SULIT
4541/1
Kimia
Kertas 1
September
2011
1 ¼ jam

Nama : .....

Tingkatan : .....

MAJLIS PENGETUA SEKOLAH - SEKOLAH MALAYSIA (MPSM)
CAWANGAN KELANTAN

PEPERIKSAAN PERCUBAAN SPM
TINGKATAN 5
2011

KIMIA
KERTAS 1
Masa : Satu jam lima belas minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

Arahan :

1. Kertas soalan ini adalah dalam dwibahasa

2. Setiap soalan mengandungi kedua-dua bahasa Inggeris dan bahasa Melayu. Bahagian atas dalam bahasa Inggeris dan diikuti di bawahnya oleh bahasa Melayu

3. Calon dikehendaki membaca maklumat di halaman 2.

Kertas soalan ini mengandungi 29 halaman bercetak.

Question 1 to **Question 50** are followed by four options **A, B, C** or **D**.
Choose the best option for each question and blackened the corresponding space on the objective answer sheet.

*Bagi **Soalan 1** hingga **Soalan 50**, tiap-tiap soalan diikuti oleh empat pilihan jawapan **A, B, C** dan **D**. Pilih satu jawapan yang terbaik bagi tiap-tiap soalan dan hitamkan ruangan yang sepadan pada kertas jawapan objektif anda*

1 Diagram 1 shows the symbol of chlorine atom.
Rajah 1 *menunjukkan simbol bagi atom klorin.*

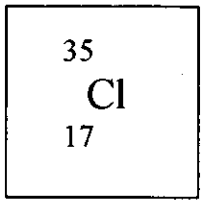


Diagram 1
Rajah 1

Number 17 is refer to
Angka 17 *merujuk kepada*

A proton number
nombor proton

B nucleon number
nombor nukleon

C number of neutron
bilangan neutron

D total number of electron and proton
jumlah bilangan proton dan elektron

2 Which of the following chemical formula of the compound is true?
Antara formula kimia sebatian berikut yang manakah betul?

	Compound *Sebatian*	Chemical formula *Formula kimia*
A	Calcium nitrate *Kalsium nitrat*	$CaNO_3$
B	Ammonium chloride *Ammonium klorida*	$(NH_4)_2Cl$
C	Lead (II) sulphate *Plumbum (II) sulfat*	$Pb(SO_4)_2$
D	Aluminium oxide *Aluminium oksida*	A_2lO_3

3 Aluminium oxide has both acidic and basic properties, therefore it is
Aluminium oksida mempunyai kedua-dua sifat asid dan bes, oleh itu ia adalah

A a base oxide
oksida bes
B an acid oxide
oksida asid
C a metalloid oxide
oksida metaloid
D an amphoteric oxide
oksida amfoterik

4 Lead(II) bromide in solid state does not conduct electricity because
Plumbum(II) bromida dalam keadaan pepejal tidak mengkonduksi elektrik kerana

A it does not consists of ions.
ia tidak mengandungi ion-ion.
B it consists of molecules.
ia terdiri daripada molekul-molekul
C it consists of lead(II) ions and bromide ions that are not free to move.
ia terdiri daripada ion plumbum(II) dan ion bromida yang tidak bebas bergerak
D lead(II) ions and bromide ions are bonded by strong covalent bonds.
ion plumbum(II) dan ion bromida terikat oleh ikatan kovalen yang kuat

5 What are the ions present in molten sodium chloride and sodium chloride aqueous solution?
Apakah ion-ion yang wujud dalam leburan natrium klorida dan larutan akues natrium klorida?

	Molten sodiun chloride *Leburan natrium klorida*	Sodium chloride aqueous solution *Larutan akues natrium klorida*
A	Na^+ , H^+, Cl^-, OH^-	Na^+ , H^+, Cl^- ,
B	Na^+, Cl^-	OH^-, Cl^-
C	Na^+, Cl^-	Na^+, Cl^- , H^+, OH^-
D	Na^+, OH^-	Na^+, Cl^- , H^+, OH^-

6 Which of the following is true about acids?
Antara berikut yang manakah benar tentang asid?

A Acids has bitter taste.
Asid mempunyai rasa pahit.

B Acids has pH values more than 7.
Asid mempunyai nilai pH lebih daripada 7.

C Acids react with alkalis to form a salt only
Asid bertindak balas dengan bes untuk menghasilkan garam sahaja.

D Acids turn moist blue litmus paper red.
Asid menukarkan kertas litmus biru lembab kepada merah.

7 Which of the following is insoluble salts?
Antara berikut, yang manakah garam tidak terlarutkan?

A Sodium carbonate
Natrium karbonat

B Zinc chloride
Zink klorida

C Silver nitrate
Argentum nitrat

D Silver chloride
Argentum klorida

8 Which of the following is a characteristic of a catalyst?
Antara yang berikut, yang manakah adalah ciri bagi mangkin?

A A catalyst is specific in its reaction.
Mangkin adalah khusus dalam tindak balasnya.

B Catalyst will become more effective when there are impurities.
Mangkin menjadi lebih berkesan apabila terdapat bendasing.

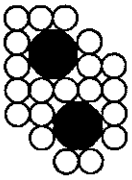
C A catalyst changes the quantity of the product formed in a reaction.
Mangkin mengubah kuantiti hasil yang terbentuk dalam tindak balas.

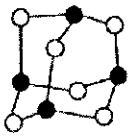
D The chemical property of a catalyst changed at the end of the reaction.
Sifat kimia bagi mangkin berubah di akhir tindak balas.

9 Which diagram shows the structure of bronze?
Rajah yang manakah mewakili struktur bagi gangsa?

A 

B 

C 

D 

10 Which of the molecular formula is unsaturated hydrocarbon?
Manakah formula molekul bagi hidrokarbon tak tepu?

A C_3H_6

B C_4H_{10}

C C_5H_{12}

D C_6H_{14}

11 Which of the followings are oxidizing agent?
Antara berikut yang manakah agen pengoksidaan?

I Magnesium
Magnesium

II Bromine water
Air bromin

III Potassium iodide solution
Kalium iodide

IV Acidified potassium dichromate (VI)
Kalium dikromat(VI) *berasid*

A I and III only
I *dan* III *sahaja*

B II and IV only
II *dan* IV *sahaja*

C I,II and III only
I,II *dan* III *sahaja*

D I,II and IV only
I,II *dan* IV *sahaja*

12 Diagram 2 shows apparatus set-up to determine the heat of reaction.
Rajah 2 *menunjukkan susunan radas untuk menentukan haba tindak balas.*

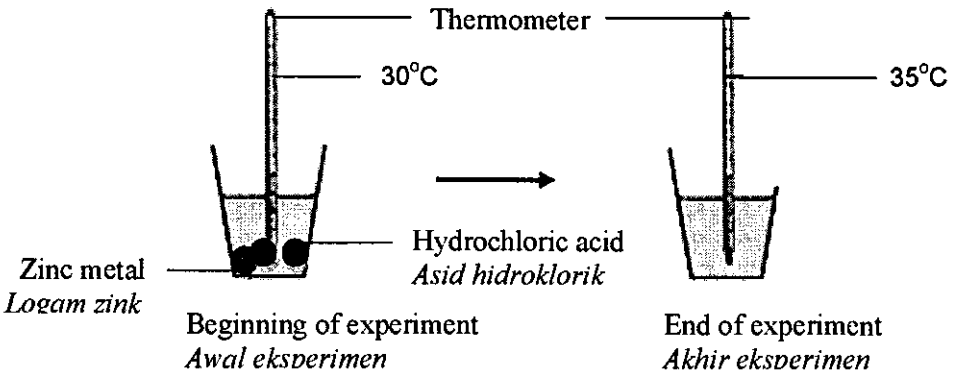


Diagram 2
Rajah 2

Based on Diagram 2, which of the following statements is true?
Berdasarkan Rajah 2, antara pernyataan berikut yang manakah benar?

A The reaction is endothermic.
Tindakbalas adalah endotermik.

B **The ΔH value in the reaction is positive.**
Nilai ΔH dalam tindakbalas ini adalah positif.

C Temperature increases during the reaction.
Suhu meningkat semasa tindakbalas berlaku.

D The energy content of the products of reaction is higher than that of the reactants.
Kandungan tenaga hasil tindakbalas lebih tinggi daripada kandungan tenaga bahan tindakbalas.

13 Diagram 3 shows a label on a sausage wrapper.
Rajah3 menunjukkan label pada pembungkus sosej

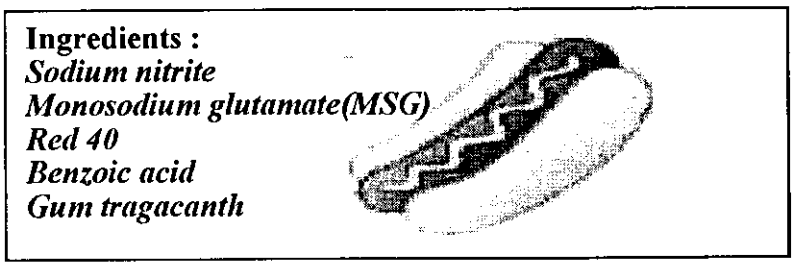


Diagram3
Rajah 3

What is the function of sodium nitrite?
Apakah fungsi natrium nitrit?

A Preservative
Pengawet

B Flavouring
Perisa

C Antioxidant
Pengantioksida

D Food Colouring
Pewarna

14 The electron arrangement of an atom of a noble gas can be represented by
Susunan elektron bagi atom gas adi boleh diwakili oleh

A 2. 1
B 2. 8
C 2. 8. 4
D 2. 8. 7

15 Diagram 4 shows the set-up of the apparatus used to determine the empirical formula of a metal oxide.

Rajah 4 *menunjukkan susunan radas untuk menentukan formula empirik suatu oksida logam*

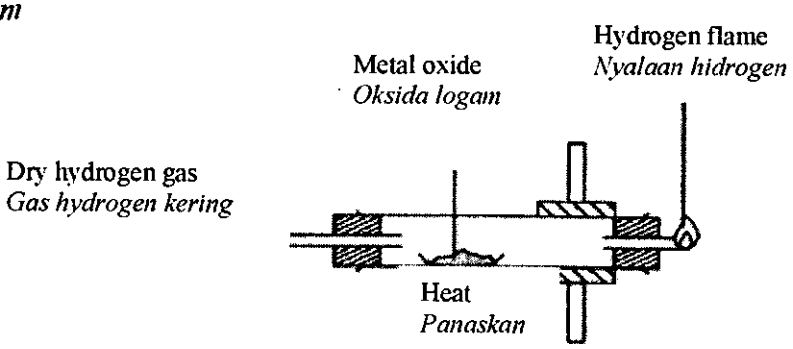


Diagram 4
Rajah 4

Which of the following metal oxides is suitable to be used in the experiment?
Antara oksida logam berikut yang manakah sesuai digunakan dalam eksperimen?

