

4541/1

Kimia

Kertas 1

Sept

2011

1 ¼ jam



JABATAN PELAJARAN NEGERI JOHOR

PEPERIKSAAN PERCUBAAN SPM 2011

KIMIA

Kertas 1

Satu jam lima belas minit

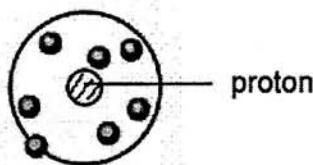
JANGAN BUKA KERTAS SOALANINI SEHINGGA DIBERITAHU

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 34 halaman bercetak

- 1 Which of the following releases heat to the surrounding?
Antara yang berikut, yang manakah membebaskan haba ke persekitaran?
- A Add acid to alkali
Tambah asid kepada alkali
- B Heat a carbonate salt
Panaskan satu garam karbonat
- C Dissolve some ammonium salt in water
Larutkan sedikit garam ammonium di dalam air
- D Add dilute acid to sodium hydrogen carbonate
Tambah asid cair kepada natrium hydrogen karbonat
- 2 Name the process of soap preparation.
Namakan proses penyediaan sabun.
- A Dehydration
Pendehidratan
- B Sulphonation
Pengsulfonan
- C Saponification
Saponifikasi
- D Polymerisation
Pempolimeran

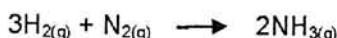
3



Who proposed the above model?
Siapakah yang mencadangkan model di atas?

- A Ernest Rutherford
- B James Chadwick
- C J.J Thomson
- D Neils Bohr

- 4 The following equation represents a reaction.
Persamaan berikut mewakili satu tindak balas.



What is the relative molecular mass of the product?

[Relative atomic mass : H=1; N=14]

Apakah jisim molekul relatif bagi hasil tersebut?

[Jisim atom relative : H=1; N=14]

- A 2
- B 17
- C 28
- D 34

- 5 Which of the following are the special characteristics of transition elements?
Antara yang berikut, yang manakah merupakan ciri istimewa bagi logam peralihan?

- I Form coloured compounds
Membentuk sebatian berwarna
- II Can be used as catalyst
Boleh digunakan sebagai mangkin
- III Have low melting point
Mempunyai takat lebur yang rendah
- IV Have only one oxidation number
Mempunyai satu nombor pengoksidaan sahaja

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

6

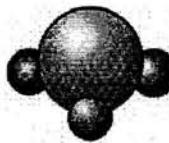


Diagram 1
Rajah 1

Diagram 1 shows the number of atoms in a molecule. Which of the following could be the molecule?

Rajah 1 menunjukkan bilangan atom dalam satu molekul. Antara yang berikut, yang manakah mungkin molekul itu?

- A Carbon dioxide
Karbon dioksida
 - B Ammonia
Ammonia
 - C Chlorine
Klorin
 - D Water
Air
- 7 Which of the following is an electrolyte?
Antara yang berikut, yang manakah merupakan elektrolit?
- A Copper (II) sulphate solution
Larutan kuprum (II) sulfat
 - B Molten naphthalene
Leburan naftalena
 - C Glucose solution
Larutan glukosa
 - D Zinc metal
Logam zink

- 8 Diagram 2 shows the pH values for solution P, Q, R and S with the same concentration.
Rajah 2 menunjukkan nilai pH bagi larutan larutan P, Q, R, dan S dengan kepekatan yang sama.

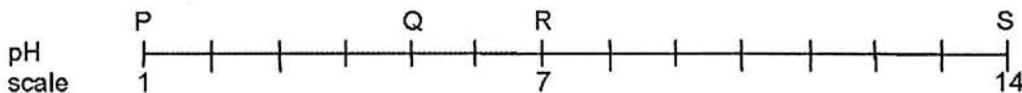


Diagram 2
Rajah 2

What are the possible solutions of P, Q, R and S?
Apakah larutan yang mungkin bagi P, Q, R dan S?

	Ethanoic acid <i>Asid etanoik</i>	Sulphuric acid <i>Asid sulfurik</i>	Sodium hydroxide <i>Natrium hidroksida</i>	Sodium chloride <i>Natrium klorida</i>
A	P	Q	R	S
B	P	Q	S	R
C	Q	P	R	S
D	Q	P	S	R

- 9 Which of the following salts can be prepared by precipitation reaction?
Antara garam yang berikut, yang manakah boleh disediakan melalui tindak balas pemendakan?
- A Barium sulphate
Barium sulfat
 - B Sodium chloride
Natrium klorida
 - C Aluminium nitrate
Aluminium nitrat
 - D Potassium carbonate
Kalium karbonat

- 10 Alloy X is made by mixing iron with carbon, chromium and nickel. What is X?
Aloj X diperbuat dengan mencampurkan besi dengan karbon, kromium dan nikel.
Apakah X?
- A Steel
Keluli
- B Pewter
Piuter
- C Bronze
Gangsa
- D Stainless steel
Keluli tahan karat
- 11 Which of the following does not affect rate of reaction ?
Antara yang berikut, yang manakah tidak mempengaruhi kadar tindak balas ?
- A Total surface area of reactant
Jumlah luas permukaan bahan tindak balas
- B Concentration of solution
Kepakatan larutan
- C Presence of catalyst
Kehadiran mangkin
- D Volume of solution
Isipadu larutan
- 12 Which of the following organic compound will undergo hydrogenation reaction?
Antara yang berikut, yang manakah sebatian organik yang akan mengalami tindak balas penghidrogenan?
- A Propene
Propena
- B Propane
Propana
- C Propanol
Propanol
- D Propanoic acid
Asid propanoik

- 13 Which of the following explains an oxidation process?

Antara yang berikut, yang manakah menerangkan proses pengoksidaan?

- A Loss of oxygen
Kehilangan oksigen
- B Gain of electrons
Penerimaan elektron
- C Loss of hydrogen
Kehilangan hidrogen
- D Decrease in oxidation number
Nombor pengoksidaan berkurang

- 14 Pickled mango is prepared by soaking mango in vinegar. What type of food additive is vinegar?

Jeruk mangga disediakan dengan merendam buah mangga di dalam cuka. Apakah jenis bahan tambah makanan bagi cuka?

- A Dyes
Pewarna
- B Thickener
Pemekat
- C Antioxidant
Pengantioksidan
- D Preservative
Pengawet

- 15 The thermochemical equation for the decomposition of calcium carbonate, CaCO_3 is as follows:

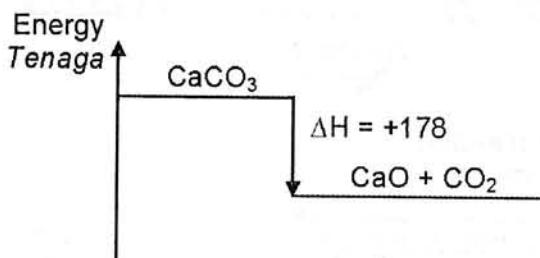
Persamaan termokimia bagi penguraian kalsium karbonat, CaCO_3 adalah seperti berikut:



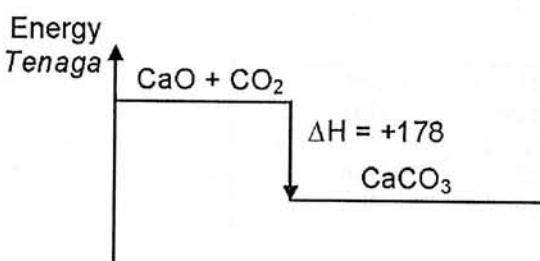
Which of the following energy level diagram represents the equation?

Antara yang berikut, yang manakah gambarajah aras tenaga mewakili persamaan itu ?

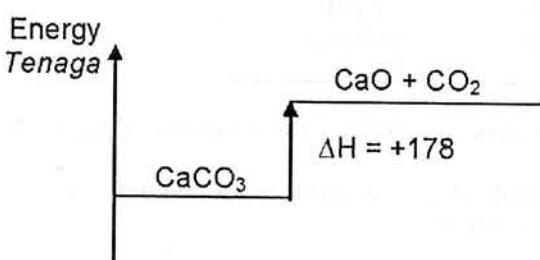
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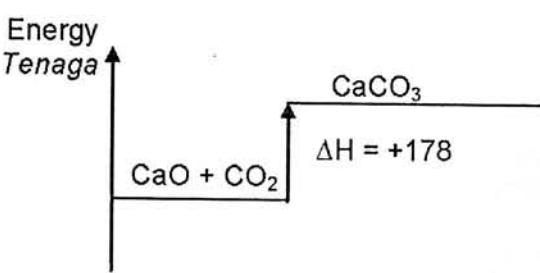
B



C



D



16

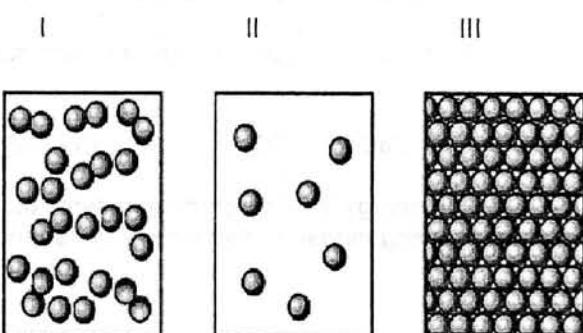


Diagram 3
Rajah 3

What are the three states of matter?

Apakah keadaan fizikal jirim di atas?

	I	II	III
A	Gas Gas	Liquid Cecair	Solid Pepejal
B	Solid Pepejal	Liquid Cecair	Gas Gas
C	Liquid Cecair	Solid Pepejal	Gas Gas
D	Liquid Cecair	Gas Gas	Solid Pepejal

- 17 Which of the substance below contains the same number of atoms as in one mole of chlorine gas?

Antara bahan yang berikut, yang manakah mengandungi bilangan atom yang sama dengan satu mol gas klorin ?

- A 1 mol neon
1 mol neon
- B $\frac{1}{2}$ mol sodium
 $\frac{1}{2}$ mol natrium
- C $\frac{2}{3}$ mol carbon dioxide
 $\frac{2}{3}$ mol karbon dioksida
- D 1 mol nitrogen dioxide
1 mol nitrogen dioksida

18

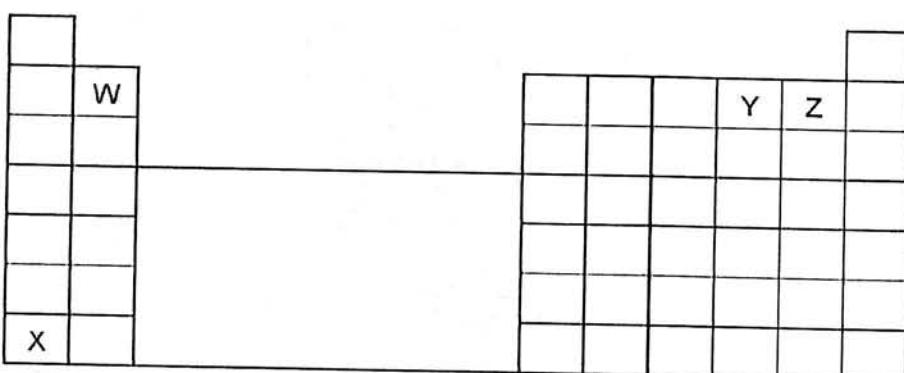


Diagram 4
Rajah 4

Diagram 4 shows parts of the Periodic Table of Elements. The symbols W, X, Y and Z are not the actual symbols of the elements. Which of the following shows the correct arrangement of elements W, X, Y and Z in order of increasing atomic size?

Rajah 4 menunjukkan sebahagian Jadual Berkala Unsur. Simbol – simbol W, X, Y dan Z tidak mewakili simbol sebenar unsur.

Antara yang berikut, yang manakah mewakili susunan yang betul pertambahan saiz atom bagi unsur-unsur W, X, Y dan Z ?

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

19

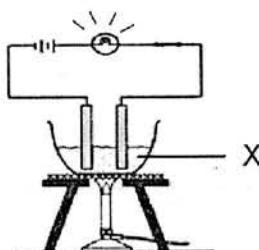


Diagram 5
Rajah 5

In Diagram 5, substance X lights up the bulb in the molten state. Which statement best explains the observation?

Dalam Rajah 5, bahan X menyalaakan mentol dalam keadaan leburan. Pernyataan yang manakah paling baik menerangkan pemerhatian tersebut?

- A X consists of ions
X terdiri daripada ion-ion.
 - B X consists of molecules
X terdiri daripada molekul-molekul
 - C X has freely moving ions
X mempunyai ion-ion bebas bergerak
 - D X has ions in fixed position
X mempunyai ion-ion dalam kedudukan tetap
- 20 A student constructed a chemical cell using a copper rod, a zinc rod, copper (II) sulphate solution and connecting wires. Which of the following will act as the positive terminal?
Seorang pelajar membina satu sel kimia menggunakan rod kuprum, rod zink, larutan kuprum (II) sulfat dan wayar penyambung. Antara yang berikut, yang manakah akan menjadi terminal positif?
- A Copper rod
Rod kuprum
 - B Zinc rod
Rod zink
 - C Connecting wires
Wayar penyambung
 - D Copper(II) sulphate solution
Larutan kuprum (II) sulfat

- 21 Diagram 6 shows the set-up of apparatus for the titration of 25 cm^3 1.0 mol dm^{-3} sodium hydroxide solution with 0.5 mol dm^{-3} of sulphuric acid.

Rajah 6 menunjukkan susunan radas bagi titratan 25 cm^3 larutan natrium hidroksida 1.0 mol dm^{-3} dengan asid sulfurik 0.5 mol dm^{-3} .

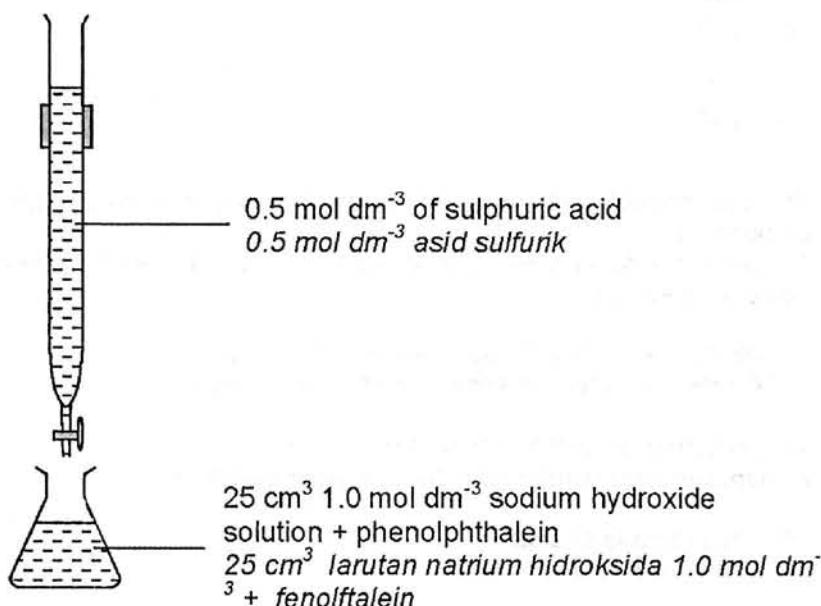


Diagram 6
Rajah 6

What is the volume of 0.5 mol dm^{-3} of sulphuric acid solution required to completely neutralize 25 cm^3 1.0 mol dm^{-3} sodium hydroxide solutions?

Berapakah isi padu 0.5 mol dm^{-3} asid sulfurik diperlukan untuk meneutralkan lengkap 25 cm^3 larutan natrium hidroksida 1.0 mol dm^{-3} ?

- A 12.50 cm^3
- B 25.00 cm^3
- C 50.00 cm^3
- D 75.50 cm^3

- 22 Which of the following ions form white precipitate that dissolves in excess ammonia solution?

Antara ion-ion berikut, yang manakah menghasilkan mendakan putih yang larut dalam larutan ammonia berlebihan?

- A Mg^{2+}
- B Al^{3+}
- C Zn^{2+}
- D Pb^{2+}

- 23 The equation below shows the formation of a composite material from its original component.

Persamaan di bawah menunjukkan pembentukan satu bahan komposit daripada komponen asalnya.



Why is fibre glass better than common plastic?

Kenapakah kaca gentian lebih baik daripada plastik biasa?

- A High tensile strength
Kekuatan regangan tinggi
- B Resistant to corrosion
Tahan kakisan
- C Able to withstand heat
Tahan haba
- D Good conductor of electricity
Konduktor elektrik yang baik

- 24 Which of the following will make meat last longer?

Antara yang berikut, yang manakah boleh menyebabkan daging tahan lebih lama?

- A Boil the meat for an hour.
Mendidihkan daging untuk satu jam.
- B Dry the meat under the sun
Mengeringkan daging di bawah matahari
- C Keep the meat in a refrigerator.
Menyimpan daging di dalam peti sejuk.
- D Fry the meat and keep into a container.
Menggorengkan daging dan menyimpan di dalam bekas .

25 The equation below shows a reaction of alkene.

Persamaan di bawah menunjukkan tindak balas alkena.



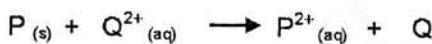
Which of the following is Y?

Antara yang berikut, yang manakah Y?

