
10 Observation:

<table><tr><td>Type of Block</td><td>Diameter of dent (cm)</td></tr><tr><td>Copper</td><td></td></tr><tr><td>Brass</td><td></td></tr></table></td><td>1
1
1
1
1

1</td><td>Max = 8</td></tr>
<tr><td>(b)(ii)</td><td>1 Presence of foreign atoms (in brass) disrupt the orderly arrangement of atoms
2 More difficult to slide.</td><td>1

1</td><td>2</td></tr>
<tr><td></td><td>Total</td><td colspan="2">20</td></tr>
</table>

END OF MARK SCHEME

SULIT
4541/3(PP)
Chemistry
Kertas 3
Peraturan
Pemarkahan

4541/3(PP)

PERSIDANGAN KEBANGSAAN PENGETUA-PENGETUA SEKOLAH MENENGAH CAWANGAN NEGERI SEMBILAN

PEPERIKSAAN PERCUBAAN BERSAMA SIJIL PELAJARAN MALAYSIA 2010

CHEMISTRY

Kertas 3

PERATURAN PEMARKAHAN

UNTUK KEGUNAAN PEMERIKSA SAHAJA

Measuring and Using Numbers
Observing

<table>
<tr><th>Question</th><th>Rubric</th><th>Score</th></tr>
<tr><td>1(a)</td><td>Able to record all the four readings correctly with one decimal place.

Answer
<table><tr><th>Voltage/ V
Voltan /V</th></tr><tr><td>2.7</td></tr><tr><td>1.1</td></tr><tr><td>0.8</td></tr><tr><td>2.0</td></tr></table></td><td>3</td></tr>
<tr><td></td><td>Able to record three/two correct readings</td><td>2</td></tr>
<tr><td></td><td>Able to record one correct reading</td><td>1</td></tr>
<tr><td></td><td>No response or wrong response</td><td>0</td></tr>
</table>

Controlling Variables

Question	Rubric	Score
1(b)	*Able to state **all three** variables correctly* Sample answer Manipulated variable : Pair of metals // W, X, Y and Z Responding variable : Voltmeter reading // voltage//Potential difference Fixed variable : Copper(II) sulphate solution // voltmeter // Copper	3
	*Able to state **any two** correct variables*	2
	*Able to state **any one** correct variable*	1
	No response or wrong response	0

Hypothesising

Question	Rubric	Score
1(c)	*Able to suggest a correct relationship between the **MV** and the **RV** with direction* Sample answer The further the distance between two metals in the electrochemical series, the higher is the voltage / the voltmeter reading	3
	*Able to suggest a relationship between the **MV** and the **RV*** Sample answer The higher is the voltage, the further the distance of the pair of metals in the electrochemical series // The higher position in in the electrochemical series, the higher is the voltage	2
	Able to suggest an idea of hypothesis . Sample answer Metals in the electrochemical series affects the voltage // Different pair of metals give different voltage value	1
	No response or wrong response	0

Interpreting Data

Question	Rubric	Score
1(d)	*Able to arrange the position of all metals correctly* Sample answer Y , Cu , X , Z , W	3
	Able to arrange the position of at least three continuous metals correctly Sample answer Cu , Y , X , Z , W // Y , Cu , X , W , Z	2
	Able to arrange the position of two continuous metals correctly	1
	No response or wrong response	0

Predicting

Question	Rubric	Score
1(e)	*Able to predict the voltage with unit correctly* Sample answer 1.9 V	3
	Able to predict the voltage without unit // ecf the value of voltage from the arrangement of the metals in 1(d) with unit Sample answer 1.9 // (1.1 – 0.8) = 0.3 V	2
	ecf the value of voltage from the arrangement of the metals in 1(d) without unit Sample answer 0.3	1
	No response or wrong response	0

Observation and Inferring

<table>
<tr><th>Question</th><th>Rubric</th><th>Score</th></tr>
<tr><td>1(f)</td><td>Able to state three observations and three correct their corresponding inferences