A Magnesium oxide
Magnesium oksida

B Aluminium oxide
Aluminium oxide

C Calcium oxide
Kalsium oksida

D Copper(II) oxide
Kuprum (II) oksida

16. A restaurant owner wants to use colourful electric lamps to attract customers.
Pemilik sebuah restoran ingin menggunakan lampu elektrik berwarna-warni untuk menarik pelanggan

Which substance is suitable to be used in the lamp?
Bahan manakah yang sesuai digunakan dalam lampu itu?

A Neon
B Argon
C Krypton
D Xenon

17 Which is **not** the characteristic of a covalent compound?.
*Yang manakah **bukan** ciri suatu sebatian kovalen?*

A It has low melting point and boiling point
Ia mempunyai takat lebur dan takat didih yang rendah

B It can dissolve in water but not in organic solvent
Ia boleh larut dalam air tetapi tidak dalam pelarut organik

C It can t conduct electricity in all physical states
Ia tidak boleh mengkonduksikan elektrik dalam semua keadaan fizik

D It usually has a low density
Biasanya, ia mempunyai ketumpatan yang rendah

18 Diagram 5 shows a chemical cell.
Rajah 5 menunjukkan satu sel kimia.

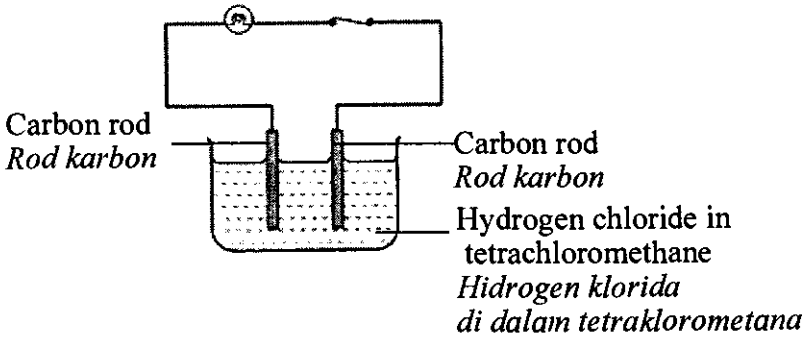


Diagram 5
Rajah 5

The bulb in Diagram 5 does not light up. This is because
Mentol dalam Rajah 5 tidak menyala. Ini disebabkan oleh

A Hydrogen chloride exist as molecules
Hidrogen klorida wujud sebagai molekul

B The electrode used is not a metal
Elektrod yang digunakan bukan suatu logam

C Hydrogenions and chloride ions move freely
Ion hidrogen dan ion klorida bergerak bebas

D Hydrogenions and chloride ions are discharged
Ion hidrogen dan ion klorida dinyahcaskan.

19 The following equation represents a neutralization reaction.
Persamaan berikut mewakili suatu tindakbalas peneutralan.

Asid + Bes → Garam + Air
Acid + Base → Salt + Water

Which pairs are reactants in the reactions?
Pasangan manakah adalah bahan tindakbalas dalam tindakbalas ini?

I Sulphuric acid + sodium hydroxide
Asid sulfurik + natrium hidroksida

II Hydrochloric acid + copper(II) oxide
Asid hidroklorik + kuprum(II) *oksida.*

III Sulphuric acid + lead(II) nitrate
Asid sulfurik + plumbum(II) *nitrat*

IV Hydrochloric acid + potassium carbonate
Asid hidroklorik + kalium karbonat.

A I and II only
I *dan* II *sahaja*

B I and IV only
I *dan* IV *sahaja*

C II and III only
II *dan* III *sahaja*

D III and IV only
III *dan* IV *sahaja*

20 Which of the following is a coloured salt?
Antara berikut yang manakah suatu garam berwarana?

A Iron(II) sulphate
Ferum(II) *sulfat*
B Silver nitrate
Argentum nitrat
C Lead(II) nitrate
Plumbum(II) *nitrat*
D Calcium carbonate
Kalsium karbonat

21 During the manufacturing of sulphuric acid, sulphur dioxide is oxidised to sulphur trioxide.
Di dalam pembuatan asid sulfurik, sulfur dioksidakan kepada sulfur trioksida.

$$2SO_2 + O_2 \rightarrow 2SO_3$$

The reaction is catalysed by
Tindak balas ini memerlukan mangkin

A Platinum
Platinum
B Vanadium(V) oxide
Vanadium(V) oksida
C Manganese(IV) oxide
Mangan(IV) oksida
D Iron
Ferum

22 The rate of reaction for the decomposition of hydrogen peroxide decreases with time because
Kadar tindak balas bagi penguraian hidrogen peroksida berkurang dengan masa kerana

A product of reaction decreases
hasil tindakbalas berkurangan
B temperature of hydrogen peroxide decreases.
suhu hidrogen peroksida berkurangan.
C volume of hydrogen peroxide decreases.
isipadu hidrogen peroksida berkurangan.
D concentration of hydrogen peroxide decreases.
kepekatan hidrogen peroksida berkurangan.

23 Which properties of propane and propene are the same?
Sifat-sifat yang manakah sama bagi propana dan propena?

A Soluble in water
Larut dalam air

B Decolourise brown colour of bromine water
menyahwarnakan warna perang air bromin

C Burn completely in air to produce carbon dioxide and water.
Terbakar lengkap dalam udara menghasilkan karbon dioksida dan air

D Decolourise purple colour of acidified potassium manganate(VII) solution
menyahwarnakan warna ungu larutan kalium manganat(VII) berasid

24 Which of the following will happen when iron rusts?
Antara berikut yang manakah akan berlaku apabila besi karat?

A Iron is reduced
Besi diturunkan

B Iron as cathode
Besi sebagai katod

C Atom of iron gains electron
Atom besi menerima elektron

D Oxidation number of iron increase
Nombor pengoksidaan besi bertambah

25 The following equation shows the reaction between Ag^+ and Cl^- ions.
Persamaan berikut menunjukkan tindak balas di antara ion Ag^+ *dan* Cl^-

$$Ag^+ (aq) + Cl^- (aq) \rightarrow AgCl (s) \quad \Delta H = -65 \text{ kJ mol}^{-1}$$

Which of the following is true about the above equation?
Antara berikut yang manakah benar tentang persamaan di atas?

A Endothermic reaction occurs.
Tindakbalas endotermik berlaku.

B Heat is released to the surroundings.
Haba dibebaskan ke persekitaran.

C The temperature of the product decreases.
Suhu hasil tindakbalas berkurangan.

D 65 kJ of heat absorbed when 1 mole of silver chloride is formed.
65 kJ *haba diserap apabila* 1 *mol argentum klorida terbentuk.*

26 Why are detergents more effective than soap?
Mengapakah detergen lebih berkesan daripada sabun

A Detergents are biodegradable whereas soaps are non-biodegradable.
Detergen boleh terurai manakala sabun tidak terurai.

B Detergents reduce the surface tension of water whereas soaps do not.
Detergen mengurangkan ketegangan permukaan air manakala sabun tidak.

C Detergents are soluble in grease, whereas soaps are insoluble in grease.
Detergen larut dalam gris, manakala sabun tidak larut dalam gris.

D Detergents do not form scum in hard water, whereas soaps form scum in hard water.
Detergen tidak membentuk kekat dalam air liat manakala sabun membentuk kekat dalam air liat.

27 Table 1 shows the information for two types of particles.
*Jadual*1 *menunjukkan maklumat bagi dua jenis zarah.*

Particle *Zarah*	Proton number *Nombor proton*	Electron arrangement *Susunan elektron*
J	11	2.8
K	20	2.8.8

Table 1
Jadual 1

Based on the information in the table, particle J and particle K are
(Berdasarkan maklumat dalam jadual, zarah J dan zarah K ialah)

A noble gases
gas adi
B negative ions
ion negatif
C positive ions
ion-ion positif
D isotopes of the same element
isotop unsur yang sama

28 What is the number of molecules in 2 mol of carbon monoxide gas , CO?
Berapakah bilangan molekul yang terdapat dalam 2 mol gas karbon monoksida, CO?
[Avogadro constant: 6.02 X 10^{23} mol^{-1}]
[*Pemalar Avogadro:* 6.02 X 10^{23} mol^{-1}]

A 1 204 x 10^{23} molecules
1 204 x 10^{23} *molekul*

B 6.02 x 10^{23} molecules
6.02 x 10^{23} *molekul*

C 1.204 x 10^{24} molecules
1.204 x 10^{24} *molekul*

D 3.01 x 10^{24} molecules
3.01 x 10^{24} *molekul*

29 Which element in the Periodic Table formed a coloured compound ?
Unsur manakah dalam Jadual Berkala berikut membentuk sebatian berwarna?

30 Diagram 6 shows a symbol of an atom Q.
Rajah6 menunjukkan simbol bagi suatu atom Q

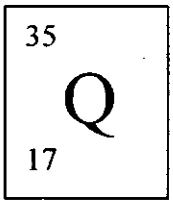
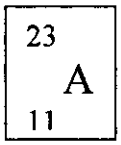
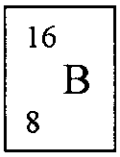
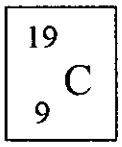


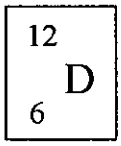
Diagram 6
Rajah 6

Which atom below reacts with atom Q by the transfer of electron?
Yang manakah atom di bawah bertindak balas dengan atom Q melalui pemindahan elektron?