- A Bromine, Br₂
Bromin, Br₂
- B Hydrogen bromide, HBr
Hidrogen bromida, HBr
- C Sodium bromide, NaBr
Natrium bromida, NaBr
- D Magnesium bromide, MgBr₂
Magnesium bromida, MgBr₂

26 The following shows an ionic equation.

Yang berikut menunjukkan suatu persamaan ion.

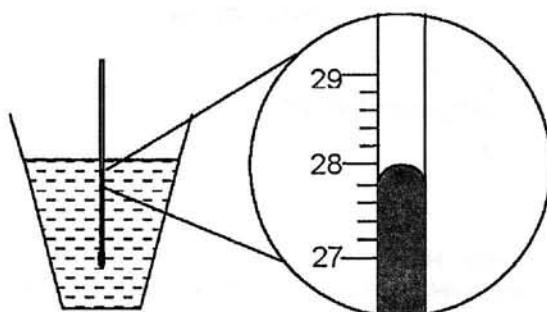


Based on the equation, which of the following is true?

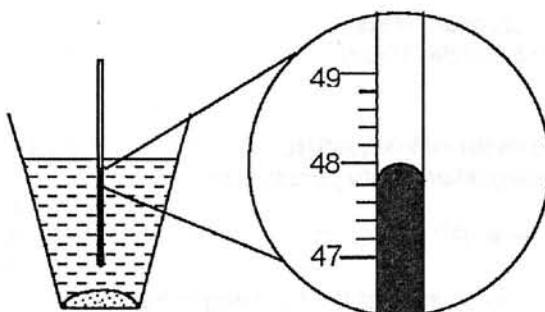
Berdasarkan persamaan tersebut, yang manakah benar?

- A P is oxidised.
P dioksidakan.
- B P²⁺ is oxidised.
P²⁺ dioksidakan.
- C Q²⁺ is a reducing agent.
Q²⁺ adalah agen peneurunan.
- D Q²⁺ donates electrons.
Q²⁺ menderma elektron.

- 27 Diagram 7 shows the results obtained when metal X is added into solution A.
Rajah 7 menunjukkan keputusan yang diperoleh apabila logam X ditambah ke dalam larutan A.



Solution A before adding metal X
Larutan A sebelum ditambahkan logam X



Solution A after adding metal X
Larutan A selepas ditambahkan logam

Diagram 7
Rajah 7

Which of the following explains the reaction?

Antara yang berikut, yang manakah menjelaskan tindak balas tersebut?

- A Displacement and endothermic
Penyesaran dan endotermik
- B Displacement and exothermic
Penyesaran dan eksotermik
- C Precipitation and endothermic
Pemendakan dan endotermik
- D Precipitation and exothermic
Pemendakan dan eksotermik

28

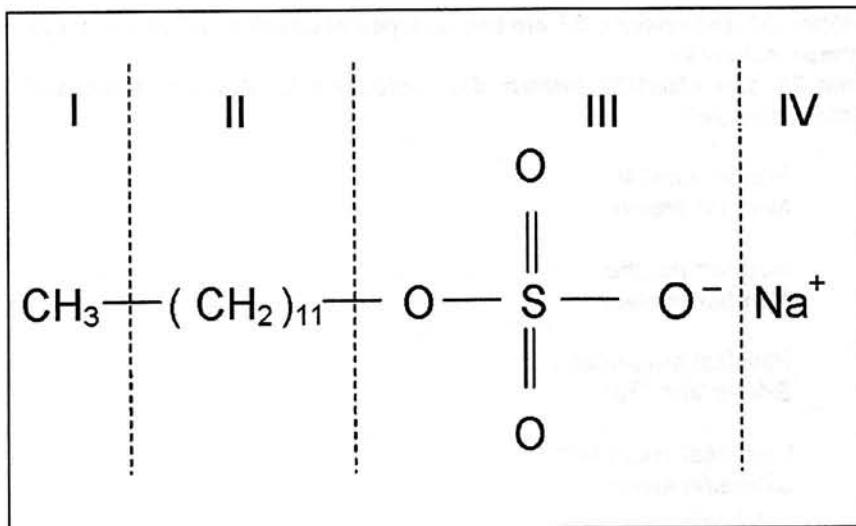


Diagram 8
Rajah 8

Based on Diagram 8 , which is the hydrophilic part in sodium dodecyl sulphate?
Berdasarkan Rajah 8, yang manakah bahagian hidrofilik dalam natrium dodekil sulfat?

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

29 Chlorine-35 and chlorine-37 are two isotopes of chlorine. What are the differences in these isotopes?

Klorin-35 dan klorin-37 adalah dua isotop klorin. Apakah perbezaan di antara isotop-isotop ini?

- I Proton number
Nombor proton
- II Nucleon number
Nombor nucleon
- III Physical properties
Sifat-sifat fizikal
- IV Chemical properties
Sifat-sifat kimia
- A I and II
I dan II
- B II and III
II dan III
- C I and III
I dan III
- D II and IV
II dan IV

- 30 Diagram 9 shows the set-up of apparatus to determine the empirical formula of metal oxide.

Rajah 9 menunjukkan susunan radas untuk menentukan formula empirik bagi oksida logam.

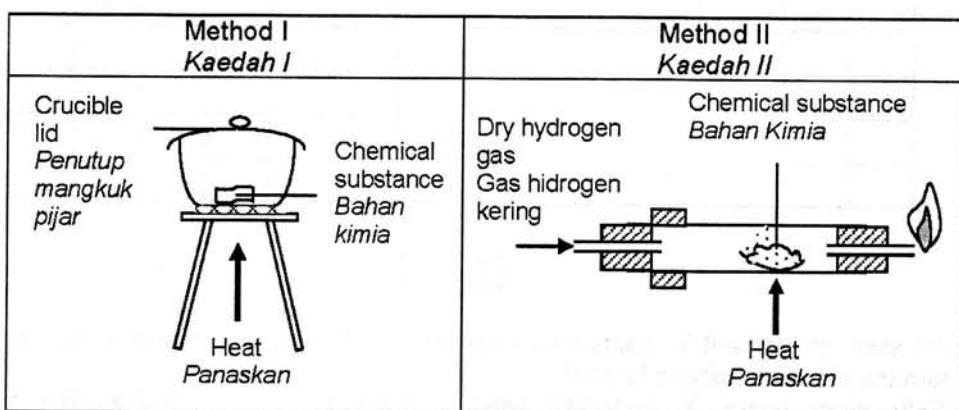


Diagram 9
Rajah 9

Which of the following is the correct match for Method I and Method II?
Antara padanan berikut, yang manakah betul untuk Kaedah I dan II?

	Method I Kaedah I	Method II Kaedah II
A	Copper (II) oxide <i>Kuprum (II) oksida</i>	Lead (II) oxide <i>Plumbum (II) oksida</i>
B	Lead (II) oxide <i>Plumbum (II) oksida</i>	Copper (II) oxide <i>Kuprum (II) oksida</i>
C	Magnesium oxide <i>Magnesium oksida</i>	Lead (II) oxide <i>Plumbum (II) oksida</i>
D	Copper (II) oxide <i>Kuprum (II) oksida</i>	Magnesium oxide <i>Magnesium oksida</i>

31

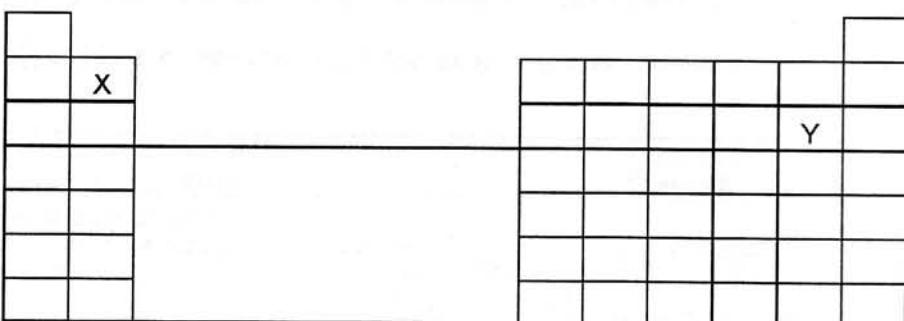


Diagram 10
Rajah 10

An atom of element X reacts with element Y to form a compound. What is the formula of the compound formed?

Satu atom unsur X bertindak balas dengan unsur Y menghasilkan satu sebatian. Apakah formula bagi sebatian yang terbentuk?

- A XY
- B X_2Y
- C XY_2
- D X_2Y_2

32 Many covalent compounds are used as solvents. Which of the following is not a solvent for paint?

Kebanyakan sebatian kovalen digunakan sebagai pelarut. Antara yang berikut, yang manakah bukan pelarut untuk cat?

- A Ether
Eter
- B Water
Air
- C Ethanol
Etanol
- D Turpentine
Turpentin

- 33 Diagram 11 shows the apparatus set-up in the electroplating of an iron spoon with silver.

Rajah 11 menunjukkan susunan radas untuk menyadur satu sudu besi dengan argentum.

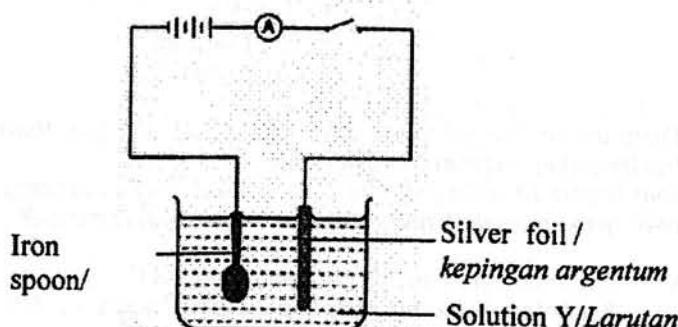


Diagram 11
Rajah 11

What could be solution Y?

Antara yang berikut, yang manakah larutan Y?

- A Iron (II) sulphate
Ferum(II) sulfat
- B Iron (II) chloride
Ferum (II) klorida
- C Silver chloride
Argentum klorida
- D Silver nitrate
Argentum nitrat

34

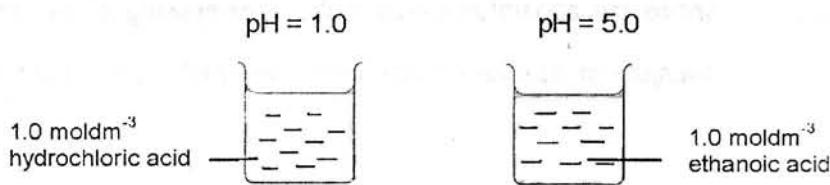


Diagram 12
Rajah 12

In Diagram 12, the pH value of ethanoic acid is higher than the hydrochloric acid. Which of the following, explain the difference?

Dalam Rajah 12, nilai pH asid etanoik lebih tinggi daripada asid hidroklorik. Antara yang berikut, yang manakah menerangkan perbezaan tersebut?

- A Ethanoic acid has low concentration of H⁺
Asid etanoik mempunyai kepekatan H⁺ yang rendah
- B Ethanoic acid is a strong acid
Asid etanoik ialah asid kuat
- C Hydrochloric acid is a weak acid
Asid hidroklorik ialah asid lemah
- D Hydrochloric acid has high concentration of OH⁻
Asid hidroklorik mempunyai kepekatan OH⁻ yang tinggi

- 35 Diagram 13 shows a series of reaction that involves compound G.
Rajah 13 menunjukkan satu siri tindak balas yang melibatkan sebatian G

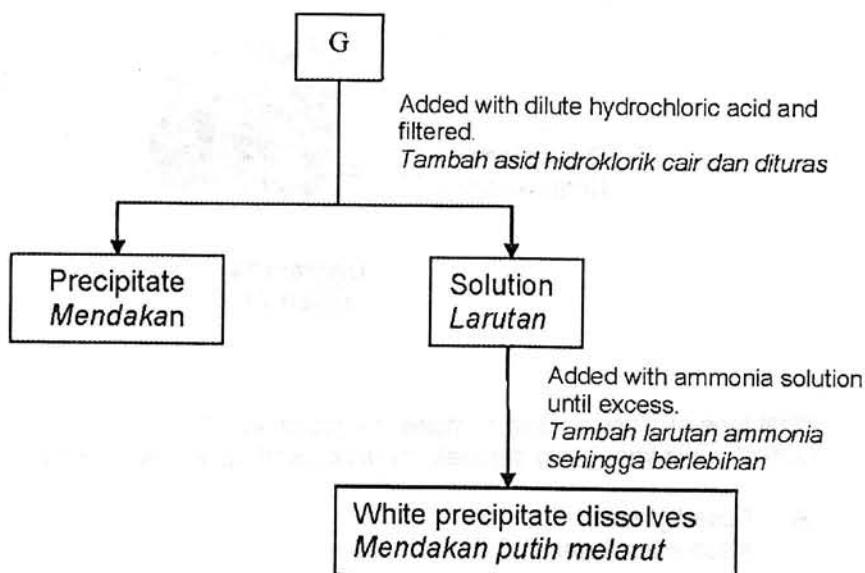


Diagram 13
Rajah 13

G is a mixture of two salts. Among the following, what is G?
G adalah campuran dua garam. Apakah G?

- A Lead (II) nitrate and zinc carbonate
 $\text{Plumbum(II) nitrat dan zink karbonat}$
- B Lead(II) nitrate and aluminium nitrate
 $\text{Plumbum(II) nitrat dan aluminium nitrat}$
- C Silver sulphate and copper (II) carbonate
 $\text{Argentum sulfat dan kuprum(II) karbonat}$
- D Magnesium sulphate and lead(II) carbonate
 $\text{Magnesium sulfat dan plumbum(II) karbonat}$

36 Diagram 14 shows a camera.

Rajah 14 menunjukkan sejenis kamera.



Diagram 14
Rajah 14

What type of glass is used to make the quartz lens?

Apakah jenis kaca yang digunakan untuk membuat kanta kuartz?

- A Fused glass
Kaca silika terlakur
- B Soda lime glass
Kaca soda kapur
- C Borosilicate glass
Kaca borosilikat
- D Lead crystal glass
Kaca plumbum

- 37 A student carried out an experiment to determine the rate of reaction between calcium carbonate and dilute hydrochloric acid. The volume of carbon dioxide gas collected at intervals of 0.5 minutes is recorded in Table 1.

Seorang pelajar menjalankan eksperimen untuk menentukan kadar tindak balas antara kalsium karbonat dan asid hidroklorik cair. Isipadu gas karbon dioksida yang terkumpul pada selang masa 0.5 minit direkod dalam Jadual 1.

Time (min) Masa (min)	0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
Volume of CO ₂ gas (cm ³)	0	27	46	59	70	79	86	92	95	95	95
Isipadu gas CO ₂ (cm ³)											

Table 1
Jadual 1

What is the average rate of reaction in the third minute?
Apakah kadar tindak balas purata dalam minit ketiga ?

- A 28.67 cm³min⁻¹
- B 23.75 cm³min⁻¹
- C 16 cm³min⁻¹
- D 14 cm³min⁻¹

- 38 Propane, C₃H₈ undergoes complete combustion to produce carbon dioxide, CO₂ and water, H₂O.

Propana, C₃H₈ mengalami pembakaran lengkap untuk menghasilkan karbon dioksida, CO₂ dan air, H₂O.

Calculate the volume of carbon dioxide produced when 0.5 mol propane burns completely at room temperature.

[Molar volume = 24 dm³mol⁻¹ at room temperature]

Kira isipadu gas karbon dioksida yang terhasil apabila 0.5 mol propana terbakar dengan lengkap pada suhu bilik.

[Isipadu molar = 24 dm³mol⁻¹ pada suhu bilik]

- A 72.0 dm³
- B 36.0 dm³
- C 24.0 dm³
- D 12.5 dm³

- 39 What is the oxidation number of X in $X_2O_7^{2-}$ ion ?
Apakah nombor pengoksidaan bagi X dalam ion $X_2O_7^{2-}$?

- A +3
- B +4
- C +5
- D +6

- 40 Table 2 shows the temperature readings for the reaction between 25 cm^3 of 0.1 mol dm^{-3} hydrochloric acid and 25 cm^3 of 0.1 mol dm^{-3} sodium hydroxide solution.

Jadual 2 menunjukkan bacaan suhu untuk tindak balas di antara 25 cm^3 asid hidroklorik 0.1 mol dm^{-3} dan 25 cm^3 larutan natrium hidroksida 0.1 mol dm^{-3} .

Average initial temperature before both solutions are mixed <i>Suhu awal kedua-dua larutan sebelum dicampurkan</i>	30°C
Highest temperature after both solutions are mixed <i>Suhu tertinggi larutan selepas dicampurkan</i>	43°C

Table 2
Jadual 2

Calculate the heat produced from the reaction.
Kirakan haba yang terhasil daripada tindak balas tersebut.

- A $25\text{ cm}^3 \times 4.2\text{ J g}^{-1}\text{ }^{\circ}\text{C}^{-1} \times 13^{\circ}\text{C}$
- B $25\text{ cm}^3 \times 4.2\text{ J g}^{-1}\text{ }^{\circ}\text{C}^{-1} \times 43^{\circ}\text{C}$
- C $50\text{ cm}^3 \times 4.2\text{ J g}^{-1}\text{ }^{\circ}\text{C}^{-1} \times 13^{\circ}\text{C}$
- D $50\text{ cm}^3 \times 4.2\text{ J g}^{-1}\text{ }^{\circ}\text{C}^{-1} \times 43^{\circ}\text{C}$

- 41 Diagram 15 shows the molecular formula of an organic compound.
Rajah 15 menunjukkan formula molekul bagi suatu sebatian organik.