<u>Sample answer</u>
<table>
<tr><th>Observation
Pemerhatian</th><th>Inference
Inferens</th></tr>
<tr><td>1. Magnesium dissolves // becomes thinner</td><td>1. Magnesium is oxidised // loses electron to from Mg^{2+} // Mg change to Mg^{2+}</td></tr>
<tr><td>2. (Brown) solid is deposited at copper // Copper becomes thicker</td><td>2. Copper is formed // Cu^{2+} discharged // Cu^{2+} change to Cu</td></tr>
<tr><td>3. Voltmeter needle deflected // Deflection of voltmeter needle decreases</td><td>3. Electricity produced // electrons flow // Electricity produced decreases</td></tr>
<tr><td>4. The intensity of blue colour solution deceases</td><td>4. The concentration of Cu^{2+} in the solution decreases</td></tr>
</table>
[Any three observations and three corresponding inferences]</td><td>3 + 3</td></tr>
<tr><td></td><td>Able to state any three observations and two corresponding inferences</td><td>3 + 2</td></tr>
<tr><td></td><td>Able to state any three observations and one corresponding inference
OR two observations and two corresponding inferences</td><td>3 + 1
2 + 2</td></tr>
<tr><td></td><td>Able to state any three observations only
OR two observations and one corresponding inference</td><td>3
2 + 1</td></tr>
<tr><td></td><td>Able to state any two observations only
OR one observation and one corresponding inference</td><td>2
1 + 1</td></tr>
<tr><td></td><td>Able to state one observation only</td><td>1</td></tr>
<tr><td></td><td>No response or wrong response</td><td>0</td></tr>
</table>

Defining Operationally

Question	Rubric	Score
1(g)	*Able to describe (1) what should be done and (2) what should be observed correctly* Sample answer 1. Dip two different types of metals into $CuSO_4$ solution and connect them to voltmeter 2. Mg becomes thinner and brown solid is deposited at copper// Voltmeter needle deflected//Reading of voltmeter decreases.	3
	Able to describe (1) what should be done incompletely and (2) what should be observed Sample answer 1. Dip two different metals into $CuSO_4$ solution 2. Mg becomes thinner and brown solid is deposited at copper// Voltmeter needle deflected	2
	Able to fulfill 1 or 2 incompletely Sample answer Thick metal	1
	No response or wrong response	0

Using Space-Time Relationship

Question	Rubric	Score
2(a)	*Able to state the colour change correctly* Sample answer Pink to colourless	3
	Able to state the colour change Sample answer colourless	2
	Able to give idea on colour change Sample answer Change colour	1
	No response or wrong response	0

Classifying

Question	Rubric	Score
2 (b)	*Able to classify **all the 4 ions** correctly* Sample answer Cations : K^+ , H^+ Anions : OH^- , SO_4^{2-}	3
	*Able to classify **(2-3) ions** correctly*	2
	*Able to classify **1 ion** correctly*	1
	No response or wrong response	0

Communicating

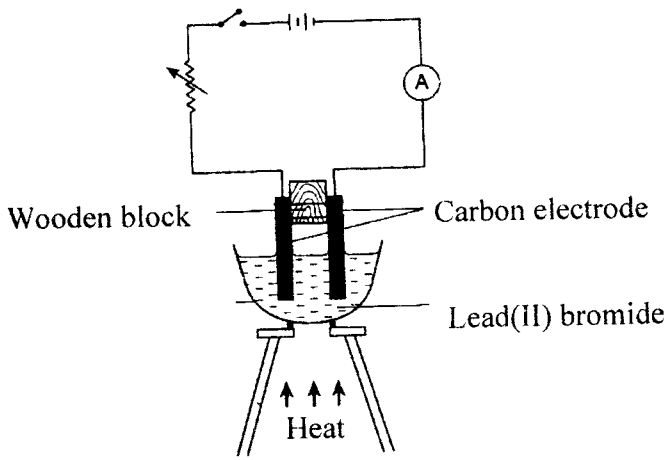
Question	Rubric	Score
2(c)	*Able to show* 1.*the working of average volume of sulphuric acid* 2. answer with correct unit 3. *the working of concentration of potassium hydroxide solution* 4. *answer with correct unit* Sample answer (i) Average volume of sulphuric acid = $\frac{20.30 + 20.40 + 20.20}{3}$ = 20.3 cm^3 (ii) Concentration of KOH = $\frac{2x0.2x20.30}{25.0}$ = 0.32 mol dm^{-3}	3
	Able to show 1, 2 and 3	2
	Able to show 1 or 2 or 3	1
	No response or wrong response	0