A 

B 

C 

D 

31 Diagram 7 shows the set up of the apparatus of a chemical cell.
Rajah 7 menunjukkan susunan radas sebuah sel kimia.

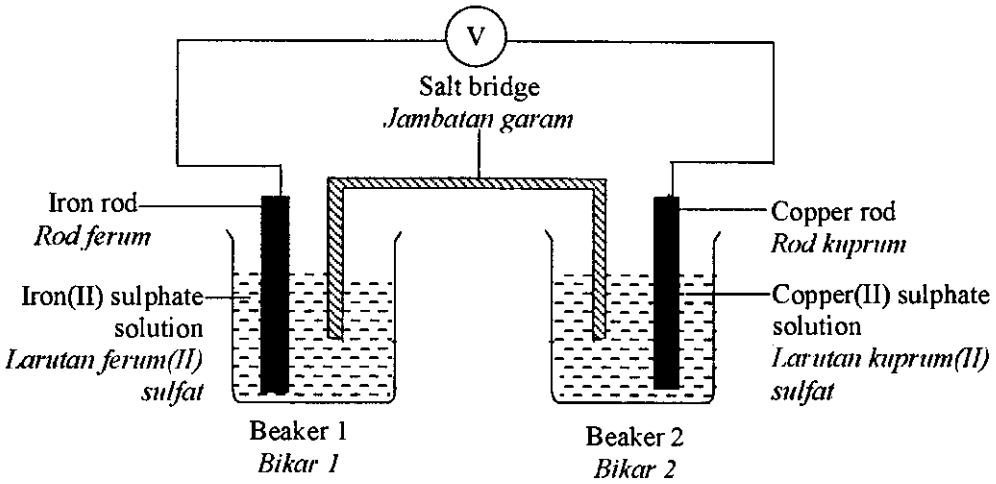


Diagram 7
Rajah 7

Which of the following occurs in the chemical cell ?
Antara berikut yang manakah berlaku dalam sel kimia itu?

A The iron rod becomes thicker
Rod ferum menjadi lebih tebal

B The copper rod becomes thinner
Rod kuprum menjadi lebih nipis

C The colour of the solution in beaker 1 changes from green to brown
Warna larutan dalam bikar 1 bertukar dari hijau ke perang

D The intensity of the blue colour of copper(II) sulphate solution decreases
Keamatan warna biru larutan kuprum (II) sulfat berkurang

32 A diprotic acid, H_2Z has the concentration of 0.5 mol dm^{-3}. Z is not the actual symbol of the element.
What is the volume of potassium hydroxide, KOH, 1.0 mol dm^{-3} that can neutralize 25.0 cm^3 of the H_2Z acid solution?

Satu asid dwibes, H_2Z *mempunyai kepekatan* 0.5 mol dm^{-3}. *Z bukan simbol sebenar unsur itu.*
*Berapakah isi padu kalium hidroksida,*KOH, 1.0 mol dm^{-3} *yang dapat menentralkan* 25.0 cm^3 *larutan asid* H_2Z *itu?*

A 6.25 cm^3

B 12.50 cm^3

C 25.00 cm^3

D 50.00 cm^3

33 Diagram 8 shows the heating of substance X and the products produce.
Rajah 8 menunjukkan pemanasan logam X dan hasil yang diperolehi

Substance X	→	Salt Y	+	Oxygen gas	+	Nitrogen dioxide gas
Bahan X	Δ	*Garam Y*		*Gas oksigen*		*Nitrogen dioksida*

Diagram 8
Rajah 8

What is could substance X be?
Apkah kemungkinan bahan X ?

A Magnesium oxide
Magnesium oksida

B Magnesium nitrate
Magnesium nitrat

C Zinc carbonate
Zink karbonat

D Zinc oxide
Zink oksida

34 Photochromic glass darkens on exposure to sunlight.
The salt used to make photochromic glass is
Kaca fotokromik menjadi gelap apabila didedahkan kepada cahaya matahari.
Garam yang digunakan untuk membuat kaca fotokromik ialah

A Lead(II) nitrate
plumbum(II) nitrat

B Copper(II) sulphate
Kuprum(II) sulfat

C Iron(II) sulphate
Ferum(II) sulfat

D Silver chloride
Argentum klorida

35 The chemical formula of butene is C_4H_8. Determine the relative molecular mass for the alcohol that same number of carbon with butene .
[Relative atomic mass of H=1, C=12, O=16]
Formula kimia bagi butena ialah C_4H_8. Tentukan jisim molekul relatif bagi alkohol yang mempunyai bilangan atom karbon yang sama dengan butena.
[Jisim atom relatif H=1, C=12, O=16*])*

A 30

B 48

C 56

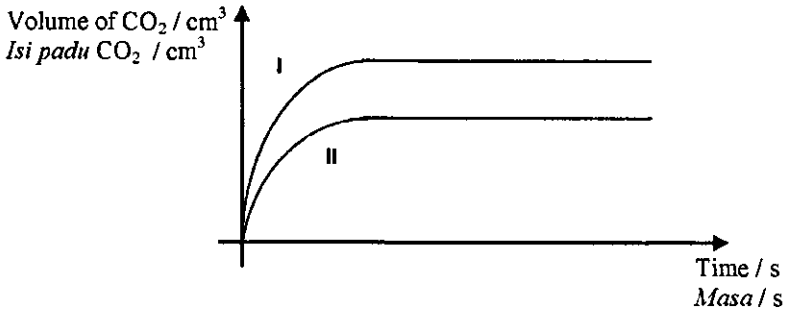
D 74

36 An experiment is carried out to study the rate of reaction between marble and hydrochloric acid to produce carbon dioxide gas.
Satu eksperimen dijalankan untuk mengkaji kadar tindak balas antara marmar dengan asid hidroklorik untuk membebaskan gas karbon dioksida.

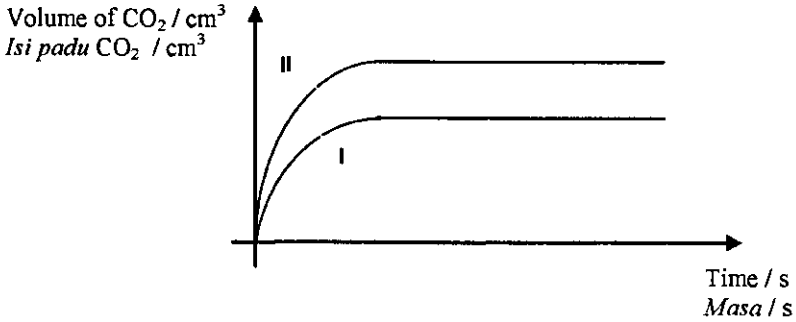
Experiment *Eksperimen*	Substances *Bahan*
I	Excess marble and 50.0 cm^3 of 2 mol dm^{-3} hydrochloric acid. *Marmar berlebihan dan* 50.0 cm^3 *asid hidroklorik* 2 mol dm^{-3}.
II	Excess marble and 100.0 cm^3 of 1 mol dm^{-3} hydrochloric acid. *Marmar berlebihan dan* 100.0 cm^3 *asid hidroklorik* 1 mol dm^{-3}.

Which graph represents the results of the two experiments?
Graf manakah mewakili keputusan bagi kedua-dua eksperimen itu?

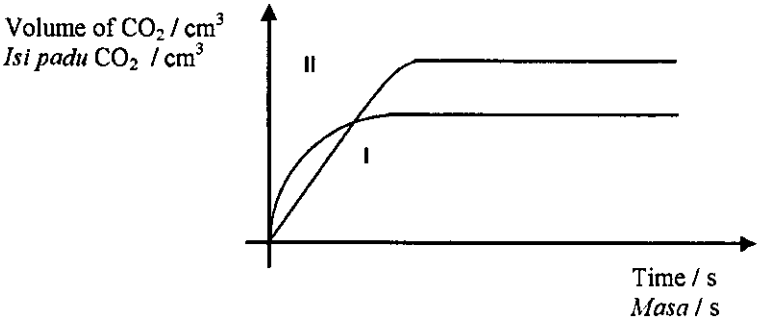
A



B



C



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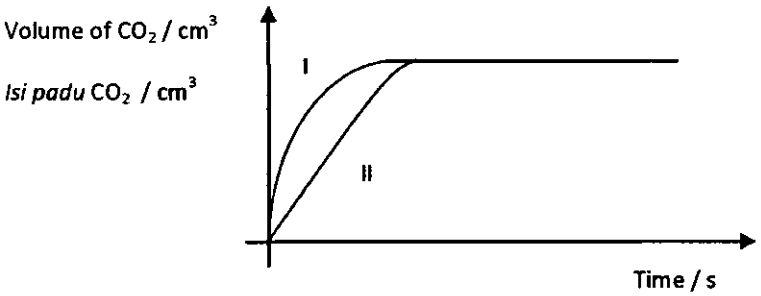


37 Which of the following is the function of an analgesic?
Antara berikut yang manakah fungsi ubat jenis analgesik?

A To relieve pain.
Melegakan rasa sakit.

B To treat asthma.
Merawat penyakit asma.

C To destroy bacteria.
Membunuh bakteria.

D To calm down the emotion of the patient.
Menenangkan emosi pesakit.

38 Diagram 9 shows the set of apparatus of an experiment to investigate the redox reaction in terms of the electron transfer at a distance.

Rajah 9 menunjukkan susunan radas satu eksperimen untuk mengkaji tindak balas redoks berdasarkan pemindahan elektron pada satu jarak.