Diagram 15
Rajah 15

The compound is an ingredient in making pineapple jam. What is the function of the compound?

Sebatian itu adalah suatu bahan dalam penyediaan jem nenas. Apakah fungsi sebatian tersebut ?

- A To make the jam thicker
Untuk memekatkan jem
- B To enhance the flavor
Untuk menambah perisa
- C To prevent oxidation
Untuk mengelakkan pengoksidaan
- D To sweeten the jam
Untuk menambah kemanisan jem

42

Substance <i>Bahan</i>	Melting point / °C <i>Takat lebur / °C</i>	Boiling point / °C <i>Takat didih / °C</i>
W	-123	78
X	-10	104
Y	59	224
Z	120	445

Table 3
Jadual 3

What are the physical states of substances W, X, Y and Z at 110°C?

Apakah keadaan fizikal bahan W, X, Y dan Z pada 110°C?

	W	X	Y	Z
A	Liquid <i>Cecair</i>	Liquid <i>Cecair</i>	Solid <i>Pepejal</i>	Gas Gas
B	Gas <i>Gas</i>	Solid <i>Pepejal</i>	Liquid <i>Cecair</i>	Gas Gas
C	Solid <i>Pepejal</i>	Liquid <i>Cecair</i>	Gas Gas	Gas Gas
D	Gas <i>Gas</i>	Gas <i>Gas</i>	Liquid <i>Liquid</i>	Solid <i>Pepejal</i>

- 43 Table 4 shows the percentage by mass of each element in a compound and their relative atomic masses.

Jadual 4 menunjukkan peratusan mengikut jisim bagi setiap unsur dalam satu sebatian dan juga jisim atom relatif masing-masing.

Elements Unsur	C	H	O
Percentage (%) Peratus (%)	26.70	2.20	71.10
Relative atomic mass Jisim atom relative	12	1	16

Table 4
Jadual 4

What is the empirical formula of the compound?
Apakah formula empirik untuk sebatian tersebut?

- A CHO
- B CHO_2
- C CH_2O
- D C_2HO

- 44 Element Z forms an oxide with the chemical formula of Z_2O_3 . Which of the following is true about this oxide?

Unsur Z membentuk oksida dengan formula molekul Z_2O_3 . Antara yang berikut, yang manakah benar tentang oksida ini?

- A The oxide of Z reacts with acid only.
Oksida Z bertindak balas dengan asid sahaja.
- B The oxide of Z reacts with alkali only.
Oksida Z bertindak balas dengan alkali sahaja.
- C The oxide of Z reacts with both acid and alkali.
Oksida Z bertindak balas dengan kedua-dua asid dan alkali.
- D The oxide of Z does not react with both acid and alkali.
Oksida Z tidak bertindak balas dengan kedua-dua asid dan alkali.

- 45 Atom X has an electron arrangement of 2.4. Atom Y has proton number of 17. What are the properties of the compound formed between elements X and Y?

Atom X mempunyai susunan elektrom 2.4. Atom Y mempunyai nombor proton 17. Apakah ciri-ciri sebatian yang terbentuk antara unsur X dan unsur Y?

- I It has high boiling point.
Ita mempunyai takat lebur yang tinggi.
 - II It does not conduct electricity.
Ita tidak boleh mengkonduksi elektrik.
 - III It does not exist as a solid at room temperature.
Ita tidak wujud sebagai pepejal pada keadaan bilik.
 - IV It is soluble in organic solvent.
Ita larut dalam pelarut organik.
- A I and II only
I dan II sahaja
- B III and IV only
III dan IV sahaja
- C I, II and III only
I, II dan III sahaja
- D II, III and IV only
II, III dan IV sahaja

- 46 The electrolysis of copper (II) sulphate solution was carried out using copper electrodes. What are the observation at anode and the product at cathode?

Elektrolisis larutan kuprum (II) sulfat menggunakan elektrod-elektrod kuprum dijalankan. Apakah pemerhatian di anod dan hasil di katod?

	Observation at anode <i>Pemerhatian di anod</i>	Product at cathode <i>Hasil di katod</i>
A	Electrode becomes thicker <i>Elektrod menjadi lebih tebal</i>	Copper metal <i>Logam kuprum</i>
B	Electrode becomes thinner <i>Elektrod menjadi lebih nipis</i>	Copper metal <i>Logam kuprum</i>
C	Colourless gas bubbles <i>Gelembung gas tidak berwarna</i>	Oxygen gas <i>Gas oksigen</i>
D	Colourless gas bubbles <i>Gelembung gas tidak berwarna</i>	Hydrogen gas <i>Gas hydrogen</i>

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



If 0.48 g of magnesium is used, calculate the volume of 0.5 mol dm^{-3} hydrochloric acid needs to be added for complete reaction.

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

Jika 0.48 g magnesium digunakan, hitungkan isipadu asid hidroklorik 0.5 mol dm^{-3} yang perlu ditambah untuk tindak balas yang lengkap.

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

- A 0.08 cm^3
- B 0.8 cm^3
- C 8 cm^3
- D 80 cm^3

- 48 Diagram 16 shows the set up of the apparatus for the action of heat on zinc carbonate. After a few minutes lime water turns cloudy.

Rajah 16 menunjukkan susunan radas bagi kesan haba ke atas bahan W. Selepas beberapa minit air kapur menjadi keruh.

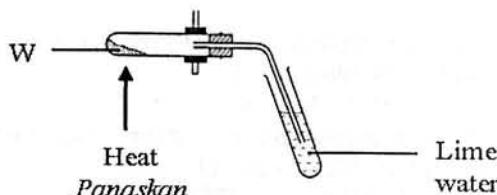


Diagram 16
Rajah 16

The mass of the boiling tube with the content before and after the heating is recorded in Table 5 below.

Jisim tabung didih dengan kandungannya sebelum dan selepas dipanaskan dicatatkan dalam Jadual 5 di bawah.

Before heating Sebelum pemanasan	31.25g
After heating Selepas pemanasan	20.25g

Table 5
Jadual 5

Calculate the volume of the gas released in dm^3 at room temperature.

[Relative atomic mass: C=12; O=16; Zn=65; Molar volume at room temperature = 24 $\text{dm}^3\text{mol}^{-1}$]

Hitung isipadu gas yang terbebas dalam dm^3 pada suhu bilik.

[Jisim atom relatif: C=12; O=16; Zn=65; Isipadu molar pada suhu bilik = 24 $\text{dm}^3\text{mol}^{-1}$]

- A 3
- B 6
- C 11
- D 12

49 Diagram 16 shows four iron nails in test tubes, P, Q, R and S.

Rajah 16 menunjukkan empat paku diletakkan di dalam empat tabung uji P, Q, R dan S.

Hot jelly solution + potassium hexacyanoferrate(III) solution
Larutan agar-agar panas + larutan kalium heksasianoferat(III)

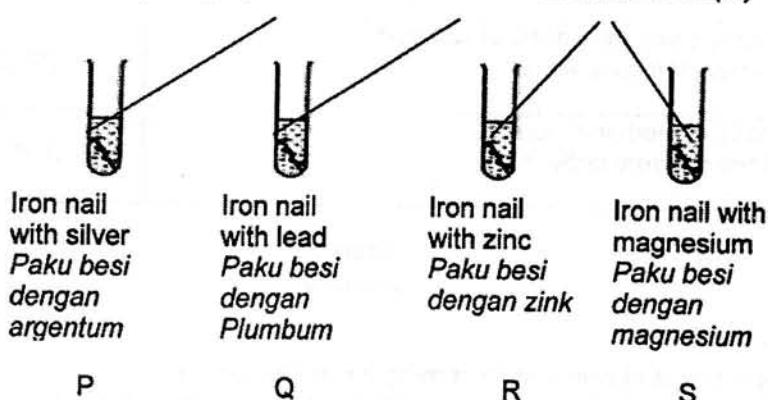


Diagram 16
Rajah 16

Which test tube shows the highest intensity of blue colouration after a day?

Tabung uji manakah yang mempunyai keamatan warna biru yang tinggi selepas satu hari?

- A P
- B Q
- C R
- D S

50 Table 6 shows a data recorded when 100 cm^3 of water was heated using methanol, CH_3OH as a fuel.

Jadual 6 menunjukkan data yang direkodkan apabila 100 cm^3 air dipanaskan dengan menggunakan metanol, CH_3OH sebagai bahan api.

Mass of water <i>Jisim air</i>	100 g
Change in temperature of water, θ <i>Perubahan suhu air, θ</i>	$20\text{ }^\circ\text{C}$
Mass of methanol burnt <i>Jisim metanol terbakar</i>	0.32 g

Table 6
Jadual 6

What is the heat of combustion of methanol in the reaction?

Apakah haba pembakaran metanol di dalam tindak balas tersebut?

[Specific heat capacity of solution: $4.2\text{ J g}^{-1}\text{ }^\circ\text{C}^{-1}$; molar mass of methanol, CH_3OH is 32 g mol^{-1}]

[Haba kapasiti spesifik larutan: $4.2\text{ J g}^{-1}\text{ }^\circ\text{C}^{-1}$; Jisim molar metanol, CH_3OH adalah 32 g mol^{-1}]

- A 0.84 kJ mol^{-1}
- B 8.4 kJ mol^{-1}
- C 84 kJ mol^{-1}
- D 840 kJ mol^{-1}

END OF QUESTION PAPER

KERTAS SOALAN TAMAT

Nama :

Kelas :



JABATAN PELAJARAN NEGERI JOHOR

PEPERIKSAAN PERCUBAAN SPM 2011
CHEMISTRY
Kertas 2
September

4541/2

2½ jam
Dua jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. Tuliskan nama dan tingkatan pada ruang 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			
Bahagian	Soalan	Markah Penuh	Markah Diperoleh
A	1	10	
	2	10	
	3	10	
	4	10	
	5	10	
	6	10	
B	7	20	
	8	20	
C	9	20	
	10	20	
Jumlah			

Kertas soalan ini mengandungi 29 halaman bercetak

[Lihat sebelah

Section A
Bahagian A

[60 marks]
[60 markah]

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

- 1 (a) Diagram 1.1 shows the manufacture of ammonia.
Rajah 1.1 di bawah menunjukkan pembuatan ammonia.

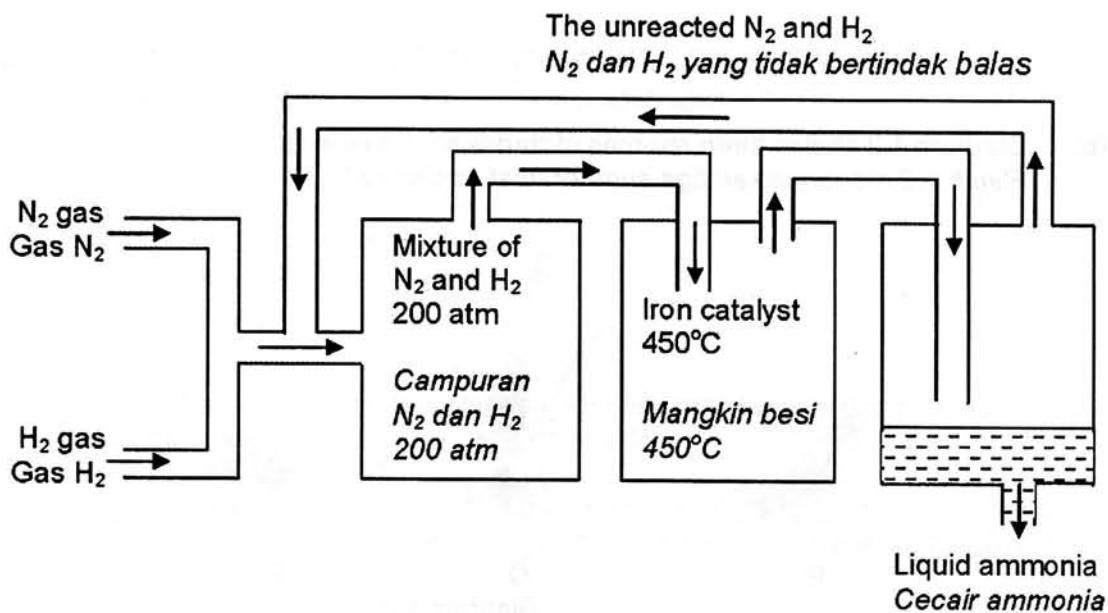


Diagram 1.1
Rajah 1.1

Based on Diagram 1.1 :
Berdasarkan Rajah 1.1 :

- (i) Name this industrial process.
Namakan proses industri ini.

..... [1 mark]

- (ii) State the names of reactants used.

Nyatakan nama untuk bahan-bahan tindak balas yang digunakan.

.....
[1 mark]

- (iii) The ammonia gas formed is condensed and separated. Why?
Gas ammonia yang terhasil dikondensasikan dan diasingkan. Kenapa?

.....
[1 mark]

- (iv) Write two main uses of ammonia.
Tuliskan dua kegunaan utama ammonia.

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

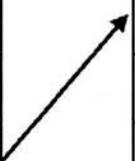
- (b) Diagram 1.2 shows three sources of traditional medicines.
Rajah 1.2 menunjukkan tiga sumber ubat tradisional.



Diagram 1.2
Rajah 1.2

Match the three sources of traditional medicine with their uses by using a line "____".
Padangkan ketiga-tiga contoh-contoh sumber dengan kegunaannya.

Source <i>Sumber</i>	Uses <i>Kegunaan</i>
P	Cure sore throat <i>Menyembuhkan sakit tekak</i>
P	Treat skin wounds <i>Merawat luka kulit</i>
Q	Treat arthritis <i>Merawat penyakit arthritis</i>
Q	
R	
R	



[1 mark]

- (c) The following shows four examples of modern medicines.

[Lihat sebelah

Di bawah menunjukkan empat contoh ubat moden.

Haloperidol
Haloperidol

Barbiturates
Barbiturat

Paracetamol
Paracetamol

Streptomycin
Streptomysin

- (i) Tick (✓) in the box provided above to indicate analgesics that relieve pain.
Tanda (✓) di dalam kotak di atas untuk ubat analgesik yang mengurangkan kesakitan.

[1 mark]

- (ii) Name another example of analgesics that is used in headache tablets and in cough medicines. What is the side effect of this medicine?

Namakan contoh lain analgesik yang digunakan dalam ubat sakit kepala dan ubat batuk. Apakah kesan sampingan contoh ubat ini?

[2 marks]

- (iii) An attention deficit hyperactivity disorder child may take dextro-amphetamine, a psychotherapeutic medicine. State its function.

Seorang kanak-kanak hiperaktif dan bermasalah kurang tumpuan boleh diberi ubat dextroamphetamine, satu contoh ubat psikoteraputik. Nyatakan fungsinya.

[1 mark]

- 2 Diagram 2 shows part of the Periodic Table of Elements.
 V, W, X, Y, Z and U do not represent the actual symbols of the elements.

*Rajah 2 menunjukkan sebahagian daripada Jadual Berkala.
 V, W, X, Y, Z dan U tidak mewakili simbol sebenar unsur berkenaan.*

1	2		13	14	15	16	17	18
		V					W	
X					Y	Z		

Diagram 2
Rajah 2

Using the letters in diagram 2, answer the following questions:
Dengan menggunakan huruf-huruf dalam rajah 2, jawab soalan-soalan berikut :

- (a) (i) Which element is a halogen?
Unsur yang manakah adalah halogen?

..... [1 mark]

- (ii) Which element is transition element?
Unsur yang manakah logam peralihan?

..... [1 mark]

- (iii) Which element is monoatomic?
Unsur yang manakah monoatom?

..... [1 mark]

[Lihat sebelah

- (b) (i) Write the electron arrangement for an atom of element X.
Tuliskan susunan elektron bagi atom unsur X.

.....
[1 mark]

- (ii) Write the formula of the ion formed from an atom of element X.
Tuliskan formula bagi ion yang terbentuk daripada satu unsur X.

.....
[1 mark]

- (c) (i) Why are elements X, Y and Z placed in the same period?
Mengapakah unsur X, Y dan Z terletak dalam kala yang sama?

.....
[1 mark]

- (ii) Arrange elements X, Y and Z according to the decrease in the size of atoms.
Susun unsur X, Y dan Z mengikut pengurangan saiz atom.

.....
[1 mark]

- (d) (i) Write the balanced chemical equation for the reaction between element X and oxygen gas.

Tuliskan persamaan kimia seimbang bagi tindak balas di antara unsur X dan gas oksigen.

.....
[2 marks]

- (ii) Element Z dissolves in water to produce a solution.
Complete the equation for the reaction.



[1 mark]

- 3 Diagram 3 shows the apparatus set up to determine the melting point of substance X. In this experiment, solid X is heated until it changes to molten state.

Rajah 3 menunjukkan susunan radas untuk menentukan takat lebur bahan X. Dalam eksperimen ini, pepejal X dipanaskan sehingga ia berubah kepada cecair.