Question	Rubric	Score
3(a)	*Able to write a statement with following criteria* 1. *question mark* 2. *name lead(II) bromide and naphthalene* 3. *state conduct electricity in molten* **r: aim of experiment** Sample answer Does the *lead(II) bromide or naphthalene conduct electricity in molten state* ?	3
	Able to fulfill criteria 1 and 2 or 1 and 3 Sample answer Does the *lead(II) bromide conduct electricity in molten state* ? / Does the *naphthalene conduct electricity in molten state* ?	2
	Able to fulfill criteria 1 Sample answer Do *compounds affect the conductivity* ?	1
	No response or wrong response	0

Question	Rubric	Score
3(b)	*Able to state the **three** variables correctly.* Sample answer **Manipulated variable** : lead(II) bromide and naphthalene// Ionic and covalent compounds **a**: symbols **Responding variable** : light up of bulb / ammeter reading **Fixed variable** : carbon electrodes / bulb / ammeter	3
	*Able to state **any two** variables correctly.*	2
	*Able to state **any one** variable correctly.*	1
	No response or wrong response	0

Question	Rubric	Score
3(c)	*Able to suggest a relationship correctly between the **MV** and the **RV** with direction* Sample answer Molten lead(II) bromide and naphthalene can/cannot light up the bulb/deflect ammeter needle	3
	*Able to suggest a relationship between the **MV** and the **RV*** Sample answer Ionic compound can light up the bulb // covalent compound cannot light the bulb	2
	Able to suggest an idea of hypothesis Sample answer Lead(II) bromide affect conductivity	1
	No response or wrong response	0

Question	Rubric	Score
3(d)	*Able to give complete list of substances and apparatus* Sample answer 2 substances : Lead(II) bromide , naphthalene 8 apparatus : batteries , carbon electrodes , bulb/ammeter , crucible , Bunsen burner , tripod stand , pipe-clay triangle , connecting wires **[can refer to labelled diagram or procedure]**	3
	*Able to give at least **two** substances and* batteries , carbon electrodes , bulb/ammeter , crucible , Bunsen burner,connecting wires	2
	*Able to give at least **one** substance and batteries , carbon electrodes , bulb/ammeter,* connecting wires	1
	No response or wrong response	0

Question	Rubric	Score
3(e)	*Able to list all the steps correctly* Sample answer 1. A crucible is filled with lead(II) bromide solid until it is half full. 2. Two carbon electrodes are immersed into lead(II) bromide and carbon electrodes are connected to batteries and bulb. 3. Record observation 4. The lead(II) bromide solid is heated until its melts. 5. Record observation 6. Repeat steps 1 to 5 using naphthalene. [If description in procedure incomplete, can refer to diagram]  	3
	Able to list steps 1,2 , 4 and 5	2
	Able to give step 1,2 and 3	1
	No response or wrong response	0

<table>
<tr><th>Question</th><th>Rubric</th><th>Score</th></tr>
<tr><td>3(f)</td><td>Able to tabulate the data with the following aspects

1. correct titles
2. lead(II) bromide and naphthalene

<u>Sample answer</u>

<table><tr><th>Substance</th><th>Observation</th></tr><tr><td>Lead(II) bromide</td><td></td></tr><tr><td>naphthalene</td><td></td></tr></table></td><td>2</td></tr>
<tr><td></td><td>Able to tabulate

1. one title
2. one name
<u>Sample answer</u>

<table><tr><th></th><th>Observation</th></tr><tr><td>Lead(II) bromide</td><td></td></tr></table></td><td>1</td></tr>
<tr><td></td><td>No response or wrong response or empty table</td><td>0</td></tr>
</table>

END OF MARK SCHEME