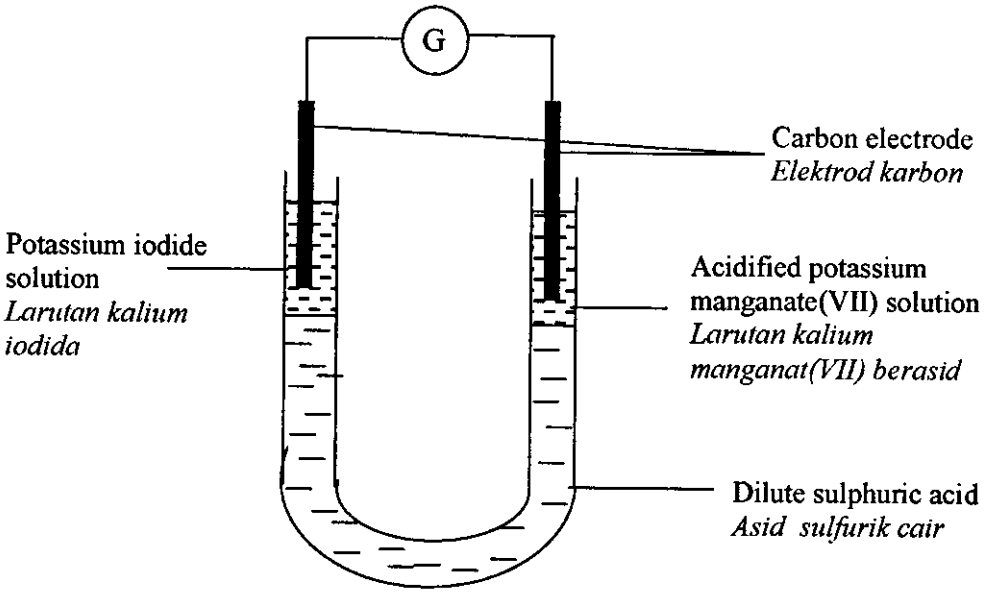


Diagram 9
Rajah 9

Which of the following statements is true about the experiment?

Antara pernyataan berikut yang manakah benar tentang eksperimen itu

A Iodide ion is the reducing agent
Ion iodida bertindak sebagai agen pemurunan

B Oxidation number of iodine decreases from 0 to -1
Nombor pengoksidaan iodin menurun dari 0 ke -1

C Oxidation number of manganese increases from +2 to +7
Nombor pengoksidaan mangan bertambah dari + 2 ke +7

D Electrons flow from potassium iodide solution to acidified potassium manganate(VII) through sulphuric acid
Elektron mengalir dari larutan kalium iodida ke larutan kalium mangnanat(VII) berasid melalui asid sulfurik

39 Diagram 10 shows an energy level diagram.
Rajah 10 *menunjukkan gambar rajah aras tenaga.*

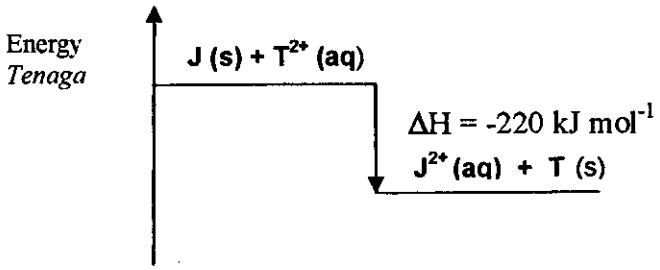


Diagram 10
Rajah 10

Based on Diagram 10, what is the increase in temperature of the solution if excess J powder is added to 50 cm^3 of T salt solution 0.2 mol dm^{-3}?
[Specific heat capacity of solution : 4.0 J g^{-1} $^oC^{-1}$]
Berdasarkan Rajah 10, *berapakah kenaikan suhu larutan jika serbuk* J *berlebihan ditambah kepada* 50 cm^3 *larutan garam* T 0.2 mol dm^{-3} ?
[*Muatan haba tentu larutan* :4.0 J g^{-1} $^oC^{-1}$]

A 4.4°C

B 5.5°C

C 8.8°C

D 11.0°C

40 Diagram 11 shows symbol of two isotopes of bromine atom.
Rajah 11 *menunjukkan simbol dua isotop bagi atom bromin.*

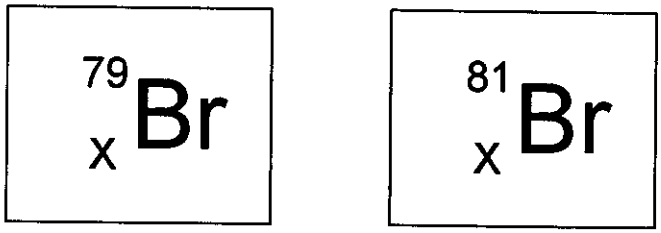


Diagram 11
Rajah 11

Bromine-79 has 44 neutrons.
Calculate the number of neutrons in Bromine-81.
Bromin-79 mempunyai 44 neutron.
Hitung bilangan neutron dalam Bromin-81.

A 35

B 37

C 46

D 90

41 Magnesium reacts with sulphuric acid according to the equation below.
Magnesium bertindak balas dengan asid sulfurik mengikut persamaan berikut.

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

What is the volume of hydrogen gas produced at STP if 0.72 g of magnesium is added to the excess of sulphuric acid?
Berapakah isipadu gas hidrogen yang dihasilkan pada STP *jika* 0.72 g *magnesium ditambahkan kepada asid sulfurik berlebihan?*
[Relative atomic mass : Mg, 24, molar volume, 22.4 $dm^3\ mol^{-1}$ at STP]
[*Jisim atom relative:* Mg, 24, *isipadu molar,* 22.4 $dm^3\ mol^{-1}$ *pada* STP]

A 0.672 dm^3

B 0.771 dm^3

C 1.296 dm^3

D 1.344 dm^3

42 Table 2 shows the proton number of elements P and Q.
Jadual 2 menunjukkan nombor proton bagi unsur P *dan* Q.

Element *Unsur*	Proton number *Nombor proton*
P	3
Q	11

Table 2
Jadual 2

Which statement is true about the elements in Table 2?
Pernyataan manakah benar mengenai unsur dalam Jadual 2 ?

A Q is less electropositive than P.
Q kurang elektropositif daripada P.

B The atomic size of Q is smaller than P.
Saiz atom Q *lebih kecil daripada* P.

C Both elements P and Q cannot conduct electricity.
Kedua-dua unsur P *dan* Q tidak dapat mengkonduksi elektrik.

D P and Q are in the same group in the Periodic Table.
P *dan* Q *terletak dalam kumpulan yang sama dalam Jadual Berkala.*

43 Table 3 shows the electron arrangements for atom of element T and atom of element U.
Jadual 3 menunjukkan susunan elektron bagi atom unsur T dan atom unsur U.

Element *Unsur*	**Electron arrangement** *Susunan elektron*
T	2.4
U	2.8.6

Table 3
Jadual 3

Which pair of formula and type of bond is correct when element T reacts with element U?
Antara pasangan formula dan jenis ikatan berikut, yang manakah benar apabila unsur T bertindak balas dengan unsur U?

	Formula *Formula*	**Type of bond** *Jenis ikatan*
A	T_2U	Ionic *Ion*
B	TU_2	Ionic *Ion*
C	T_2U	Covalent *Kovalen*
D	TU_2	Covalent *Kovalen*

44 Magnesium chloride solution, 0.001mol dm^{-3} is electrolyzed using carbon electrodes. Which are the half equations for the reactions occurring at the anode and the cathode?
Larutan magnesium klorida, 0.001 mol dm^{-3} dielektrolisis menggunakan elektrod karbon. Yang manakah setengah persamaan bagi tindak balas yang berlaku di anod dan di katod

	Anode *Anod*	Cathode *Katod*
A	$4OH^- \rightarrow O_2 + 2H_2O + 4e$	$Mg^{2+} + 2e \rightarrow Mg$
B	$4OH^- \rightarrow O_2 + 2H_2O + 4e$	$2H^+ + 2e \rightarrow H_2$
C	$2Cl^- \rightarrow Cl_2 + 2e$	$2H^+ + 2e \rightarrow H_2$
D	$2Cl^- \rightarrow Cl_2 + 2e$	$Mg^{2+} + 2e \rightarrow Mg$

45 Diagram 12 shows the apparatus set-up for the titration of potassium hydroxide solution with sulphuric acid.
Rajah 12 *menunjukkan susunan radas bagi proses pentitratan larutan kalium hidroksida dengan asid sulfurik.*

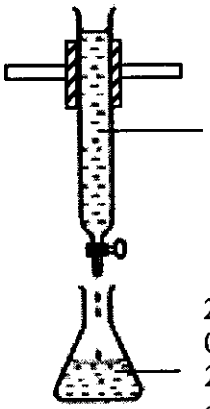


Diagram 12
Rajah 12

What is the total volume of the mixture in the conical flask at the end point of the titration in Diagram 12?
Berapakah jumlah isi padu campuran di dalam kelalang kon pada takat akhir pentitratan dalam Rajah 12?

A 10 cm^3
B 20 cm^3
C 30 cm^3
D 40 cm^3

46 The following equation shows the decomposition of copper(II) carbonate when heated strongly.
Persamaan berikut menunjukkan penguraian kuprum(II) karbonat apabila dipanaskan dengan kuat.

$$CuCO_3 \xrightarrow[\Delta]{} CuO + CO_2$$

What is the mass of copper(II) oxide produced when 12.4 g of copper(II) carbonate is decomposed completely?
[Relative atomic mass: C, 12; O, 16; Cu, 64]
Apakah jisim kuprum(II) oksida yang terhasil apabila 12.4 g kuprum(II) karbonat terurai dengan lengkap?
[Jisim atom relatif: C, 12; O, 16; Cu, 64]

A 4.0 g

B 8.0 g

C 12.4 g

D 80.0 g

47 Ammonium sulphate, $(NH_4)_2SO_4$ is an example of a fertilizer
Calculate the percentage of nitrogen in 1 mole of ammonium sulphate.
[Relative atomic mass: N=14, H=1, S=,32, O=16]
Ammonium sulfat, $(NH_4)_2SO_4$ *adalah satu contoh baja.*
Hitungkan peratus nitrogen dalam 1 mol ammonium sulfat.
[Jisim atom relatif: N=14, H=1, S=,32, O=16]

A 12.12 %

B 21.21 %

C 23.23 %

D 31.31 %

48 Table 4 shows the total volume of gas collected at regular intervals in a reaction.
Jadual 4 menunjukkan jumlah isi padu gas yang terkumpul pada sela masa tertentu dalam suatu tindak balas.

Time /s *Masa*	0	30	60	90	120	150	180	210
Volume of gas / cm^3 *Isi padu gas*	0	2.0	3.7	5.2	6.4	7.3	8.6	8.6

Table 4
Jadual 4

What is the average rate of reaction in the second minute?
Berapakah kadar tindak balas purata dalam minit kedua?