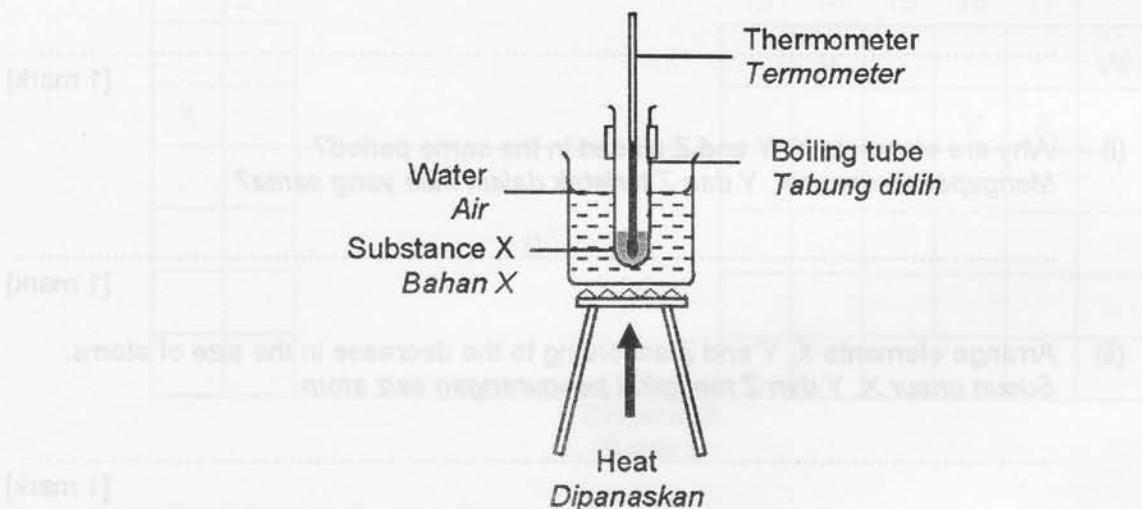


Diagram 3
Rajah 3

Based on diagram 3, answer the following questions.
Berdasarkan rajah 3, jawab soalan-soalan berikut.

- (a) What is the name of the process when solid changes to molten state?
Apakah proses apabila pepejal berubah menjadi leburan?

[1 mark]

[Lihat sebelah

- (b) Solid X has a melting point of 90°C . If a test tube of molten X at 150°C is allowed to cool at room temperature,

Pepejal X mempunyai takat lebur 90°C . Sekiranya tabung uji yang mengandungi leburan X pada suhu 150°C disejukkan pada suhu bilik,

- (i) Sketch a graph of temperature against time for the cooling of molten X.
Lakarkan graf suhu melawan masa untuk penyejukan leburan X.

[2 marks]

- (ii) How to avoid supercooling process?
Bagaimana untuk mengelakkan proses penyejukan lampau?

.....
[1 mark]

- (iii) Draw a labelled apparatus set-up for the cooling process of substance X.
Lukis susunan radas berlabel untuk proses penyejukan bagi bahan X.

[2 marks]

- (c) Particles consist of atom, molecule or ions. Why is an atom neutral?
Zarah-zarah terdiri daripada atom, molekul atau ion. Mengapa atom adalah neutral?

.....

[1 mark]

- (d) A bromine atom has 35 protons and 45 neutrons. Write the standard representation of bromine atom.
Satu atom bromin mempunyai 35 proton dan 45 neutron. Tuliskan perwakilan piawai untuk atom bromin.

.....

[1 mark]

- (e) (i) What are isotopes?
Apakah isotop?

.....

[1 mark]

- (ii) Phosphorus-31 and phosphorus-32 are isotopes of phosphorus. State one use of phosphorus-32.

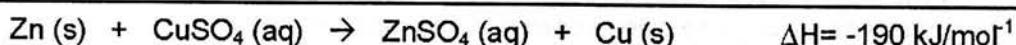
Fosforus-31 dan fosforus-32 adalah isotop untuk fosforus. Nyatakan satu kegunaan fosforus-32.

.....

[1 mark]

- 4 The thermochemical equation represent the displacement reaction of copper from copper(II) sulphate solution by zinc.

Persamaan termokimia berikut mewakili tindak balas penyesaran kuprum daripada larutan kuprum(II) sulfat oleh zink.



- (a) State the meaning of heat of displacement.

Nyatakan maksud haba penyesaran.

.....

.....

[1 mark]

- (b) Is it an exothermic reaction or endothermic reaction?

Adakah ia tindak balas eksotermik atau endotermik?

.....

[1 mark]

- (c) State two observations in this experiment.

Nyatakan dua pemerhatian dalam tindak balas ini.

.....

.....

.....

[2 marks]

- (d) Draw an energy level diagram for this reaction.

Lukis gambarajah aras tenaga bagi tindak balas ini.

[2 marks]

- (e) In the experiment, excess zinc powder was reacted with 25 cm^3 of 0.2 mol dm^{-3} copper(II) sulphate solution.

Dalam eksperimen itu, serbuk zink berlebihan ditindak balaskan dengan 25 cm^3 larutan kuprum(II) sulfat 0.2 mol dm^{-3} .

Calculate the heat energy released in this experiment.

Hitungkan tenaga haba yang dibebaskan di dalam eksperimen ini.

[Specific heat capacity of solution: $4.2 \text{ J g}^{-1} \text{ }^\circ\text{C}^{-1}$; Density of solution: 1 g cm^{-3}]
[Muatan haba tentu larutan: $4.2 \text{ J g}^{-1} \text{ }^\circ\text{C}^{-1}$; Ketumpatan larutan: 1 g cm^{-3}]

[2 marks]

- (b) In another reaction, zinc was replaced with magnesium to react with copper(II) sulphate solution.

Predict the value of heat of displacement, ΔH and explain why.

Dalam satu tindak balas lain, zink telah digantikan dengan magnesium untuk bertindak balas dengan larutan kuprum(II) sulfat.

Ramalkan nilai haba penyesaran, ΔH dan terangkan mengapa.

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

[2 marks]

- 5 Diagram 5.1 shows a flow chart for the qualitative analysis of substance X.
Rajah 5.1 menunjukkan carta alir analisis kualitatif bagi sebatian X.

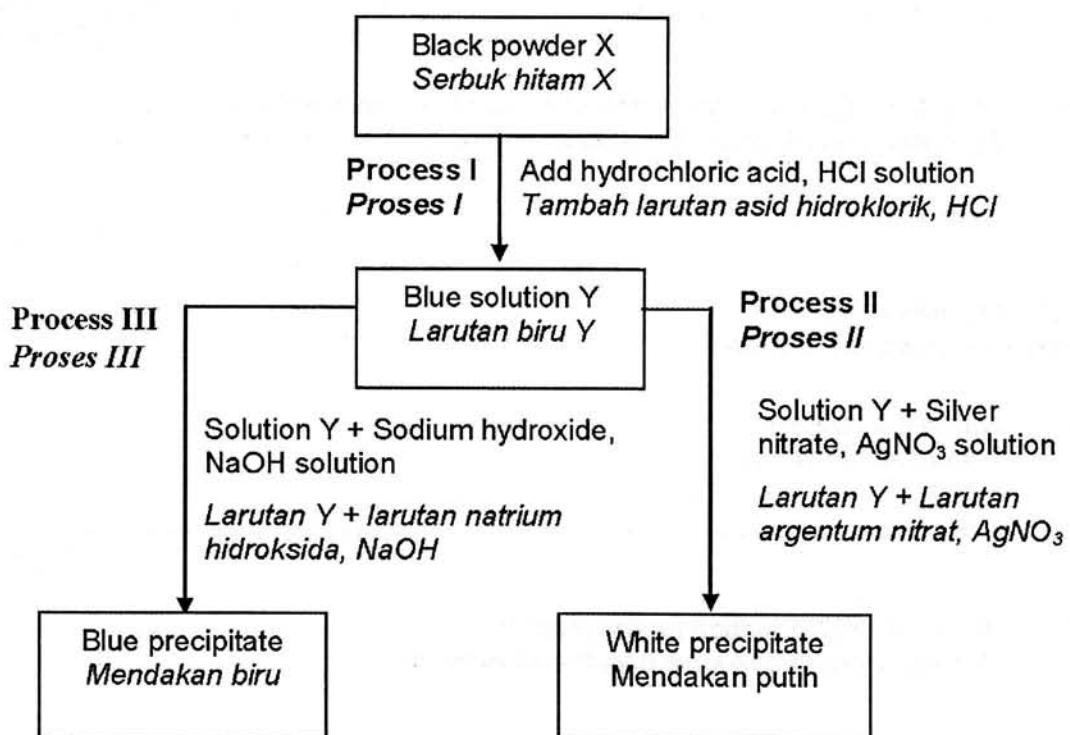


Diagram 5.1
Rajah 5.1

- (a) Based on Diagram 5.1,
Berdasarkan Rajah 5.1,

(i) Name the black powder X.
Namakan serbuk hitam X.

..... [1 mark]

(ii) Name the process I.
Namakan proses I.

..... [1 mark]

- (iii) Write a balanced chemical equation for the reaction.
Tuliskan persamaan kimia yang seimbang bagi tindak balas yang berlaku.
-
[2 marks]
- (iv) Why is the black powder X added in excess in the reaction?
Mengapa serbuk hitam X ditambah secara berlebihan dalam tindak balas ini?
-
[1 mark]
- (b) Based on process II,
Berdasarkan kepada proses II,
- (i) Name the process.
Namakan proses itu.
-
[1 mark]
- (ii) Write the ionic equation for the reaction.
Tuliskan persamaan ionik bagi tindak balas itu.
-
[1 mark]
- (iii) How to obtain the white precipitate in the process II?
Bagaimana mendapatkan mendakan putih dalam proses ini?
-
[1 mark]
- (c) Based on the process I and process III, state the cation and anion present in solution Y.
Berdasarkan proses I dan proses III, nyatakan kation dan anion yang hadir di dalam larutan Y.

Cation : Anion :
Kation *Anion*

[2 marks]

- 6 Diagram 6.1 shows an experiment to investigate a factor that influences the rate of reaction. The experiment is repeated five times at different temperatures.

Rajah 6.1 menunjukkan suatu eksperimen untuk mengkaji satu faktor yang mempengaruhi kadar tindak balas. Eksperimen ini diulangi sebanyak lima kali pada suhu yang berlainan.

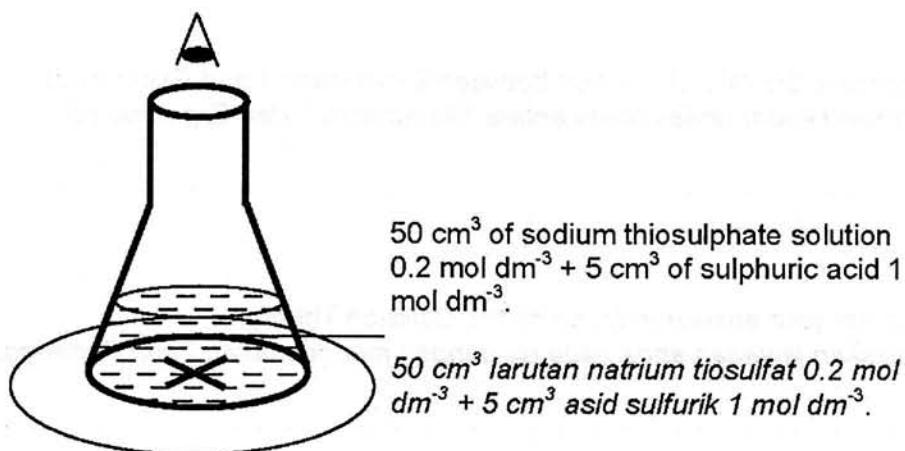


Diagram 6.1

Rajah 6.1

Table 6 shows the temperature and time taken for "X" mark to disappear from view when observed vertically from the top.

Jadual 6 menunjukkan suhu dan masa yang diambil untuk tanda "X" hilang dari pandangan bila diperhatikan dari atas.

Experiment <i>Eksperimen</i>	Temperature / °C <i>Suhu / °C</i>	Time / s <i>Masa / s</i>
1	30.0	55.5
2	40.0	33.0
3	50.0	23.0
4	60.0	17.0
5	70.0	13.0

Table 6

Jadual 6

- (a) State one observation from this experiment.

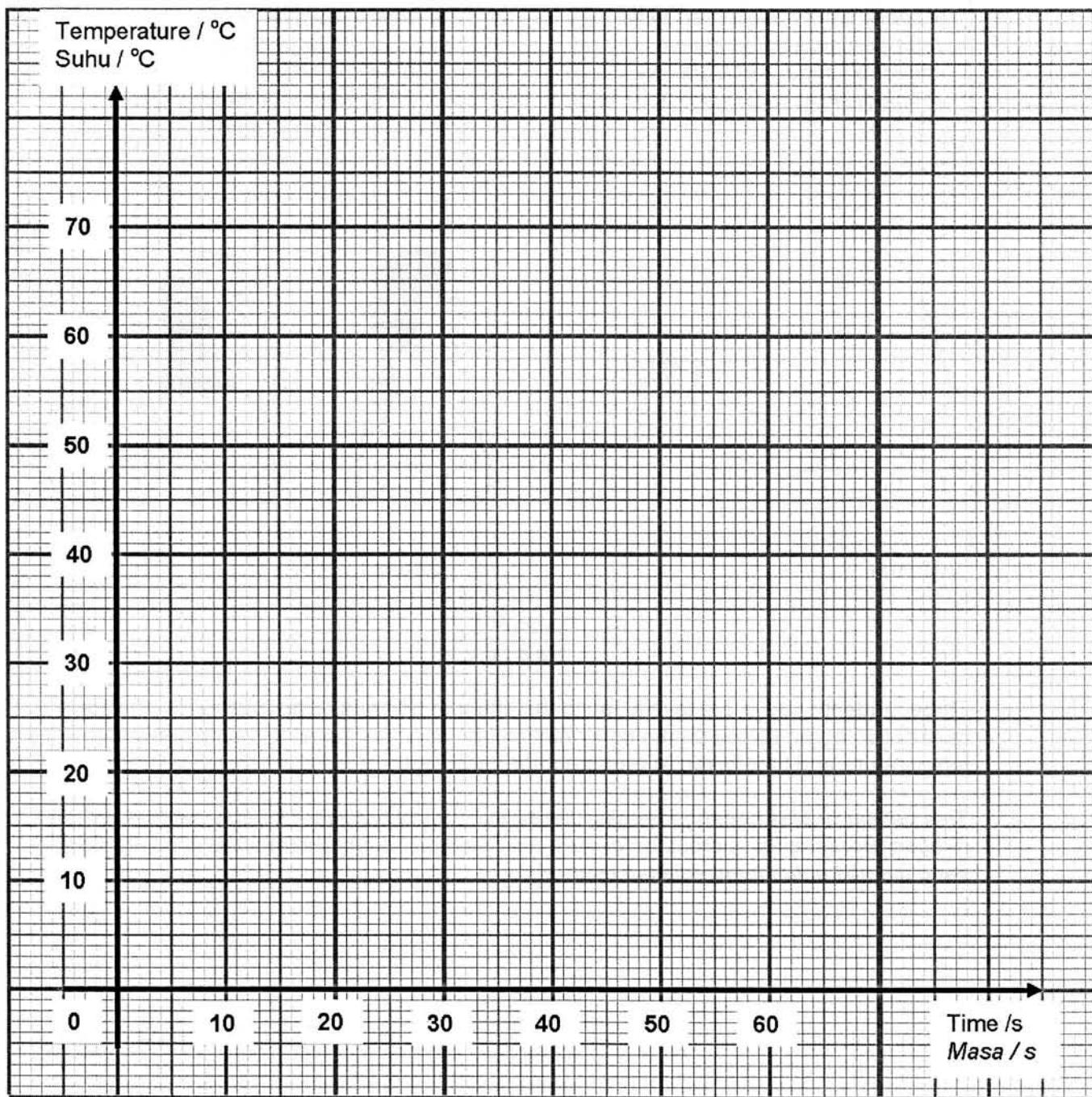
Nyatakan satu pemerhatian daripada eksperimen ini.

[1 mark]

- (e) By using the data in table 6, draw the graph of temperature against time for this experiment in the graph provided below.

Dengan menggunakan data dalam jadual 6, lukiskan graf suhu melawan masa bagi eksperimen ini di dalam kertas graf yang disertakan di bawah.

[1 mark]



- (f) Diagram 6.2 shows a conversation between Ummu and Qistina.
Rajah 6.2 menunjukkan perbualan di antara Ummu dan Qistina.

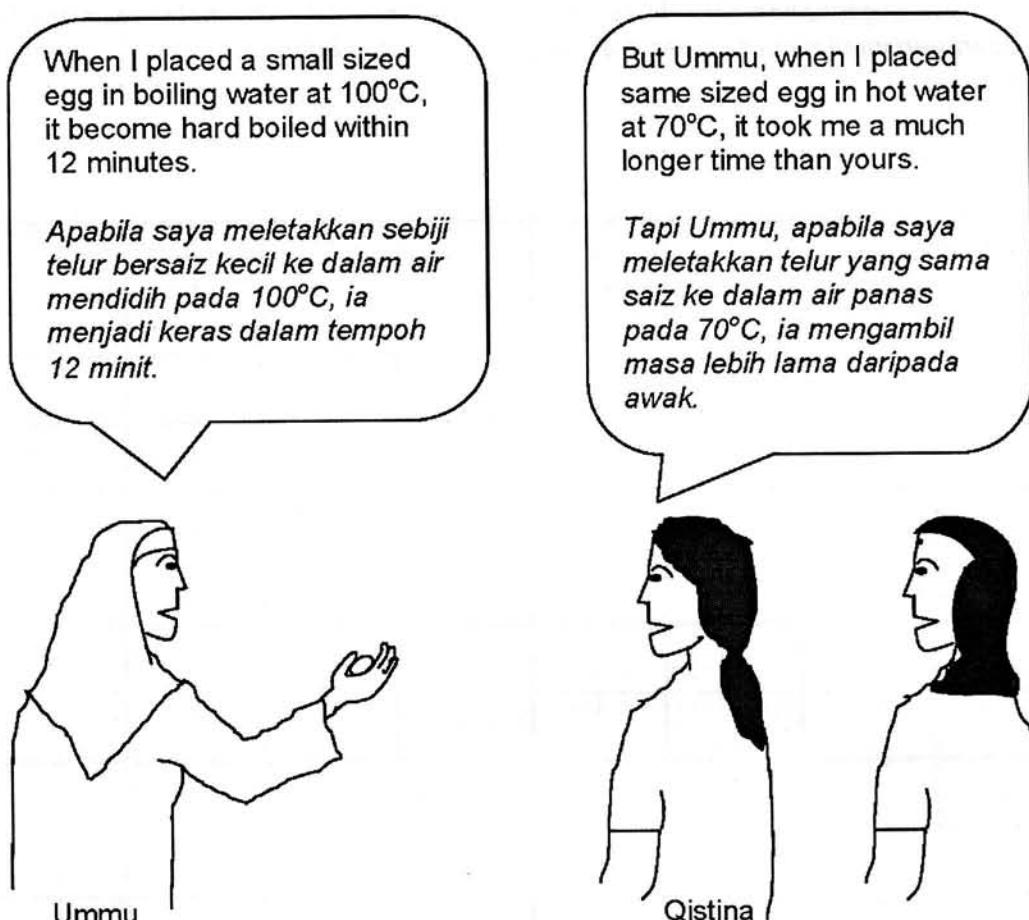


Diagram 6.2
Rajah 6.2

Three students above are investigating the effect of different temperatures to prepare hard boiled eggs. Based on the conversation above, state the relationship between temperature and time taken to prepare hard boiled egg.

Tiga pelajar di atas sedang mengkaji kesan suhu yang berlainan ke atas telur yang direbus. Berdasarkan perbualan di atas, nyatakan perkaitan antara suhu dengan masa yang diambil untuk menyediakan telur rebus.

.....

[2 marks]

[Lihat sebelah

Section B
Bahagian B**[20 marks]****Answer any one question from this section.***Jawab mana-mana satu soalan daripada bahagian ini.*

- 7 (a) A student wants to carry out an experiment to electroplate an iron key with silver.

Seorang pelajar ingin menjalankan satu eksperimen untuk menyadur satu kunci besi dengan argentum.

- (i) State the anode, cathode and electrolyte that must be used to carry out the experiment.

Nyatakan anod, katod dan elektrolit yang mesti digunakan untuk menjalankan eksperimen tersebut.

[3marks]

- (ii) Write the half-equations for the reaction at the anode and the cathode.
Tuliskan setengah persamaan bagi tindak balas di anod dan katod.

[2marks]

- (iii) Suggest two ways to obtain a smooth and beautiful coating of the iron key with silver.

Cadangkan dua cara untuk memperoleh penyaduran argentum yang rata dan cantik pada kunci besi.

[2marks]

- (b) Diagram 7 shows apparatus set-up used to investigate the reaction of metal displacement from its salt solution by some metals and the observations obtained from the experiment in 1 minute.

Rajah 7 menunjukkan susunan radas yang digunakan untuk mengkaji tindak balas penyesaran logam daripada larutan garamnya oleh beberapa jenis logam tertentu dan pemerhatian yang di peroleh daripada eksperimen dalam tempoh 1 minit.

Exp. Eksp.	Apparatus and observation after 1 minute <i>Alat radas dan pemerhatian selepas 1 minit</i>	Chemical formula for product aqueous solution
I	<p>25 cm³ of 0.1 mol dm⁻³ of copper(II) sulphate solution</p> <p>25 cm³ larutan kuprum(II) sulfat 0.1 mol dm⁻³</p>	P ₂ (SO ₄) ₃
II	<p>25 cm³ of 0.1 mol dm⁻³ of copper(II) sulphate solution</p> <p>25 cm³ larutan kuprum(II) sulfat 0.1 mol dm⁻³</p>	QSO ₄
III	<p>25 cm³ of 0.1 mol dm⁻³ of Q sulphate solution</p> <p>25 cm³ larutan Q sulfat 0.1 mol dm⁻³</p>	QSO ₄

Diagram 7
Rajah 7

[Lihat sebelah

- (i) Based on the information given in Diagram 7, compare the differences between:

Berdasarkan maklumat yang diberikan dalam Rajah 7, bandingkan perbezaan di antara:

- Experiment I and II,
Eksperimen I dan II,
- Experiment I and III.
Eksperimen I dan III.

Explain your answer in terms of:

Terangkan jawapan anda dari segi:

- Position in the electrochemical series.
Kedudukan dalam siri elektrokimia.
- Observation in all three experiments.
Pemerhatian dalam ketiga-tiga eksperimen.

[8 marks]

- (ii) Identify metal P and Q.

Kenal pasti logam P dan Q.

[2 marks]

- (iii) In experiment II, 25 cm³ of 0.1 mol dm⁻³ copper(II) sulphate solution react completely with metal Q.
Calculate the mass of copper produced.

*Dalam eksperimen II, 25 cm³ larutan kuprum(II) sulfat 0.1 mol dm⁻³ bertindak balas lengkap dengan logam Q.
Kirakan jisim kuprum yang terbentuk.*

[Relative atomic mass: Cu = 64]

[Jisim atom relatif: Cu = 64]

[3 marks]

- 8 (a) A covered gas jar contains 1.5 mol of ammonia gas, NH_3 .

Satu balang gas bertutup mengandungi 1.5 mol gas ammonia, NH_3 .

How many ammonia molecules are there in the gas jar?

Berapakah bilangan molekul ammonia di dalam balang gas tersebut?

[2 marks]

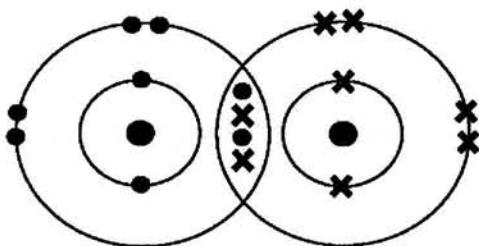
- (b) Urea, $\text{CO}(\text{NH}_2)_2$, ammonium nitrate, NH_4NO_3 and hydrazine, N_2H_4 are fertilizers that are used in agriculture. Which fertilizer has the highest percentage mass of nitrogen?

Urea, $\text{CO}(\text{NH}_2)_2$, ammonium nitrat, NH_4NO_3 and hydrazin, N_2H_4 adalah baja yang digunakan dalam pertanian. Baja yang manakah mengandungi peratus jisim nitrogen tertinggi?

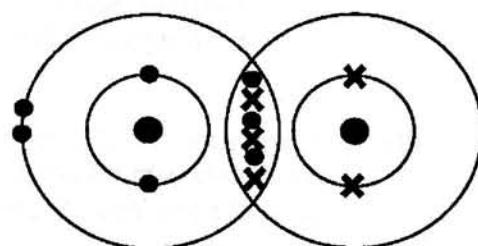
[4 marks]

- (c) Diagram 8.1 shows the electron arrangement of molecules A and B.

Rajah 8.1 menunjukkan susunan elektron bagi molekul A dan B.



A



B

Diagram 8.1

Rajah 8.1

Based on diagram 8.1:

Berdasarkan rajah 8.1:

State the type of covalent bond in each molecule and explain why.

Nyatakan jenis ikatan kovalen dalam setiap molekul dan terangkan mengapa.

[4 marks]

[Lihat sebelah

- (d) Diagram 8.2 shows the formula of two different compounds.
Rajah 8.2 menunjukkan formula bagi dua sebatian berbeza.

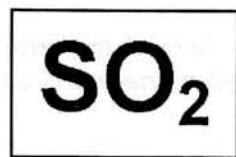


Diagram 8.2
Rajah 8.2

Based on Diagram 8.2:
Berdasarkan Rajah 8.2:

- (i) Compare and contrast the two compounds in terms of physical states at room temperature, melting point, electrical conductivity and solubility in water.
Banding dan beza kedua-dua sebatian dari segi keadaan fizikal pada suhu bilik, takat lebur, kekonduksian elektrik dan kelarutan dalam air.
- (ii) Explain the differences of the melting point for the two compounds.
Terangkan perbezaan takat lebur bagi kedua-dua sebatian.

[10 marks]

Section C
Bahagian C

[20 marks]

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

- 9 (a) Diagram 9.1 shows a structural formula of butene,
Rajah 9.1 menunjukkan formula struktur bagi butena.

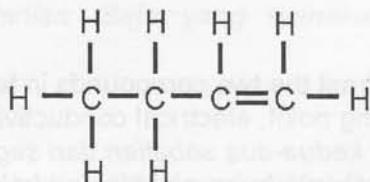


Diagram 9.1

Rajah 9.1

Draw another two structural formulae of butene and write their respective names according to the IUPAC nomenclature.

Lukis dua formula struktur lain bagi butena dan tuliskan nama masing-masing berdasarkan penamaan IUPAC.

[4 marks]

- (b) Diagram 9.2 shows the structural formula of an ester.
Rajah 9.2 menunjukkan formula struktur bagi suatu ester.

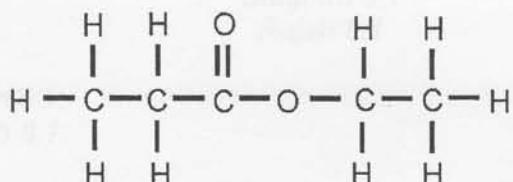


Diagram 9.2

Rajah 9.2

[Lihat sebelah

Based on diagram 9.2: *Identify the two organic chemicals needed to produce the ester above.*
Berdasarkan rajah 9.2: Kenalpasti dua bahan kimia organik yang diperlukan untuk menghasilkan ester di atas.

- (i) Identify the two organic chemicals needed to produce the ester above.
Kenalpasti dua bahan kimia organik yang diperlukan untuk menghasilkan ester di atas.

[2 marks]

- (ii) State two chemical properties for each organic chemicals that you stated in 9(b)(i).
Nyatakan dua sifat kimia bagi setiap bahan kimia organik yang anda nyatakan dalam 9(b)(i).

[4 marks]

- (c) You are given an apparatus and chemicals as follow:
Anda diberikan alat radas dan bahan-bahan kimia seperti berikut.

Apparatus: test tube, dropper.
Radas: tabung uji, penitis

Chemicals: Bromine in trichloroethane, acidified potassium manganate(VII) solution
Bahan kimia: bromin dalam trikloroetana, larutan kalium manganat(VII) berasid

Describe two chemical tests using the apparatus and chemicals given above to differentiate between hexane and hexene.

Your description must include the procedure and observation.

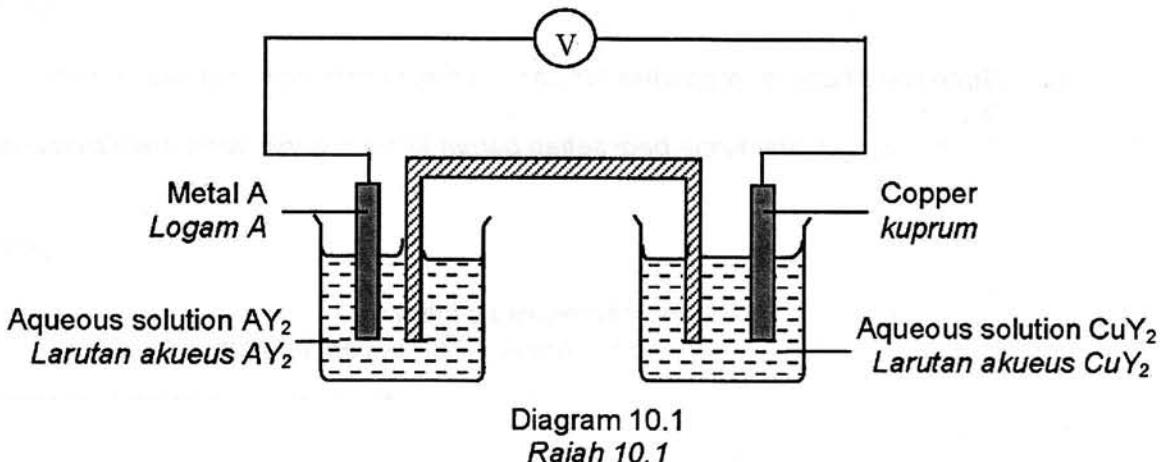
Huraikan dua ujian kimia menggunakan alat radas dan bahan kimia yang diberikan di atas untuk membezakan antara heksana dan heksena.

Dalam huraian anda mesti disertakan prosedur dan pemerhatian.

[10 marks]

- 10 (a) Diagram 10.1 shows the apparatus set-up for a voltaic cell.

Rajah 10.1 menunjukkan susunan radas untuk satu sel voltan.



Metal A is more electropositive than copper.

Suggest one possible cation for X^{2+} ion.

Logam A lebih elektropositif daripada kuprum.

Cadangkan satu kation yang mungkin bagi ion X^{2+} .

Based on the electrode factor which affects the selective discharge of ions at the electrode,

Berdasarkan faktor elektrod yang manakah mempengaruhi pemilihan ion yang dinyahcas pada elektrod,

- (i) Write the half-equation for the reaction at the electrode of metal A.
Tuliskan setengah persamaan bagi tindak balas di elektrod logam A.

[3 marks]

- (ii) State the type of reaction at the anode.
Nyatakan jenis tindak balas di anod.

[1 mark]

[Lihat sebelah

- (b) Table 10.1 shows the result of chemical tests used to change the solution X and Solution Y.

Jadual 10.1 menunjukkan keputusan ujian kimia untuk menukar larutan X dan larutan Y.

Experiment Eksperimen	Procedure Prosedur	Observation Pemerhatian
I	Bromine water is added into X solution and warmed. Sodium hydroxide solution is added into mixture until excess. <i>Air bromin ditambahkan ke dalam larutan X dan dihangatkan. Larutan natrium hidroksida ditambahkan ke dalam campuran sehingga berlebihan.</i>	Green precipitate formed <i>Mendakan hijau terbentuk</i>
II	Zinc powder is added into solution Y and the mixture is shaken. Sodium hydroxide solution is then added into the mixture until excess. <i>Serbuk zink ditambah ke dalam larutan Y dan digonangkan sehingga tiada perubahan. Larutan natrium hidroksida ditambahkan sehingga berlebihan ke dalam campuran.</i>	Brown precipitate formed <i>Mendakan perang terbentuk</i>

Table 10.1

Jadual 10.1

Based on Table 10.1:

- Identify the solution X and solution Y.
- State the reducing agent in experiment I and oxidising agent in experiment II and give one reason for each of your choices based on the changes of oxidation number.

Berdasarkan Jadual 10.1:

- *Kenal pasti larutan X dan larutan Y.*
- *Nyatakan bahan yang bertindak sebagai agen penurunan dalam eksperimen I dan agen pengoksidaan dalam eksperimen II serta beri satu sebab untuk setiap pilihan anda berdasarkan perubahan nombor pengoksidaan.*

[6 marks]

(c)

Chlorine is good oxidizing agent.
Klorin adalah agen pengoksidaan yang baik.

You are given the following apparatus:
Anda diberikan alat-alat radas berikut:

U-tube, galvanometer, connecting wires, stopper, dropper, carbon electrodes and retort stand with clamps.

Tiub-U, galvanometer, wayar penyambung, penyumbat, penitis, elektrod-elektrod karbon dan kaki retot dan pengapit.

Suggest a suitable chemical and describe an experiment to verify the above statement using the given apparatus.

Cadangkan bahan kimia yang sesuai dan huraikan satu eksperimen untuk mengesahkan pernyataan di atas dengan menggunakan alat radas yang diberi.