A $0.040\ cm^3\ s^{-1}$

B $0.045\ cm^3\ s^{-1}$

C $0.053\ cm^3\ s^{-1}$

D $0.062\ cm^3\ s^{-1}$

49 Compound P undergoes combustion in excess of oxygen to produce carbon dioxide and water. The equation for the reaction is as follows:
Sebatian P mengalami pembakaran dalam oksigen berlebihan untuk menghasilkan karbon dioksida dan air. Persamaan tindakbalas adalah seperti berikut:

$$P + 3O_2 \longrightarrow 2CO_2 + 3H_2O$$

What is compound P?
Apakah sebatian P?

A C_2H_4

B C_2H_6

C C_2H_5OH

D C_3H_7OH

50 Which of the following is the oxidation number of manganese, Mn in the corresponding substances?

Antara berikut yang manakah nombor pengoksidaan mangan, Mn *yang sepadan dengan sebatiannya?*

	$KMnO_4$	MnO_2	Mn_2O_3
A	+7	+2	+3
B	+3	+4	+2
C	+7	+4	+3
D	+4	+2	+6

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

SULIT
4541/2
Kimia
Kertas 2
September
2011
2 ½ jam

Nama : .....

Tingkatan : .....

MAJLIS PENGETUA SEKOLAH - SEKOLAH MALAYSIA (MPSM)
CAWANGAN KELANTAN

PEPERIKSAAN PERCUBAAN SPM
TINGKATAN 5
2011

KIMIA
KERTAS 2

Masa : 2 jam 30 minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Kertas soalan ini adalah dalam dwibahasa*
2. *Setiap soalan mengandungi kedua-dua bahasa Inggeris dan bahasa Melayu. Bahagian atas dalam bahasa Inggeris dan diikuti di bawahnya oleh bahasa Melayu*
3. *Calon dibenarkan menjawab keseluruhan atau sebahagian soalan samada dalam bahasa Melayu atau bahasa Inggeris*
4. *Calon dikehendaki membaca maklumat dihalaman 2.*

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

Kertas soalan ini mengandungi 25 halaman bercetak.

Section A
Bahagian A

[60 marks]
[60 *markah*]

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

1 Diagram 1.1 shows the set-up of apparatus to prepare soap.
Rajah 1.1 *menunjukkan susunan radas untuk menyediakan sabun.*

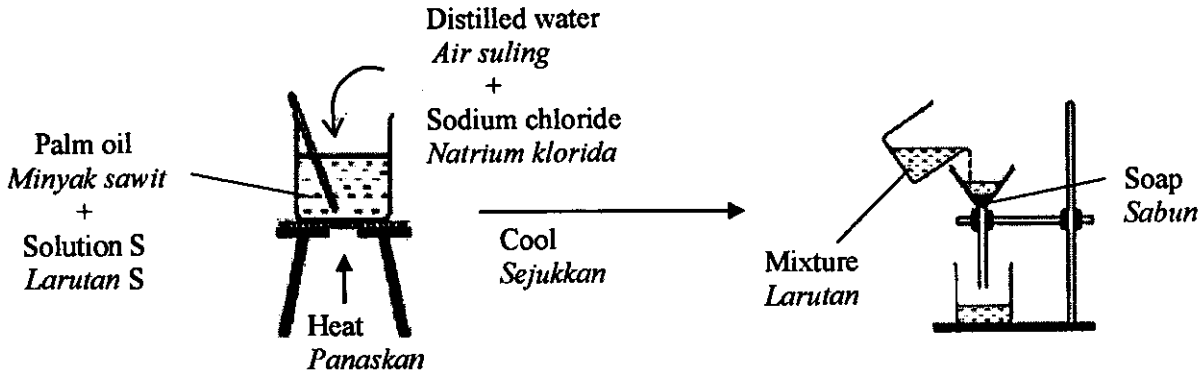


Diagram 1.1
Rajah 1.1

(a) (i) Name the process of preparing soap.
Namakan proses penyediaan sabun.

.....
[1 mark]

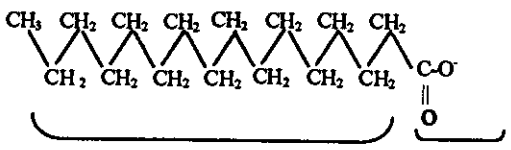
(ii) Name solution S.
Namakan larutan S.

.....
[1 mark]

(iii) State the purpose of adding sodium chloride to the reaction mixture in the experiment.
Nyatakan tujuan menambahkan natrium klorida kepada campuran tindak balas dalam eksperimen itu.

.....

(iv) Diagram 1.2 shows the structure of a soap anion.
Rajah 1.2 *menunjukkan struktur satu anion sabun.*



Part X
Bahagian X

Part Y
Bahagian Y

Diagram 1.2
Rajah 1.2

Based on Diagram 1.2, state which part is soluble in grease
Berdasarkan Rajah 1.2, *nyatakan bahagian manakah yang dalam gris*

.....

[1 mark]

(b) When soap is used to wash clothes in sea water, scum is formed.
Apabila sabun digunakan untuk mencuci pakaian menggunakan air laut, kekat terbentuk

(i) What is the meaning of scum?
Apakah maksud kekat?

.....

[1 mark]

(ii) Name **one** ion in sea water that cause the formation of scum
Namakan ***satu*** *ion dalam air laut yang menyebabkan pembentukan kekat*

.....

[1 mark]

(c) Glass and ceramic are widely used in our daily life.
Kaca dan seramik digunakan secara meluas dalam kehidupan harian.

(i) Name a chemical of the main component of glass and ceramic
Namakan bahan kimia yang menjadi bahan utama dalam kaca dan seramik

.....

[1 mark]

(ii) State a reason why glass is used as laboratory apparatus instead of metal.
Nyatakan satu alasan mengapa kaca digunakan sebagai radas makmal bukannya logam.

.....

[1 mark]

(iii)

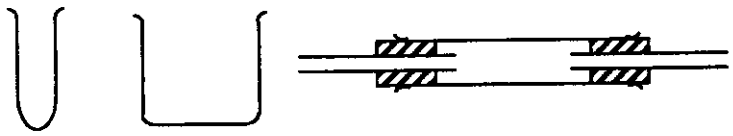


Diagram 1.3
Rajah 1.3

State the type of glass that used in making the laboratory glassware in Diagram 1.3
Nyatakan jenis kaca yang digunakan untuk membuat alat radas kaca makmal dalam Rajah 1.3

.....

[1 mark]

2 Diagram 2.1 shows part of the Periodic Table of Elements.
Rajah 2.1 *menunjukkan sebahagian daripada Jadual Berkala Unsur*

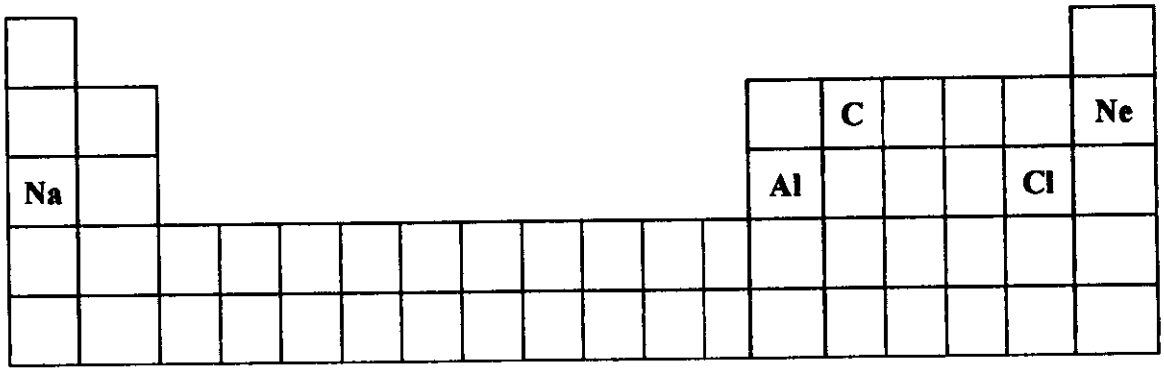


Diagram 2.1
Rajah 2.1

(a) Based on the Diagram 2.1,answer the following questions.
Berdasarkan Rajah 2.1, *jawab soalan-soalan berikut:*

(i) Choose an element which is a halogen.
Pilih satu unsur yang merupakan halogen.

.....
[1 mark]

(ii) Which element exist as monoatomic?
Unsur yang manakah wujud monoatom?

.....
[1 mark]

(iii) Which element forms an amphoteric oxide?
Unsur yang manakah membentuk oksida bersifat amfoterik?

.....
[1 mark]

(iv) Arrange all elements according to the increase in the size of atom.
Susun semua unsur mengikut pertambahan saiz atom.

.....
[1 mark]

(b) Diagram 2.2 shows the proton number and nucleon number for Na and Cl.
Rajah 2.2 *menunjukkan nombor proton dan nombor nukleon bagi* Na *dan* Cl.

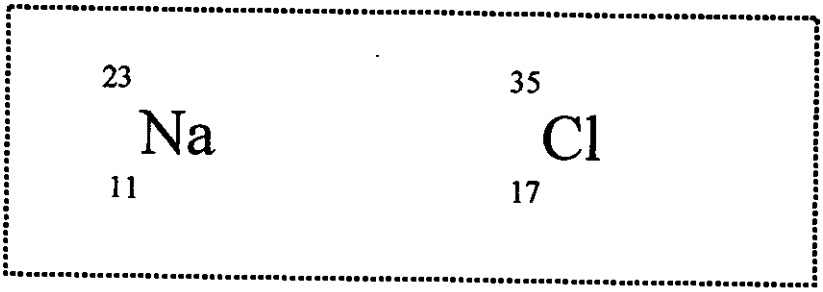


Diagram 2.2
Rajah 2.2

(i) Draw an electron arrangement of the compound formed between elements Na and Cl.
Lukiskan susunan elektron bagi sebatian yang terbentuk di antara unsur Na *dan* Cl.

[2 marks]

(ii) State the type of compound formed.
Nyatakan jenis sebatian yang terbentuk.

.....
[1 mark]

(iii) Name the force that exists between the particles in the compound.
Namakan daya yang wujud di antara zarah-zarah dalam sebatian itu.

.....
[1 mark]

(iv) State **one** physical property of this compound.
Nyatakan satu sifat fizik bagi sebatian ini.