[10 marks]

**END OF QUESTION PAPER
KERTAS SOALAN TAMAT**

[Lihat sebelah

PERIODIC TABLE OF THE ELEMENTS

		Proton number																			
		Symbol		Name of element																	
1	H	Hydrogen	1	Ne	Neon	10	He	Helium	4	O	Oxygen	8	F	Fluorine	9	Ne	Neon	10	He	Helium	2
3	Li	Beryllium	4	Be	Boron	5	C	Nitrogen	7	N	Arsenic	6	P	Phosphorus	14	Aluminum	Silicon	13	Si	Aluminum	12
7	Lithium	Beryllium	9	Neon	Neon	11	Carbon	Baron	11	O	Oxygen	16	Ge	Gallium	27	Phosphorus	Zinc	14	Ge	Gallium	28
11	Na	Magnesium	12	Neon	Neon	12	Nitrogen	Iron	56	Co	Cobalt	59	As	Antimony	28	Sulfur	Chlorine	15	As	Antimony	26
23	Mg	Magnesium	24	Sodium	Manganese	25	Iron	Nickel	64	Cu	Copper	65	Se	Selenium	31	Phosphorus	Nickel	16	Se	Selenium	32
19	K	Calcium	21	Titanium	Cr	22	Vanadium	Manganese	55	Fe	Iron	56	Ge	Germanium	30	Antimony	Phosphorus	31	Ge	Germanium	32
39	Ca	Scandium	40	Titanium	Chromium	45	Chromium	52	Mo	Molybdenum	41	Ag	Palladium	47	Te	Tellurium	33	Br	Krypton	34	
37	Rb	Sr	38	Zr	Nb	40	Titanium	Nickel	93	Ru	Ruthenium	98	Pd	Palladium	48	Sn	Iodine	34	Kr	Krypton	35
86	Rb	Sr	88	Y	Zr	89	Zirconium	Nickel	91	Tc	Technetium	96	Rh	Rhodium	101	Cd	Indium	51	Br	Bromine	80
55	Cs	Ba	56	Hf	Ta	57	Tantalum	Hafnium	179	Re	Rhenium	73	Pt	Platinum	103	Sn	Tin	52	Ar	Argon	84
133	Cs	Ba	137	Ta	Tungsten	139	Tungsten	Tantalum	181	Os	Osmium	76	Ag	Silver	106	Bi	Lead	53	Ar	Argon	85
87	Fr	Ra	88	Unq	Unp	89	Unp	Unnil-	104	Ir	Iridium	184	Au	Gold	197	Tl	Thallium	81	Xe	Xenon	86
223	Fr	Ra	226	Actinium	Actinium	227	Actinium	Unnil-	105	U	Unnil-	186	Hg	Mercury	192	Po	Polonium	204	Rn	Radon	222
								quadium	106	No	Unnil-	190	Platinum	195	Uuo	Unnil-	201	At	Astatine	210	
								hexium	107	Unnil-	192	Unnil-	197	Unnil-	206	Unnil-	Unnil-	207	Uuo	Unnil-	210
								pentium	108	Unnil-	193	Unnil-	198	Unnil-	205	Unnil-	Unnil-	208	Unnil-	Unnil-	210
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								pentium	114	Unnil-	199	Unnil-	204	Unnil-	211	Unnil-	Unnil-	214	Unnil-	Unnil-	214
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								pentium	160	Unnil-	245	Unnil-	250	Unnil-	257	Unnil-	Unnil-	260	Unnil-	Unnil-	260
								pentium													

SULIT

Nama :

Tingkatan :



JABATAN PELAJARAN NEGERI JOHOR

PEPERIKSAAN PERCUBAAN SPM 2011

CHEMISTRY

Kertas 3

September

4541/3

1½ jam

Satu jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. Tuliskan nama dan tingkatan pada ruang 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		
Soalan	Markah Penuh	Markah Diperoleh
1	18	
2	15	
3	17	
JUMLAH	50	

Kertas soalan ini mengandungi 13 halaman bercetak dan 1 halaman tidak bercetak.

- 1 Table 1 shows the observations in three test tubes used to investigate the effect of other metals on rusting. A mixture of jelly solution, potassium hexacyanoferrate(III), $K_3Fe(CN)_6$ solution and phenolphthalein were used as medium in each test tube. The observations were recorded after one week.

Jadual 1 menunjukkan pemerhatian dalam tiga buah tabung uji yang digunakan untuk menyiasat kesan logam lain ke atas pengaratan. Medium yang digunakan di dalam setiap tabung uji adalah campuran larutan agar-agar, larutan kalium heksasianoferat(III), $K_3Fe(CN)_6$ dan fenoltalein. Pemerhatian direkod selepas satu minggu.

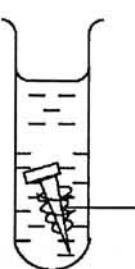
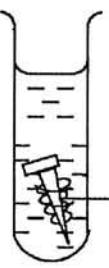
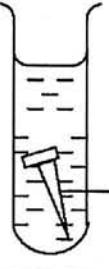
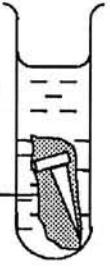
Test tube Tabung uji	Observation Pemerhatian
I	 <p style="text-align: center;">1 week 1 minggu</p> <div style="border: 1px solid black; padding: 5px; width: fit-content;"> Iron nail coiled with copper strip Paku besi dililit dengan kepingan kuprum </div> 
II	 <p style="text-align: center;">1 week 1 minggu</p> <div style="border: 1px solid black; padding: 5px; width: fit-content;"> Iron nail coiled with zinc strip Paku besi dililit dengan kepingan zink </div> 
III	 <p style="text-align: center;">1 week 1 minggu</p> <div style="border: 1px solid black; padding: 5px; width: fit-content;"> Iron nail Paku besi </div> 

Table 1
Jadual 1

Reference/Petunjuk:  Blue spot / tompok biru
 Pink spot / tompok merah jambu

- (a) State one inference for each test tubes I, II and III.
Nyatakan satu inferensi untuk setiap tabung uji I, II dan III.

Test tube I:

Tabung uji I:

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

Test tube II:

Tabung uji II:

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

Test tube III:

Tabung uji III:

1(a)

3

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

- (i) The manipulated variable.
Pembolehubah dimanipulasi.

.....
.....

- (ii) The responding variable.
Pembolehubah bergerak balas.

.....
.....

- (iii) The constant variable.
Pembolehubah dimalarkan.

.....
.....

1(b)

3

[Lihat halaman sebelah
SULIT]

For
Examiner's
Use

- (c) State the hypothesis for the experiment.
Nyatakan hipotesis bagi eksperimen tersebut.

1(c)

3

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

- (d) State the operational definition for the rusting of iron nail.
Nyatakan definisi secara operasi bagi pengaratan paku besi.

1(d)

3

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

- (e) Diagram 1 shows the apparatus set-up of an experiment.
Rajah 1 menunjukkan susunan radas bagi satu eksperimen.

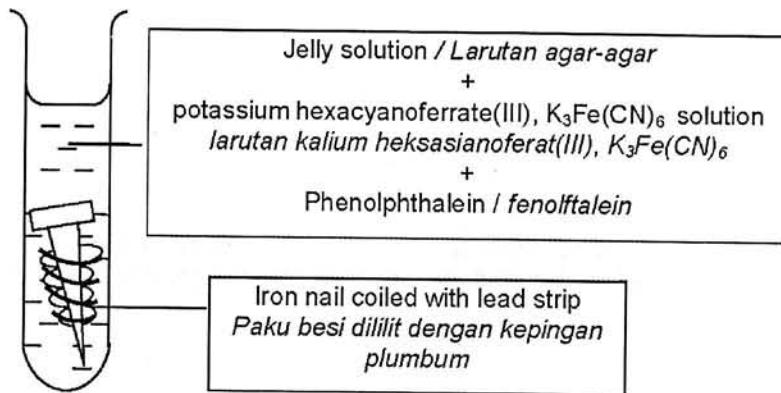


Diagram 1
Rajah 1

Predict an observation for the experiment after a week.

Ramalkan satu perhatian daripada eksperimen itu selepas satu minggu.

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

1(e)

3

Total
1

15

- 2 Diagram 2 shows the apparatus set up for an experiment to determine the end point of titration in neutralisation reaction.

Rajah 2 menunjukkan susunan radas satu eksperimen bagi menentukan takat akhir pentitratan dalam tindak balas peneutralan.

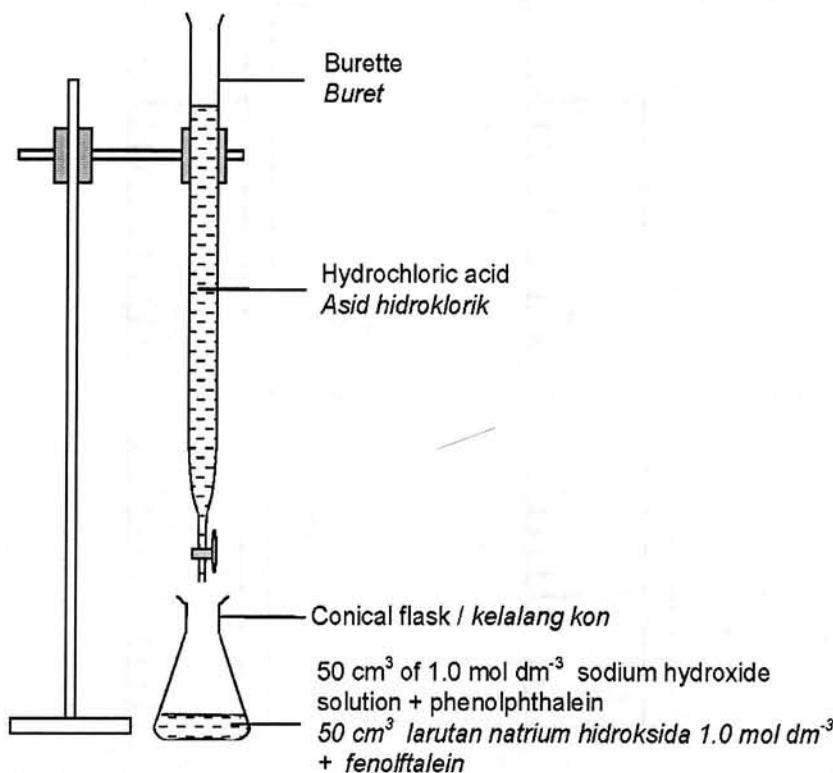


Diagram 2

Rajah 2

- (a) State two observations that you could obtain during the experiment.
Nyatakan dua pemerhatian yang boleh anda dapati semasa eksperimen.

1.....

2.....

2(a)

3

The experiment is repeated three times and the volume of hydrochloric acid used for each set is shown in Table 2.

Eksperimen itu diulang tiga kali dan isipadu asid hidroklorik yang digunakan bagi setiap set ditunjukkan pada Jadual 2.

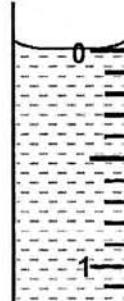
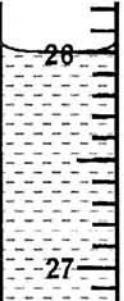
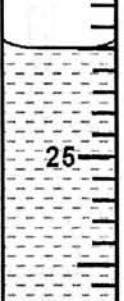
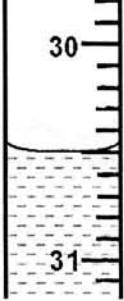
Set Set	Initial reading <i>Bacaan awal</i>	Final reading <i>Bacaan akhir</i>
I	cm ³	cm ³
II	cm ³	cm ³
III	cm ³	cm ³

Table 2
Jadual 2

- (b) Record the burette readings in the spaces provided in Table 2.
Catatkan bacaan buret pada ruang yang disediakan dalam Rajah 2.

2(b)

3

[Lihat halaman sebelah
SULIT]

For
Examiner's
Use

- (c) Construct a table to record the data from sets I, II and III. The table should include the initial reading, final reading and the volume of hydrochloric used in the titration.

Bina satu jadual untuk merekod data bagi set I, II dan III itu. Jadual tersebut hendaklah mengandungi bacaan awal, bacaan akhir dan isipadu asid hidroklorik yang digunakan dalam titratan.

2(c)

3

- (d) The chemical equation for the reaction is shown below:
Persamaan kimia tindak balas ditunjukkan di bawah:



Calculate the average volume of hydrochloric acid, HCl needed to neutralise 50 cm³ of 1.0 mol dm⁻³ sodium hydroxide, NaOH solution.

Hitungkan isipadu purata bagi asid hidroklorik, HCl yang diperlukan untuk meneutralaskan 50 cm³ larutan natrium hidroksida 1.0 mol dm⁻³, NaOH.

2(d)

3

- (e) During the titration process, state the relationship between the concentration hydroxide ion, OH^- in sodium hydroxide, NaOH solution with time until the end point of titration.

Semasa proses pentitratian, nyatakan hubungan antara kepekatan ion OH^- dalam larutan sodium hidroksida, NaOH dengan masa sehingga takat akhir pentitratian.

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

2(e)

3

- (f) Classify the following acids into monoprotic, diprotic and triprotic acid.
Kelaskan asid-asid berikut kepada asid monoprotik, diprotik dan triprotik.

Hydrochloric acid <i>Asid hidroklorik</i>	Sulphuric acid <i>Asid sulfurik</i>
Ethanoic acid <i>Asid etanoik</i>	Nitric acid <i>Asid nitrik</i>
Phosphoric acid <i>Asid fosforik</i>	

Monoprotic acid <i>Asid monoprotik</i>	Diprotic acid <i>Asid diprotik</i>	Triprotic acid <i>Asid triprotik</i>

2(f)

3

Total
2

18

[Lihat halaman sebelah
SULIT]

- 3 Diagram 2 shows some samples of battery. Battery is a voltaic cell that can be built using any two different metals and suitable electrolyte.

Rajah 2 menunjukkan beberapa contoh bateri. Bateri ialah sejenis sel kimia yang boleh dibina menggunakan sebarang dua logam berlainan dan elektrolit yang sesuai.



Diagram 2
Rajah 2

Voltmeter reading of voltaic cell depends on the pair of metals used as electrodes.
Bacaan voltmeter sel kimia bergantung kepada pasangan logam yang digunakan sebagai elektrod.

Plan a laboratory experiment to investigate that different pairs of metal produce different voltage of a voltaic cell. Your planning should include the following aspects:
Rancang satu eksperimen untuk menyiasat bahawa pasangan logam yang berbeza menghasilkan voltan sel kimia yang berbeza. Perancangan anda hendaklah mengandungi aspek-aspek berikut:

- (a) Problem statement
Pernyataan masalah
- (b) All the variables
Semua pembolehubah
- (c) Hypothesis
Hipotesis
- (d) List of material and apparatus
Senarai bahan dan alat radas
- (e) Procedure
Prosedur
- (f) Tabulation of data
Penjadualan data

[17 marks]
[17 markah]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT



JABATAN PELAJARAN NEGERI JOHOR

PEPERIKSAAN PERCUBAAN SETARA NEGERI JOHOR 2011

SKEMA PEMARKAHAN

CHEMISTRY

PAPER 1

PAPER 2

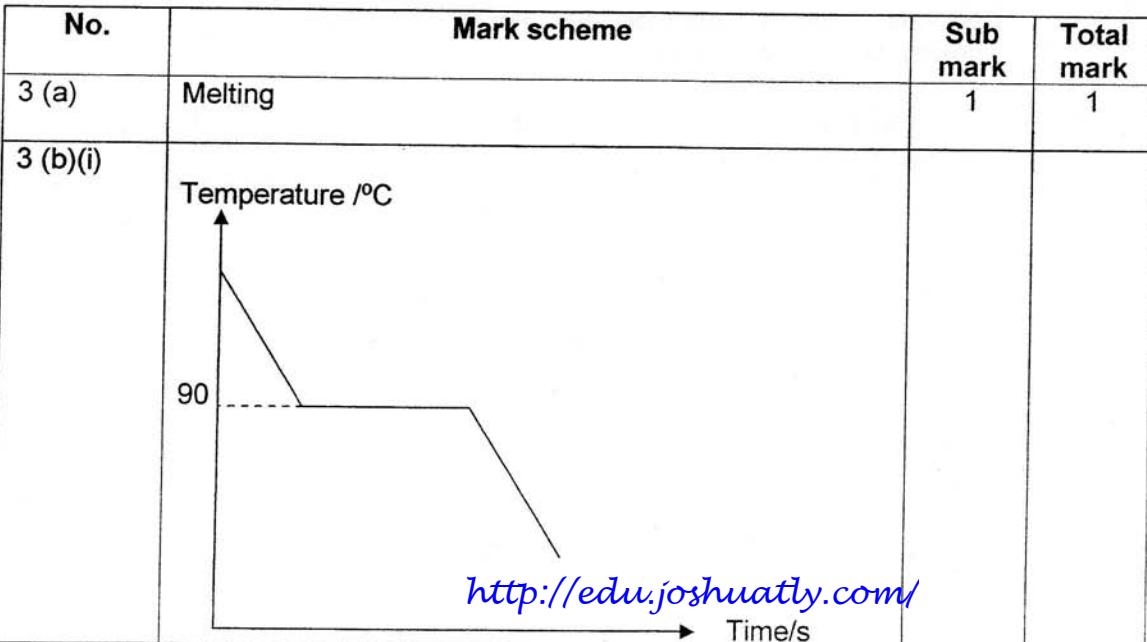
PAPER 3

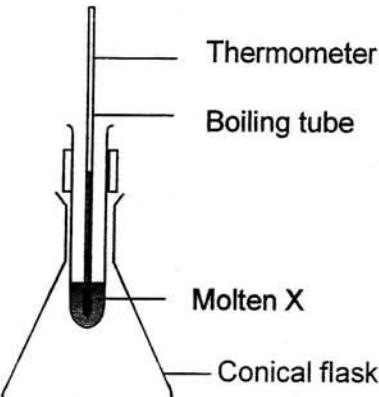
JULANG JOHOR 2011
CHEMISTRY
PAPER 1
ANSWER