.....
[1 mark]

3 (a) Diagram 3.1 shows the set up of the apparatus used to electroplate an iron key with silver metal.
Rajah 3.1 *menunjukkan susunan radas yang digunakan untuk menyadur satu kunci besi dengan logam perak.*

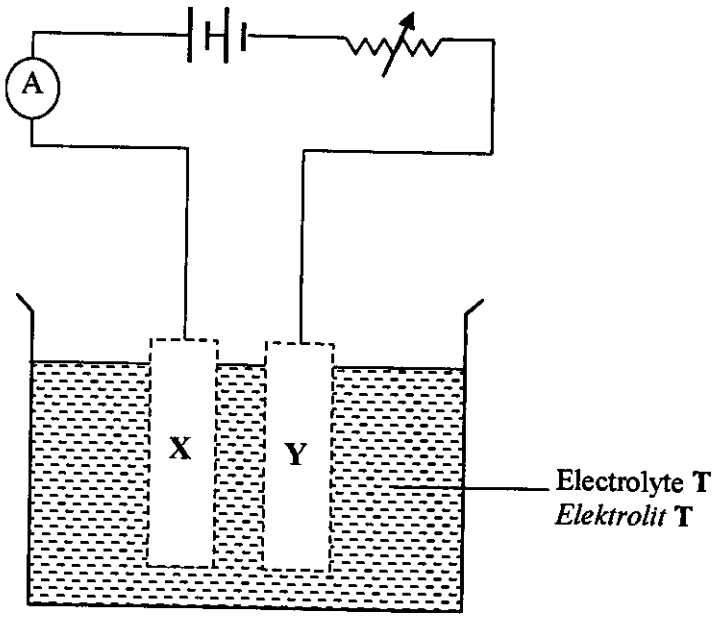


Diagram 3.1
Rajah 3.1

Based on Diagram 3.1 :
Berdasarkan Rajah 3.1 :

(i) State the correct position of the iron key either electrodes X or Y.
Nyatakan kedudukan yang betul bagi kunci besi samada elektrod X *atau* Y.

.....

[1 mark]

(ii) Name a suitable solution that can be used as electrolyte T.
Namakan satu larutan yang sesuai digunakan sebagai elektrolit T.

.....

(iii) Write half equation for the reaction occurring at electrode X.
Tuliskan setengah persamaan bagi tindak balas yang berlaku di elektrod X

.....

[1 mark]

(b) Diagram 3.2 shows the set-up of apparatus of a purification process.
Rajah 3.2 menunjukkan susunan radas bagi suatu proses penulenan.

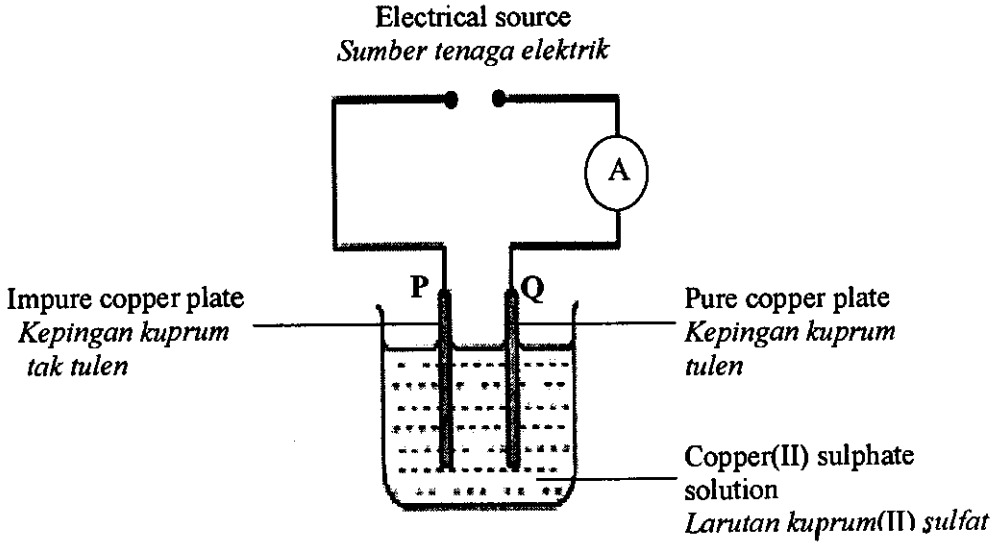


Diagram 3.2
Rajah 3.2

(i) Identify the anode and the cathode.
Kenal pasti anod dan katod.

P : .....

Q : .....

[2 marks]

(ii) During this process, the intensity of the blue colour of copper(II) sulphate remains unchanged. Explain why.
Semasa proses ini, didapati keamatan warna biru larutan kuprum(II) sulfat tidak berubah. Terangkan mengapa.

.....

.....

[2 marks]

(c) Diagram 3.3 shows the set-up of apparatus of a voltaic cell.
Rajah 3.3 menunjukkan susunan radas satu sel kimia.

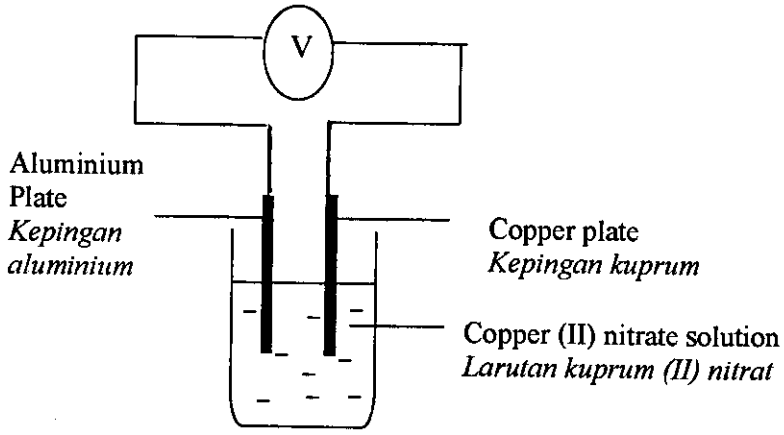


Diagram 3.3
Rajah 3.3

Based on Diagram 3.3, answer the following questions.
Berdasarkan Rajah 3.3, jawab soalan-soalan berikut.

(i) Name the negative terminal of the voltaic cell.
Namakan terminal negative bagi sel klimia ini

.....

[1 mark]

(ii) Explain your answer in (d)(i)
Terangkan jawapan anda di (d)(i)

.....

[1 mark]

(iii) Write half equation for the reaction occurring at the positive terminal.
Tuliskan setengah persamaan bagi tindak balas yang berlaku di terminal positif.

.....

[1 mark]

4 Diagram 4 shows the flow chart for the chemical changes that occurs to a carbonate salt, P.
Rajah 4 menunjukkan carta alir bagi perubahan kimia yang berlaku pada suatu garam karbonat, P.

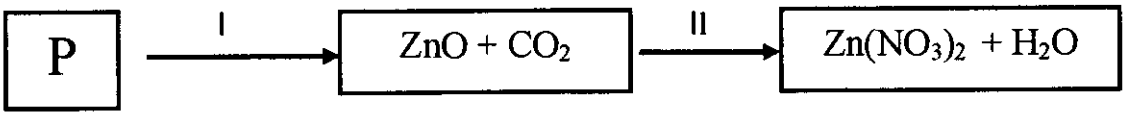


Diagram 4
Rajah 4

Based on the Diagram 4,
Berdasarkan Rajah 4,

(a) Name salt P?
Namakan garam P?

.....

[1 mark]

(b) (i) State the colour of zinc oxide, ZnO during process I.
Nyatakan warna bagi zink oksida, ZnO *semasa proses* I.

Hot *Panas*	Cold *Sejuk*

[2 marks]

(ii) Carbon dioxide gas, CO_2 that released in process I is bubbled into the lime water. State the observation.
Gas karbon dioksida, CO_2 *yang terbebas dalam proses I dialirkan ke dalam air kapur.*
Nyatakan pemerhatian.

.....

[1 mark]

(c) Zinc oxide, ZnO is dissolved in the nitric acid, HNO_3 in process II.
Zink oksida, ZnO *dilarutkan dalam asid nitrik,* HNO_3 *dalam proses* II.

(i) Name the type of reaction in process II.
Namakan jenis tindak balas dalam proses II .

.....

[1 mark]

(ii) State the colour of the salt solution produced.
Nyatakan warna larutan garam terhasil.

.....

[1 mark]

(iii) Write chemical equation for the reaction.
Tuliskan persamaan kimia bagi tindakbalas itu.

.....

[1 mark]

(d) Describe a method to confirm the cation in salt P.
Huraikan satu kaedah untuk mengesahkan kation dalam garam P.

.....

.....

.....

[3 marks]

5 A group of students carried out two experiments to investigate one factor that affects the rate of a reaction .

Sekumpulan pelajar menjalankan dua eksperimen untuk mengkaji satu faktor yang mempengaruhi kadar suatu tindak balas.

Experiment 1: Excess granulated of metal zinc is added to 25 cm^3 of 0.2 mol dm^{-3} hydrochloric acid.

Eksperimen 1: *Ketulan logam zink berlebihan di tambah kepada* 25 cm^3 *asid hidroklorik* 0.2 mol dm^{-3}

Experiment 2: Excess powder of metal zinc is added to 25 cm^3 of 0.2 mol dm^{-3} hydrochloric acid.

Eksperimen 2: *Serbuk logam zink berlebihan di tambah kepada* 25 cm^3 *asid hidroklorik* 0.2 mol dm^{-3}

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

.....

[2 marks]

(iii) Calculate the maximum volume of hydrogen gas released at room condition.
[Molar volume of gas at room condition: 24 dm^3 mol^{-1}]

Hitungkan isi padu maksima gas hidrogen yang terbebas pada keadaan bilik.
[*Isi padu molar gas pada keadaan bilik*: 24 dm^3 mol^{-1}]

[3 marks]

(b) Diagram 5 shows the results of experiment 1.
Rajah 5 menunjukkan keputusan eksperimen 1.

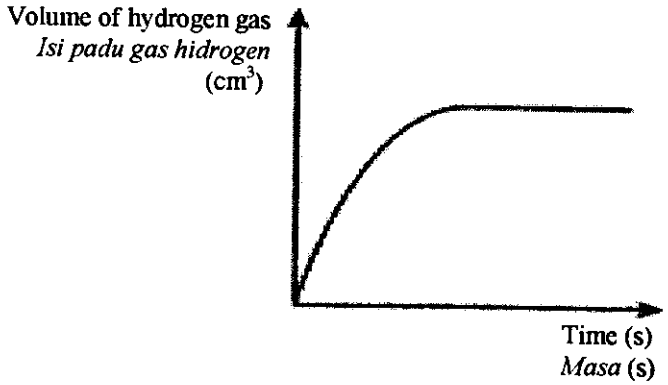


Diagram 5
Rajah 5

(i) Sketch the curve for experiment 2 on diagram 5.
Lakarkan lengkung bagi eksperimen 2 pada rajah 5.

[2 marks]

(ii) What is the factor that affects the rate of reaction in this experiment.
Apakah faktor yang mempengaruhi kadar tindak balas dalam eksperimen ini.

.....

[1 mark]

(iii) Compare the rate of reaction between experiment 1 and experiment 2.
Give a reason.
Bandingkan kadar tindak balas antara eksperimen 1 dan eksperimen 2.
Berikan satu sebab.

.....

.....

[3 marks]

6 The combustion of an alcohol in air is represented by the equation below:
Pembakaran suatu sebatian alkohol di udara diwakili oleh persamaan berikut:

$$C_2H_5OH + 3O_2 \rightarrow 2CO_2 + 3H_2O \quad \Delta H = -1260 \text{ kJ mol}^{-1}$$

(a) (i) Name the alcohol in the above equation.
Namakan sebatian alkohol di dalam persamaan di atas.

.....

[1 mark]

(ii) What is meant by '$\Delta H = -1260$ kJ mol^{-1}' in the above equation?
Apakah yang dimaksudkan dengan '$\Delta H = -1260$ kJ mol^{-1}' *dalam persamaan di atas?*

.....

[1 mark]

(b) 200 g of water is heated by the combustion of 0.23 g of the alcohol.
200 g *air dipanaskan oleh pembakaran* 0.23 g *alkohol tersebut.*

(i) Calculate the heat released by the alcohol in the reaction.
[Relative Atomic Mass: H=1; C=12 and O=16]
Kirakan haba yang dibebaskan oleh alkohol itu dalam tindak balas.
[*Jisim atom relatif:* H=1; C=12 *dan* O=16]

[3 marks]

(ii) Calculate the temperature change of water expected in the experiment.
[Specific heat capacity of water: 4.2 J g^{-1} °C^{-1}]
Kirakan perubahan suhu air yang dijangkakan dalam eksperimen itu.
[*Haba tentu air:* 4.2 J g^{-1} °C^{-1}]

[2 marks]

(c) Why is the value of heat of combustion obtained always less than the actual value?
Mengapa nilai haba pembakaran yang didapati biasanya lebih rendah daripada nilai yang sebenar?

.....

[1 mark]

(d) Draw the energy level diagram for the combustion of the alcohol.
Lukis gambarajah aras tenaga untuk pembakaran alkohol tersebut.

[2 marks]

(e) Table 6 shows the heat of combustion of various alcohols.
Jadual 6 menunjukkan haba pembakaran bagi pelbagai alkohol.

Number of carbon atoms *Bilangan atom karbon*	Molecular formula *Formula molekul*	Name of substances *Nama sebatian*	Heat of combustion *Haba pembakaran* (kJ / mol^{-1})
1	CH_3OH	Methanol	-728
2	C_2H_5OH		-1376
3	C_3H_7OH	Propanol	-2016
4	C_4H_9OH	Butanol	

Table 6
Jadual 6

Predict the heat of combustion of butanol.
Ramalkan haba pembakaran bagi butanol.

.....

[1 mark]

Section B
Bahagian B

[20 marks]

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

7 (a) Uranium-235 and uranium-238 are two isotopes of uranium.
Table 7 shows the numbers of the subatomic particles in an atom of uranium-235.
Uranium-235 dan uranium-238 adalah dua isotop bagi uranium.
Jadual 7 menunjukkan bilangan zarah-zarah sub-atom dalam satu atom uranium-235.

Sub-atomic particle *Zarah sub-atom*	Number *Bilangan*
Electron *Elektron*	92
Neutron *Neutron*	143
Proton *Proton*	92

Table 7
Jadual 7

(i) State the number of electrons and neutrons in an atom of uranium-238.
Nyatakan bilangan elektron dan bilangan neutron dalam satu atom uranium-238

[2 marks]

(ii) Explain why these two atoms of uranium are isotope?
Terangkan mengapa dua atom uranium ini adalah isotop?

[2 marks]

(b) X is a substance that has melting point of 43°C and boiling point of 89°C.
X adalah sebatian yang mempunyai takat lebur 43°C *dan takat didih* 89°C.

(i) Sketch a graph of temperature against time when substance X is heated from 30°C to 100°C.
Lakarkan satu graf suhu terhadap masa apabila X dipanaskan dari 30°C *kepada* 100°C.

[3 marks]

(ii) Compare in terms of arrangement of particles, force of attraction and kinetic energy when substance X is at 30°C and 80°C.
Bandingkan dari segi susunan zarah, daya tarikan dan tenaga kinetik apabila bahan X adalah pada suhu 30°C *dan* 80°C.

[6 marks]

(c) Chemical analysis shows that compound P contains 74.10 % carbon, 8.64 % hydrogen and 17.26 % nitrogen. The relative molecular mass of P is 162. Determine the molecular formula of P.
Analisa kimia menunjukkan yang sebatian P *mengandungi* 74.10 % *karbon,* 8.64 % *hidrogen dan* 17.26 % *nitrogen. Jisim molekul relatif* P *ialah* 162. *Tentukan formula molekul* P.

[Relative atomic mass: H = 1; C = 12; N = 14]

[7 marks]

8 (a) The equations below show two reactions between sodium hydroxide with hydrochloric acid and sodium hydroxide with sulphuric acid.
Persamaan di bawah menunjukkan dua tindak balas antara natrium hidroksida dengan asid hidroklorik dan natrium hidroksida dengan asid sulfurik.

$$NaOH + HCl \rightarrow NaOH + H_2O$$

$$2NaOH + H_2SO_4 \rightarrow Na_2SO_4 + 2H_2O$$

Based on these equations, explain why hydrochloric acid is classified as a monoprotic acid and sulphuric acid is classified as a diprotic acid.
Berdasarkan persamaan ini terangkan mengapa asid hidroklorik dikelaskan sebagai asid monobes dan asid sulfurik dikelaskan sebagai asid dwibes.

[4 *marks*]

(b) Potassium chloride solution is prepared by neutralisation reaction between hydrochloric acid and potassium hydroxide solution. The potassium hydroxide solution is prepared by dissolving 14.0 g solid potassium hydroxide in water to produce 250 cm^3 solution. 25.0 cm^3 of potassium hydroxide solution neutralised 24.50 cm^3 of the hydrochloric acid.
[Relative atomic mass: H=1, O=16, K=39, Cl=35.5]

Larutan kalium klorida disediakan melalui tindak balas peneutralan antara asid hidroklorik dengan larutan kalium hidroksida. Larutan kalium hidroksida disediakan dengan melarutkan 14.0 g *pepejal kalium hidroksida dalam air untuk menghasilkan* 250 cm^3 *larutan.* 25.0 cm^3 *larutan kalium hidroksida meneutralkan* 24.50 cm^3 *asid hidroklorik.*
[*Jisim atom relatif*: H=1, O=16, K=39, Cl=35.5]

Calculate
Hitungkan

(i) the concentration of potassium hydroxide solution in mol dm^{-3}.
kepekatan larutan kalium hidroksida dalam mol dm^{-3}.

(ii) the concentration of the hydrochloric acid used.
kepekatan asid hidroklorik yang digunakan.

(iii) the mass of potassium chloride obtained.
jisim kalium klorida yang diperolehi.

[6 marks]

(c) (i) Table 8.1 shows the relation between the concentration and the pH values of hydrochloric acid and sodium hydroxide solution.
Jadual 8.1 *menunjukkan hubungan antara kepekatan dan nilai* pH *bagi asid hidroklorik dan larutan natrium hidroksida.*

Concentration *Kepekatan* (mol dm^{-3})	0.0001	0.001	0.01	0.1
pH value of hydrochloric acid *nilai pH asid hidroklorik*	4	3	2	1
pH value of sodium hydroxide solution *nilai pH larutan natrium hidroksida*	10	11	12	14

Table 8.1
Jadual 8.1

Based on Table 8.1, state the relation between concentration of hydrochloric acid and sodium hydroxide solution with their pH values.
Referring to the concentration of hydrogen ion and hydroxide ion, explain your answer.
Berdasarkan Jadual 8.1 *nyatakan hubungan antara kepekatan asid hidroklorik dan kepekatan natrium hidroksida dengan nilai pHnya.*
Merujuk kepada kepekatan ion hidrogen dan kepekatan ion hidroksida, terangkan jawapan anda.

[6 marks]

(ii) Table 8.2 shows the pH values of 0.1 mol dm^{-3} ethanoic acid, CH_3COOH and hydrochloric acid, HCl.
Jadual 8.2 *menunjukkan nilai* pH *bagi* 0.1 mol dm^{-3} *asid etanoik,* CH_3COOH *dan asid hidroklorik,* HCl.

Acid *Asid*	pH value *Nilai* pH
Ethanoic acid, *Asid etanoik*, CH_3COOH	4
Hydrochloric acid *Asid hidroklorik*, HCl	1

Table 8.2
Jadual 8.2

Explain why the pH value of ethanoic acid is lower compared to hydrochloric acid.
Terangkan mengapa nilai pH *bagi asid etanoik lebih rendah berbanding asid hidroklorik.*

[4 marks]

Section C
Bahagian C

[20 marks]

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

9 (a) Methane is the first member of the homologous series of alkane. While P is the first member of another homologous series of hydrocarbon with the general formula of C_nH_{2n}.
Metana adalah ahli pertama bagi siri homolog alkana. Manakala P *ialah ahli pertama bagi satu lagi siri homolog hidrokarbon dengan formula am* C_nH_{2n}.

(i) Draw the structural formula of methane.
Lukiskan formula struktur metana.