QUESTION	ANSWER
1	A
2	C
3	A
4	B
5	B
6	B
7	A
8	D
9	A
10	D
11	D
12	A
13	C
14	D
15	C
16	D
17	C
18	D
19	C
20	A
21	B
22	C
23	A
24	C
25	B

QUESTION	ANSWER
26	A
27	B
28	C
29	B
30	C
31	C
32	B
33	D
34	A
35	A
36	A
37	C
38	B
39	D
40	C
41	B
42	D
43	B
44	C
45	D
46	B
47	D
48	B
49	A
50	D

No.		Mark scheme	Sub mark	Total mark
2 (a)	(i)	Z	1	3
	(ii)	U	1	
	(iii)	W	1	
(b)	(i)	2.8.1	1	2
	(ii)	X ⁺	1	
(c)	(i)	They have same number of shells filled/occupied with electrons	1	2
	(ii)	X, Y, Z // X > Y > Z	1	
(d)	(i)	$4X + O_2 \rightarrow 2X_2O$ // $2X + \frac{1}{2}O_2 \rightarrow X_2O$ Correct reactants and products – 1 Correctly balance - 1	1 + 1	3
	(ii)	Z ₂ + H ₂ O → <u>HZ</u> + HOZ	1	
			Total Mark	10



	Correct axis with units Correct graph and 90°C is stated	1 1	
3(b)(ii)	The molten X is stirred continuously throughout the experiment	1	
(iii)	 <p>Labelled diagram Correct and functional apparatus</p>		
	Labelled diagram Correct and functional apparatus	1 1	5
3(c)	Because an atom consists of an equal number of electrons and protons.	1	1
3(d)	80 Br 35	1	1
3(e)(i)	Atoms of the same element with the same number of protons / proton number but different number of neutrons/ nucleon number	1	2
3(e)(ii)	Use in phosphate fertilizers // to study the metabolism of phosphorus in plants	1	
Total mark			10

Section A

No.	Mark scheme	Sub mark	Total mark											
1 (a) (i)	Haber	1												
(ii)	Nitrogen and Hydrogen	1												
(iii)	To get a better yield	1												
(iv)	1. To make fertilisers 2. To produce nitric acid	1+1	5											
(b)	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr><th>Source</th></tr> <tr><td>P</td></tr> <tr><td>P</td></tr> <tr><td>Q</td></tr> <tr><td>Q</td></tr> <tr><td>R</td></tr> <tr><td>R</td></tr> </table> <table border="1" style="display: inline-table; vertical-align: middle;"> <tr><th>Use</th></tr> <tr><td>Cure sore throat <i>Merawat sakit tekak</i></td></tr> <tr><td>Treat skin wounds <i>Merawat luka kulit</i></td></tr> <tr><td>Treat arthritis <i>Merawat penyakit arthritis</i></td></tr> </table>	Source	P	P	Q	Q	R	R	Use	Cure sore throat <i>Merawat sakit tekak</i>	Treat skin wounds <i>Merawat luka kulit</i>	Treat arthritis <i>Merawat penyakit arthritis</i>	1	1
Source														
P														
P														
Q														
Q														
R														
R														
Use														
Cure sore throat <i>Merawat sakit tekak</i>														
Treat skin wounds <i>Merawat luka kulit</i>														
Treat arthritis <i>Merawat penyakit arthritis</i>														
(c) (i)	Paracetamol <input checked="" type="checkbox"/>	1												
(ii)	Codeine / 3-methylmorphine Addiction / depression / nausea / vomiting / itching / drowsiness / dry mouth / orthostatic hypotension / urinary retention / miosis / constipation	1												
(iii)	Activate level of alertness // Reduce normal fatigue // Elevate mood // Stimulate activity of brain / central nervous system.	1	4											
		Total mark	10											

No.	Mark Scheme	Sub Mark	Total Mark
4 (a)	Heat released when 1 mole of metal is displaced from its salt solution by a more electropositive metal. a: heat change	1	1
(b)	exothermic	1	1
(c)	1. Brown solid deposited. 2. The colour of solution change from blue to light blue / colourless. 3. Container becomes hot. 4. Mass of zinc decreased 5. Size of zinc becomes thinner [Any two]	2	2
(d)	<p>Energy</p> <ul style="list-style-type: none"> Correct two energy levels and axis labeled energy. Correct reactants, products and value of ΔH. 	1 1	2
(e)	No. of mole CuSO ₄ = $\frac{(0.2)(25)}{1000}$ // 0.005 mol	1	
	Heat energy released = 0.005 mol x 190 kJ mol ⁻¹ // = 0.95 kJ / 950 J	1	2
(f)	<ol style="list-style-type: none"> Value of ΔH more / higher than -190kJ. Magnesium is more electropositive compare zinc in electrochemical series // Distance between magnesium and copper is further than the distance between zinc and copper in electrochemical series. 	1 1	2
	Total mark		10

No.	Mark Scheme	Sub Mark	Total Mark
5 (a)(i)	Copper(II) oxide	1	1
(ii)	Neutralisation	1	1
(iii)	Correct reactants and products Balance the equation $2\text{HCl} + \text{CuO} \rightarrow \text{CuCl}_2 + \text{H}_2\text{O}$	1 1	2
(iv)	To complete the reaction	1	1
5(b)(i)	Double Decomposition / Precipitation reaction	1	1
(ii)	$\text{Ag}^+ + \text{Cl}^- \rightarrow \text{AgCl}$	1	1
(iii)	Filtration	1	1
(c)	Cation : Cu^{2+} Anion : Cl^-	1 1	2
Total mark			10

No.	Mark Scheme	Sub Mark	Total Mark
6 (a)	Yellow precipitate	1	1
(b)	$\text{Na}_2\text{S}_2\text{O}_3 + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + \text{S} + \text{H}_2\text{O} + \text{SO}_2$	1	1
(c)	1. <u>Rate of reaction for Experiment 5 is higher than Experiment 1 (or vice versa).</u>	1	1
(d)	1. Temperature in <u>Experiment 5</u> is higher. 2. The kinetic energy of the particles is higher. 3. The frequency of collisions between H^+ ions and $\text{S}_2\text{O}_3^{2-}$ ions increases 4. The frequency of effective collisions increases.	1 1 1 1	4

(e)			
(f)	1. The higher the temperature 2. the shorter the time taken for the egg to become hard-boiled // vice versa	1 1	1 2
Total mark			10

Section B

No.		Mark Scheme	Sub mark	Total Mark				
7(a)	(i)	Anode: Silver (rod/foil) Cathode: Iron key Electrolyte: Silver nitrate solution	1 1 1	3				
	(ii)	Anode : $\text{Ag} \rightarrow \text{Ag}^+ + e^-$ Cathode : $\text{Ag}^+ + e^- \rightarrow \text{Ag}$	1 1	2				
	(iii)	1. Use a small electrical current 2. Use low concentration of the silver nitrate solution. 3. Turn the iron key slowly during experiment. 4. Clean the iron key with sandpaper before carrying out experiment. Any two	2	2				
7(b)	(i)	<u>Experiment I and II</u> <table border="1" data-bbox="377 1700 1090 1924"> <thead> <tr> <th>Comparison</th> <th>Explanation</th> </tr> </thead> <tbody> <tr> <td>1. Rate of reaction in experiment I is higher // The reaction in experiment I is faster</td> <td>2. Metal P is more electropositive compared with metal Q in the electrochemical series</td> </tr> </tbody> </table>	Comparison	Explanation	1. Rate of reaction in experiment I is higher // The reaction in experiment I is faster	2. Metal P is more electropositive compared with metal Q in the electrochemical series	1 + 1	
Comparison	Explanation							
1. Rate of reaction in experiment I is higher // The reaction in experiment I is faster	2. Metal P is more electropositive compared with metal Q in the electrochemical series							

		<p>3. Deposit of brown metal is more in experiment I compared with experiment II</p> <p>4. Distance between metals P and Cu is further than metal Q and Cu in the electrochemical series</p>	1 + 1							
<u>Experiment I and III</u>										
		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Comparison</th> <th style="text-align: center;">Explanation</th> </tr> </thead> <tbody> <tr> <td>5. There is a reaction in experiment I and no reaction in experiment III</td> <td>6. Metal P is more electropositive compared with copper metal in the electrochemical series</td> </tr> <tr> <td>7. There is brown deposit in experiment I and no deposit in experiment III</td> <td>8. Metal P is placed higher than copper in the electrochemical series // Copper metal is placed below metal R in the electrochemical series // metal P is more electropositive than Cu</td> </tr> </tbody> </table>	Comparison	Explanation	5. There is a reaction in experiment I and no reaction in experiment III	6. Metal P is more electropositive compared with copper metal in the electrochemical series	7. There is brown deposit in experiment I and no deposit in experiment III	8. Metal P is placed higher than copper in the electrochemical series // Copper metal is placed below metal R in the electrochemical series // metal P is more electropositive than Cu	1 + 1	
Comparison	Explanation									
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7. There is brown deposit in experiment I and no deposit in experiment III	8. Metal P is placed higher than copper in the electrochemical series // Copper metal is placed below metal R in the electrochemical series // metal P is more electropositive than Cu									
(ii)		<p>Metal P : Aluminium, Al Metal Q : Zn / Fe / Sn r: Pb</p>	1	2						
(iii)		<p>Mol of CuSO₄ solution = $\frac{(0.1)(25)}{1000}$ // 0.0025 mol</p> <p>Ratio : 1 mol of CuSO₄ produced 1 mol Cu 0.0025 mol of CuSO₄ produced 0.0025 mol Cu</p> <p>Mass of copper = 0.0025 mol × 64 = 0.16 g</p>	1 1 1 1	3						
Total mark				20						

No.		Mark scheme	Sub mark	Total mark
8(a)		The number of molecules = $1.5 \times 6.02 \times 10^{23}$ $= 9.03 \times 10^{23}$	1 1	2
8(b)		Urea, CO(NH ₂) ₂ $\frac{2(14)}{12 + 16 + (14+2)2} \times 100\% = 46.67\%$	1	

Ammonium nitrate, NH_4NO_3

$$\frac{2(14)}{14 + 4 + 14 + 3(16)} \times 100\% = 35.0\%$$

1

Hydrazine, N_2H_4

$$\frac{2(14)}{2(14) + 4(1)} \times 100\% = 87.5\%$$

1

Hydrazine has the highest percentage mass of nitrogen

1

4

8(c) 1. Double bond

Formed when two pairs of electrons are shared between two non-metal atoms.

1

1

2. Triple bond

Formed when three pairs of electrons are shared between two non-metal atoms.

1

1

4

8(d) (i)

	Compound	K_2O	SO_2
1	Physical state at room temperature	Solid	Gas
2	Melting point	High	Low Accept : A melting point of K_2O is higher than SO_2
3	Electrical conductivity	Can conduct electricity in molten or aqueous state	Cannot conduct electricity in all physical state
4	Solubility in water	Soluble	Insoluble

1+1

1+1

1+1

1+1

8

Answers can be in sentence form to show comparison.

(d) (ii)

K_2O :

1. forces of attraction between ions in K_2O is stronger than SO_2
2. more heat is needed to overcome / break the attraction force
// vice versa for SO_2

1

1

2

Total mark

20

Section C

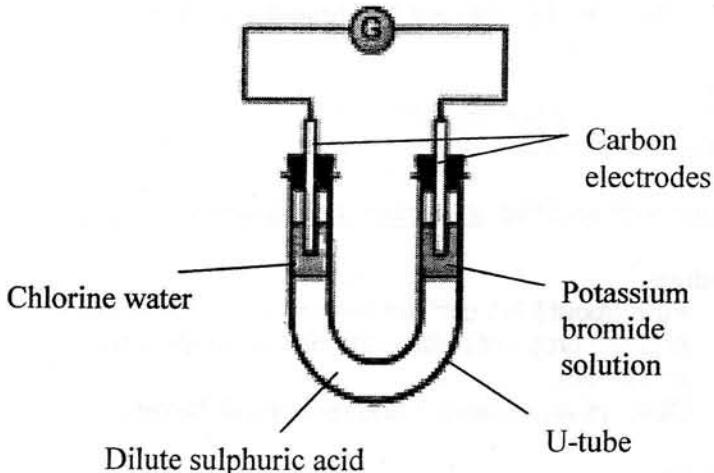
No.	Mark Scheme	Sub Mark	Total Mark
9(a)	$\begin{array}{ccccccc} & \text{H} & \text{H} & \text{H} & \text{H} & & \\ & & & & & & \\ \text{H} & -\text{C} & -\text{C} & =\text{C} & -\text{C} & -\text{H} & \\ & & & & & & \\ & \text{H} & & & \text{H} & & \\ \end{array}$ <p style="text-align: right;">But-2-ene</p> $\begin{array}{ccccc} & \text{H} & & \text{H} & \\ & & & & \\ \text{H} & -\text{C} & =\text{C} & -\text{C} & -\text{H} \\ & & & & \\ & & \text{H} & \text{H} & \\ & & & & \\ & \text{H} & -\text{C} & -\text{H} & \\ & & & & \\ & & \text{H} & & \end{array}$ <p style="text-align: right;">2-methylpropene // 2-methylprop-1-ene</p>	1+1	
(b)	<p>(i) Propanoic acid , Ethanol</p> <p>(ii) [Accept if student name the reactants or the products]</p> <p>Chemical properties for propanoic acid:</p> <ol style="list-style-type: none"> 1. React with reactive metal produce salt and hydrogen gas // 2. React with bases produce salt and water // 3. React with carbonates metal produce salt, carbon dioxide gas and water // 4. React with alcohol produce ester <p>[Any two answers]</p> <p>Chemical properties for ethanol:</p> <ol style="list-style-type: none"> 1. Undergo combustion produce carbon dioxide and water // Burnt in oxygen to produce CO_2 and H_2O 2. Undergo oxidation produce carboxylic acid / ethanoic acid // React with acidified $\text{K}_2\text{Cr}_2\text{O}_7$ / KMnO_4 to produce carboxylic acid 3. Undergo dehydration produce alkene / ethene. <p>[Any two answers]</p>	1+1 1 1	2 4
(c)	Reaction with bromine http://edu.joshuatly.com/		

	<p>Procedure:</p> <ol style="list-style-type: none"> Pour about [2 -5 cm³] of hexane into a test tube. Add 4-5 drops of bromine water and shake. Observe any changes and repeat with hexene. 	1 1 1
	<p>Observation:</p> <p>Hexane: brown colour remains unchanged.</p> <p>Hexene: Brown colours decolourise / turn colourless.</p>	1 1
		5
	<p><u>Reaction with acidified potassium manganate(VII) solution</u></p>	
	<p>Procedure:</p> <ol style="list-style-type: none"> Pour about [2-5 cm³] of hexane into a test tube. Add 4-5 drops of potassium manganate(VII) solution and shake. Observe any changes and repeat with hexene. 	1 1 1
	<p>Observation:</p> <p>Hexane: Purple colour remain unchanged</p> <p>Hexene: Purple colours decolourise.</p>	1 1
	[Any two tests]	5
		Total mark

No	Mark scheme	Sub mark	Total mark
10 (a)(i)	Sample answer : Metal A : Magnesium / Mg $\text{Mg} \rightarrow \text{Mg}^{2+} + 2\text{e}$ Reactant and product correct Balance the equation correctly	1 1 1	3
(ii)	Oxidation	1	1
(b)	Solution X : Ferum (II) sulphate / FeSO_4 Solution Y : Ferum (III) sulphate / $\text{Fe}_2(\text{SO}_4)_3$ Reducing agent : Fe^{2+} / Ferum (II) sulphate / FeSO_4 / Iron(II) ion Reason : oxidation number increase from +2 to +3 Oxidising agent : Fe^{3+} / Ferum (III) sulphate / $\text{Fe}_2(\text{SO}_4)_3$ / Iron(III) ion Reason : Oxidation number decrease from +3 to +2	1 1 1 1 1 1 1	6

(c)

Galvanometer



Correct and functional apparatus

1

Correctly labelled

1

1. Suitable chemical : potassium bromide solution //any suitable chemical solution
2. Dilute sulphuric acid is poured into a U-tube
3. A dropper is used to fill one arm of the U-tube with chlorine water
4. Potassium bromide solution is added carefully to another arm of the U-tube
5. Both arm of the U-tube is fitted with carbon electrode
6. Reducing agent : potassium bromide solution
7. At negative electrode, bromide ions are oxidized to bromine
8. $2\text{Br}^- \rightarrow \text{Br}_2 + 2\text{e}$
9. At positive electrode, chlorine are reduced to chloride ions
10. $\text{Cl}_2 + 2\text{e} \rightarrow 2\text{Cl}^-$

1

1

1

1

1

1

1

1

Max=

10

Total mark

20



JABATAN PELAJARAN NEGERI JOHOR

PEPERIKSAAN PERCUBAAN SPM 2011
CHEMISTRY

Kertas 3
September

4541/3

SKEMA PEMARKAHAN

UNTUK KEGUNAAN PEMERIKSA SAHAJA

AMARAN

Peraturan pemarkahan ini **SULIT** dan **Hak Cipta Jabatan Pelajaran Negeri Johor**. Kegunaannya khusus untuk pemeriksa yang berkenaan sahaja. Sebarang maklumat dalam peraturan pemarkahan ini tidak boleh dimaklumkan kepada sesiapa. Peraturan pemarkahan ini tidak boleh dikeluarkan dalam apa-apa bentuk media.

Peraturan pemarkahan ini mengandungi 18 halaman bercetak

Marking Scheme Paper 3

Question	Mark Scheme	Score
1(a)	Able to state one inference for each experiment <u>Sample answers:</u> Test tube I : Iron rust/oxidised // iron atom released electron// iron(II) ions / Fe^{2+} formed // iron(II) ions present/rusting occur Test tube II : Iron does not rust // iron(II) ions are not present // zinc corrodes // zinc atom released electron// zinc ions formed // zinc oxidised Test tube III : Iron rust/oxidised // iron atom released electron// iron(II) ions / Fe^{2+} formed // rusting occur // iron(II) ions present	
	Able to state any two inferences	2
	Able to state any one inference	1
	No response or wrong response	0

Question	Mark Scheme	Score
1(b)	<p>Able to state the hypothesis accurately</p> <p>Sample answer</p> <p>When a more/less electropositive metal is in contact with iron/ferum/Fe, the metal inhibits/(speeds up) rusting/corrosion of iron //</p> <p>When a more/less electropositive metal is in contact with iron/ferum/Fe, rusting of iron/ferum/Fe is faster/slower //</p> <p>If the metal in contact with iron is higher/lower than iron/ferum/Fe in electrochemical series, the rusting/corrosion of iron is slower/faster //</p> <p>The higher/lower the metal in contact with iron in electrochemical series/ than iron/ferum/Fe, the rusting/corrosion of iron/ferum/Fe is slower/faster</p>	3
	<p>Able to state the hypothesis correctly</p> <p>Sample answer</p> <p>When a more/less electropositive metal, the metal inhibits/(speeds up) rusting/corrosion of iron //</p> <p>If the metal in contact with iron is higher than iron/ferum/Fe in reactivity series, the rusting/corrosion of iron is slower/faster //</p> <p>The rusting of iron/ferum/Fe is faster/slower, if a more/less electropositive metal is in contact with iron/ferum/Fe</p>	2
	<p>Able to state the idea of hypothesis</p> <p>Sample answer</p> <p>Different metal in contact with iron, will cause iron to rust //</p> <p>Metal can cause iron to rust.</p>	1
	No response or wrong response	0

Question	Mark Scheme	Score
1(c)	<p>Able to state the three variables correctly</p> <p><u>Sample answer:</u></p> <p>(i) Manipulated variables: Type/different metals // position of metal in electrochemical series</p> <p>(ii) Responding variable: Rusting / corrosion // presence of blue/pink colour</p> <p>(iii) Constant variable: Size/mass of iron nail // type of nail // clean iron nails // temperature // medium in which the iron nails are kept</p>	3
	Able to state any two variables correctly.	2
	Able to state any one variable correctly.	1
	No response or wrong response	0

Question	Mark Scheme	Score
1(d)	<p>Able to give the operational definition accurately</p> <p>Sample answer</p> <p>When iron is in contact with metal lower than iron in electrochemical series, blue colouration indicates rusting //</p> <p>Rusting occurs when iron nail is in contact with copper/tin /less electropositive metal and form blue colouration//</p> <p>Blue colouration is formed when iron is in contact with metal lower than iron in electrochemical series</p>	3
	<p>Able to give the operational definition correctly.</p> <p>Sample answer:</p> <p>Blue colouration indicates rusting //</p> <p>Rusting occurs when iron nail is in contact with copper/tin /less electropositive metal</p>	2
	<p>Able to give an idea of the operational definition .</p> <p>Sample answer:</p> <p>Rusting occurs when the colour of solution changes. //</p> <p>Rusting occurs</p>	1
	No response or wrong response	0

Question	Mark Scheme	Score
1(e)	<p>Able to predict any one the observations based on the laboratory experiment correctly</p> <p>Sample answers</p> <p>Blue spot/colouration //</p> <p>Iron nail becomes smaller //</p> <p>Lead strip remains unchanged</p>	3
	<p>Able to predict one observations less correctly.</p> <p>Sample answer:</p> <p>Pink spot/colouration</p>	2
	<p>Able to give an idea of observations.</p> <p>Sample answer:</p> <p>Iron rusts // Brown deposit/spot</p>	1
	<p>No response or wrong response</p>	0

Question	Mark Scheme	Score
2(a)	Able to state both two observations accurately during the experiment. Sample answer: 1. Pink solution turns colourless. 2. Conical flask becomes warm/hot.	3
	Able to state one observation accurately during the experiment.	2
	Able to state any idea of observation. Sample answer: 1. Volume increases 2. Pink 3. Colourless 4. Warm/hot	1
	No response or wrong response	0

Question	Mark Scheme	Score												
2(b)	<p>Able to record the burette readings accurately with 2 decimal points.</p> <p><u>Answer</u></p> <table border="1"> <thead> <tr> <th>Set</th><th>Initial reading</th><th>Final reading</th></tr> </thead> <tbody> <tr> <td>I</td><td>0.00</td><td>26.00</td></tr> <tr> <td>II</td><td>0.50</td><td>24.50</td></tr> <tr> <td>III</td><td>5.50</td><td>30.50</td></tr> </tbody> </table>	Set	Initial reading	Final reading	I	0.00	26.00	II	0.50	24.50	III	5.50	30.50	3
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I	0 // 0.0	26 // 26.0												
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	<p>Able to record any reading from the burette completely.</p> <p><u>Sample Answer:</u></p> <table border="1"> <thead> <tr> <th>Set</th><th>Initial reading</th><th>Final reading</th></tr> </thead> <tbody> <tr> <td>I</td><td>0</td><td>26</td></tr> <tr> <td>II</td><td>1.5</td><td>25.5</td></tr> <tr> <td>III</td><td>6.5</td><td>31.5</td></tr> </tbody> </table>	Set	Initial reading	Final reading	I	0	26	II	1.5	25.5	III	6.5	31.5	1
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2(c)	<p>Able to make a table to record the the data from three experiments accurately with units.</p> <p>Sample Answer:</p> <table border="1"> <thead> <tr> <th>Set</th><th>Initial reading/ cm³</th><th>Final reading/ cm³</th><th>Volume HCl/ cm³</th></tr> </thead> <tbody> <tr> <td>I</td><td>0.00</td><td>26.00</td><td>26.00</td></tr> <tr> <td>II</td><td>0.50</td><td>24.50</td><td>24.00</td></tr> <tr> <td>III</td><td>5.50</td><td>30.50</td><td>25.00</td></tr> </tbody> </table>	Set	Initial reading/ cm ³	Final reading/ cm ³	Volume HCl/ cm ³	I	0.00	26.00	26.00	II	0.50	24.50	24.00	III	5.50	30.50	25.00	3																
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	<p>Able to make a table to record the data from three experiments accurately without units <u>or</u> correctly with units.</p> <p>1. Sample Answer:</p> <table border="1"> <thead> <tr> <th>Set</th><th>Initial reading</th><th>Final reading</th><th>Volume HCl</th></tr> </thead> <tbody> <tr> <td>I</td><td>0.00</td><td>26.00</td><td>26.00</td></tr> <tr> <td>II</td><td>0.50</td><td>24.50</td><td>24.00</td></tr> <tr> <td>III</td><td>5.50</td><td>30.50</td><td>25.00</td></tr> </tbody> </table> <p>2. Sample answer:</p> <table border="1"> <thead> <tr> <th>Set</th><th>Initial reading/ cm³</th><th>Final reading/ cm³</th><th>Volume HCl/ cm³</th></tr> </thead> <tbody> <tr> <td>I</td><td>0//0.0</td><td>26//26.0</td><td>26//26.0</td></tr> <tr> <td>II</td><td>0.5</td><td>24.5</td><td>24//24.0</td></tr> <tr> <td>III</td><td>5.5</td><td>30.5</td><td>25//25.0</td></tr> </tbody> </table>	Set	Initial reading	Final reading	Volume HCl	I	0.00	26.00	26.00	II	0.50	24.50	24.00	III	5.50	30.50	25.00	Set	Initial reading/ cm ³	Final reading/ cm ³	Volume HCl/ cm ³	I	0//0.0	26//26.0	26//26.0	II	0.5	24.5	24//24.0	III	5.5	30.5	25//25.0	2
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	<p>Able to make a table to record any data including the following:</p> <ul style="list-style-type: none"> - Reading from 2(b) - Heading without units - Set of experiment <p>Sample answer:</p> <table border="1"> <thead> <tr> <th>Set</th><th>Initial reading</th><th>Final reading</th><th>Volume HCl</th></tr> </thead> <tbody> <tr> <td>I</td><td></td><td></td><td></td></tr> <tr> <td>II</td><td></td><td></td><td></td></tr> <tr> <td>III</td><td></td><td></td><td></td></tr> </tbody> </table>	Set	Initial reading	Final reading	Volume HCl	I				II				III				1																
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Question	Mark Scheme	Score
2(d)	<p>Able to calculate the average volume of hydrochloric acid accurately.</p> <p><u>Answer:</u></p> $\frac{26.00 + 24.00 + 25.00}{3} = 25.00 \text{ cm}^3$	3
	<p>Able to state the average volume of hydrochloric acid accurately with units.</p> <p><u>Answer:</u></p> 25.00 cm^3	2
	<p>Able to state the idea of average volume of hydrochloric acid.</p> <p><u>Sample answer:</u></p> $25.00 // 25.0 // 25 // (\text{Average reading data from } 2b) \frac{x + y + z}{3}$	1
	No response or wrong response	0

Question	Mark Scheme	Score
2(e)	<p>Able to state the relationship between the concentration of hydroxide ion, OH⁻ in sodium hydroxide, NaOH with time until the end point of titration accurately.</p> <p>Sample answer:</p> <p>The concentration of hydroxide ions/OH⁻ decreases with time. //</p> <p>The longer the time taken, the lower the concentration of hydroxide ions/ OH⁻</p>	3
	<p>Able to state the relationship between the concentration hydroxide ion, OH⁻ in sodium hydroxide, NaOH with time until the end point of titration inaccurately.</p> <p>Sample answer:</p> <p>The concentration decreases with time. //</p> <p>The longer the time taken, the lower the concentration</p>	2
	<p>Able to state an idea of the relationship between the concentration hydroxide ion, OH⁻ in sodium hydroxide, NaOH with time until the end point of titration.</p> <p>Sample answer:</p> <p>Concentration decreases // Lower concentration</p>	1
	No response or wrong response	0

Question	Mark Scheme	Score												
2(f)	<p>Able to classify all acids into monoprotic, diprotic and triprotic acid accurately.</p>	3												
	<p>Answer:</p> <table border="1"><tr><td>Monoprotic, acid</td><td>Diprotic acid</td><td>Triprotic acid</td></tr><tr><td>Hydrochloric acid</td><td>Sulphuric acid</td><td>Phosphoric acid</td></tr><tr><td>Ethanoic acid</td><td></td><td></td></tr><tr><td>Nitric acid</td><td></td><td></td></tr></table>	Monoprotic, acid	Diprotic acid	Triprotic acid	Hydrochloric acid	Sulphuric acid	Phosphoric acid	Ethanoic acid			Nitric acid			
Monoprotic, acid	Diprotic acid	Triprotic acid												
Hydrochloric acid	Sulphuric acid	Phosphoric acid												
Ethanoic acid														
Nitric acid														
	<p>Able to classify any four acids into monoprotic, diprotic and triprotic acid accurately.</p>	2												
	<p>Able to classify any two acids into monoprotic, diprotic and triprotic acid accurately.</p>	1												
	<p>No response or wrong response</p>	0												

Question	Mark Scheme	Score
3(a)	<p>Able to give statement of the problem accurately.</p> <p>Sample answer:</p> <p>Does the position/distance between two metals in electrochemical series affect the voltmeter reading/voltage/potential difference? //</p> <p>Does the position/distance between pair of metals in electrochemical series affect the voltmeter reading/voltage/potential difference? //</p> <p>Does the further the distance of two metals in electrochemical series increase the potential difference?</p>	3
	<p>Able to give statement of the problem correctly.</p> <p>Sample answer:</p> <p>Does the position/distance between metals in Electrochemical Series affect the voltmeter reading/voltage/potential difference? //</p> <p>Does pair of metals in electrochemical series affect the voltmeter reading/voltage/potential difference?</p>	2
	<p>Able to give an idea of statement of the problem correctly</p> <p>Sample answer:</p> <p>Does the position/distance between two metals in reactivity series affect the voltmeter reading/voltage/potential difference? //</p> <p>Metals produce a voltage.</p>	1
	No response or wrong response	0

Question	Mark Scheme	Score
3(b)	Able to state the three variables correctly	3
	Sample answer: Manipulated variable : Pairs of metals Responding variable : Voltage // voltmeter reading // potential difference Constant variable : Electrolyte // the metal as the positive/negative terminal // volume and concentration of electrolyte	
	Able to state any two variables correctly	2
	Able to state any one variable correctly	1
	No response or wrong response	0

Question	Mark Scheme	Score
3(c)	<p>Able to state the relationship between the manipulated variable and the responding variable and state the direction accurately.</p> <p>Sample answer:</p> <p>The further the distance of the pair of metals in the electrochemical series, the voltage / voltmeter reading / potential difference becomes greater. //</p> <p>The further the position of two metals in electrochemical series, the higher the voltage / potential difference reading</p>	3
	<p>Able to state the relationship between the manipulated variable and the responding variable and without stating the direction.</p> <p>Sample answer:</p> <p>The distance of the pair of metals in the Electrochemical Series influences the voltage / voltmeter reading / potential difference</p>	2
	<p>Able to state the idea of hypothesis correctly</p> <p>Sample answer:</p> <p>The further the distance of electrodes in the Electrochemical Series, the voltage / voltmeter reading / potential difference becomes greater/smaller</p> <p>Different metals give different voltage / voltmeter reading / potential difference</p>	1
	No response or wrong response	0

Question	Mark Scheme	Score
3(d)	<p>Able to give adequate list of materials and apparatus that involves the following</p> <ul style="list-style-type: none"> - Three suitable metals [below calcium] - One suitable electrolyte - Voltmeter, beaker, connecting wires, sand paper <p>• Only two materials and/or apparatus can list out from diagram.</p> <p>Sample answer:</p> <p>Aluminum, zinc, copper, copper(II) solution, voltmeter, beaker, connecting wires, sand paper</p>	3
	<p>Able to give a list of materials and apparatus that involves the Following 3 items:</p> <ul style="list-style-type: none"> - Two suitable metals [below calcium] - One suitable electrolyte and container - Voltmeter <p>Sample answer:</p> <p>Silver, iron , siver nitrate solution voltmeter, basin/test tube</p>	2
	<p>Able to give a list of materials that involves the following 2 items:</p> <ul style="list-style-type: none"> - Two metals - Any named electrolyte <p>Sample answer:</p> <p>Lithium and potassium // Silver and lead Hydrochloric acid</p>	1
	No response or wrong response	0

Question	Mark Scheme	Score
3(e)	Able to state the following 6 steps correctly.	3
	<p>Sample answer:</p> <ol style="list-style-type: none"> 1. Pour copper(II) sulphate solution / suitable electrolyte into a container/beaker 2. Clean the metal strips/aluminium and copper with sand paper 3. Dip both metal/aluminium and copper into the electrolyte 4. Connect the metals/aluminium and copper to the voltmeter // complete the circuit 5. Record the voltmeter reading 6. Repeat steps 1 to 5 by substituting one metal for another/aluminium with zinc 	
	Able to state the following steps correctly based on score 3.	2
	<ul style="list-style-type: none"> - Steps 1 or 3 - Step 4 - Step 5 - Step 6 	
	Able to state the following steps correctly based on score 3.	1
	<ul style="list-style-type: none"> - Step 1 or 3 	
	No response or wrong response	0

Question	Mark Scheme	Score						
3(f)	<p>Able to exhibit the tabulation of data which includes the following three information</p> <ol style="list-style-type: none"> 1. Heading for the manipulated variable 2. Examples of two pairs of metals 3. Heading for the responding variable with units <p>Sample answer:</p> <table border="1"> <thead> <tr> <th>Pair of metals/Electrodes</th> <th>Voltage /V</th> </tr> </thead> <tbody> <tr> <td>Aluminium and copper</td> <td></td> </tr> <tr> <td>Zinc and copper</td> <td></td> </tr> </tbody> </table>	Pair of metals/Electrodes	Voltage /V	Aluminium and copper		Zinc and copper		2
Pair of metals/Electrodes	Voltage /V							
Aluminium and copper								
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	<p>Able to exhibit the tabulation of data which includes the following information</p> <ol style="list-style-type: none"> 1. Heading for manipulated variable/responding variable without unit 2. Examples of one pair of metals <p>Sample answer:</p> <table border="1"> <thead> <tr> <th>Metals/Electrodes</th> <th>Voltage</th> </tr> </thead> <tbody> <tr> <td>Aluminium and copper</td> <td></td> </tr> </tbody> </table>	Metals/Electrodes	Voltage	Aluminium and copper		1		
Metals/Electrodes	Voltage							
Aluminium and copper								
	No response or wrong response	0						

END OF MARKING SCHEME