[1 mark]

(ii) Write the molecular formula of P and name P.
Tuliskan formula molekul P *dan namakan* P.

[2 marks]

(iii) Table 9 shows the observation of a test to differentiate between methane and P.
Jadual 9 *menunjukkan ujian untuk membezakan antara metana dan* P.

Reaction *Tindak balas*	Methane *Metana*	P
Reaction with bromine water *Tindakbalas dengan air bromin*	Brown colour of bromine water remains unchanged *Warna perang air bromin tak berubah*	Brown colour of bromine water is decolourised *Warna perang air bromin dinyahwarnakan.*

Table 9
Jadual 9

Explain why there are differences in observation?
Terangkan mengapa terdapat perbezaan dalam pemerhatian?

[5 marks]

(b) Diagram 9 shows the reactions of propene.
Rajah 9 menunjukkan tindak balas bagi propena.

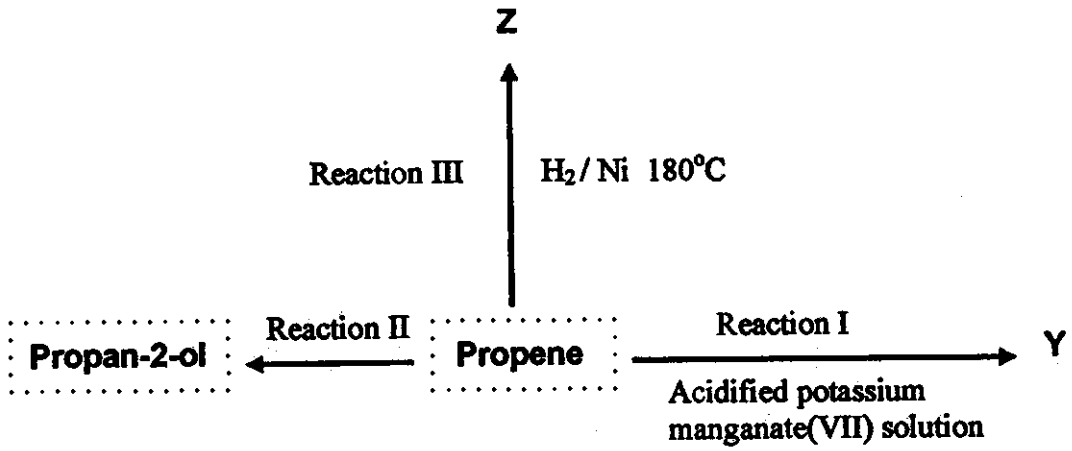


Diagram 9
Rajah 9

(i) Write the chemical equations for the reaction I and III.
Tuliskan persamaan kimia bagi tindak balas I dan III.

[4 marks]

(ii) Reaction II produced another isomer other than propan-2-ol. Draw the structural formula for this isomer.
Tindak balas II menghasilkan satu lagi isomer selain propan-2-ol. Lukiskan formula struktur bagi isomer ini.

[1 mark]

(iii) Describes how propan-2-ol is produced in industry. In your description state also the conditions needed and chemical equation involved.
Huraikan bagaimana propan-2-ol dihasilkan dalam industri. Dalam huraian anda nyatakan juga keadaan yang diperlukan dan persamaan kimia yang terlibat.

[7 marks]

10 (a) A student intends to change the colour of 1.0 mol dm^{-3} iron(II) sulphate solution from green to brown. Suggest a suitable method to help the student.
Write the half equation to explain the changes.

Seorang pelajar ingin mengubah warna larutan ferum(II) sulfat 1.0 mol dm^{-3} dari hijau kepada perang. Cadangkan satu kaedah sesuai bagi membantu pelajar itu. Tuliskan persamaan setengah bagi menerangkan perubahan itu.

[4 marks]

(b) Table 10 shows the results of experiment, Set I and Set II, to study the effects of metal X and Y on the displacement of copper.
Jadual 10 *menunjukkan keputusan eksperimen, Set* I *dan Set* II, *bagi mengkaji kesan logam* X *dan logam* Y *ke atas penyesaran kuprum.*

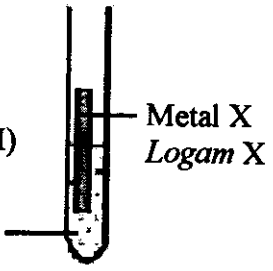
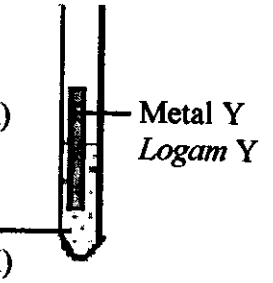
Experiment *Eksperimen*	Set up of apparatus *Susunan radas*	Observation *Pemerhatian*
Set I		• Brown solid is deposited. *Pepejal perang dienapkan.* • Metal X dissolved. *Logam X melarut.* • The blue colour of solution fades. *Warna biru larutan pudar.*
Set II		• No change. *Tiada perubahan*

Table 10
Jadual 10

Based on Table 10,
Berdasarkan Jadual 10,

(i) explain the different in observations in Set I and II.
terangkan perbezaan pemerhatian dalam Set I *dan Set* II.

[5 marks]

(ii) arrange in ascending order metals X, Y and copper in electrochemical series.
susunkan dalam urutan menaik logam X, Y *dan kuprum dalam siri elektrokimia.*

[1 mark]

(c) Diagram 10 shows the order of metals P, Q, R and S in the electrochemical series.
Rajah 10 *menunjukkan susunan logam-logam* P, Q, R *dan* S *dalam siri elektrokimia.*

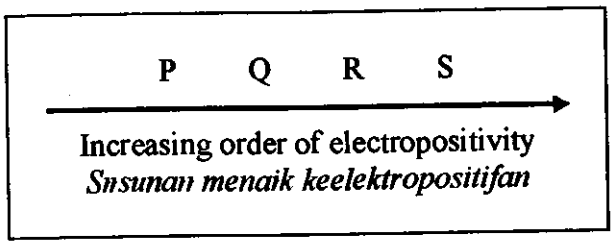


Diagram 10
Rajah 10

Describe an experiment to show the order of these metals in the electrochemical series. Your description must include all the apparatus and materials used, observation and a conclusion.
Huraikan satu eksperimen untuk menunjukkan susunan logam-logam ini dalam siri elektrokimia. Huraian anda mesti mengandungi semua alat radas dan bahan kimia yang digunakan, pemerhatian dan kesimpulan.

[10 marks]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

SULIT
4541/3
Kimia
Kertas 3
September
2011
1 jam 30 minit

Nama : .....

Tingkatan : .....

MAJLIS PENGETUA SEKOLAH - SEKOLAH MALAYSIA (MPSM)
CAWANGAN KELANTAN

PEPERIKSAAN PERCUBAAN SPM
TINGKATAN 5
2011

KIMIA
KERTAS 3
Masa : 1 jam 30 minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

Arahan

1. *Kertas soalan ini adalah dalam dwibahasa.*
2. *Soalan dalam Bahasa Inggeris mendahului soalan yang sepadan dalam Bahasa Melayu.*
3. *Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam Bahasa Inggeris atau Bahasa Melayu.*
4. *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		

Kertas soalan ini mengandungi 10 halaman bercetak.

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

1 A student is carried out three experiments to investigate the electrical conductivity of three compounds in their molten state. Diagram 1.2 shows the results obtained from the experiment.
Seorang pelajar menjalankan tiga eksperimen untuk mengkaji kekonduksian elektrik tiga sebatian dalam keadaan leburan. Rajah 1.2 menunjukkan keputusan yang diperoleh daripada eksperimen.

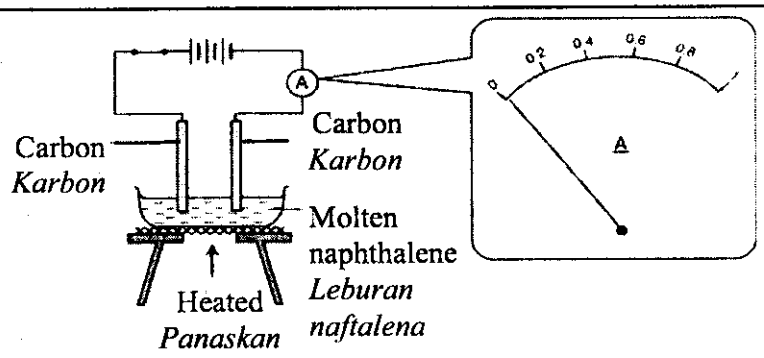
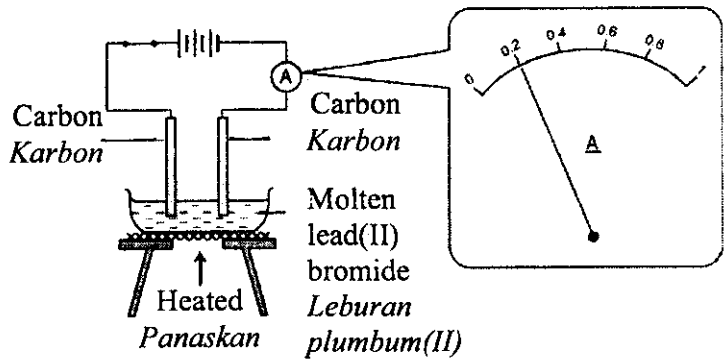
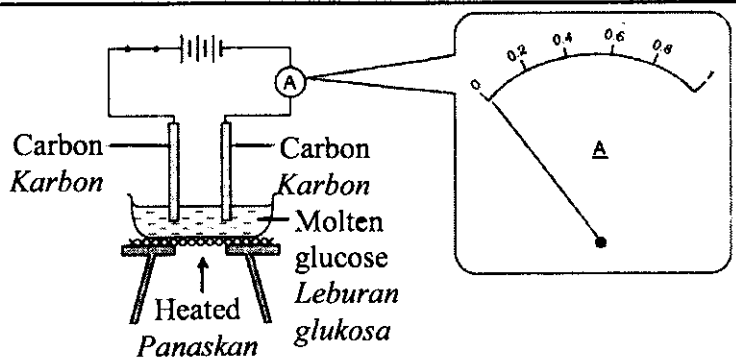
Experiment *Eksperimen*	Result *Keputusan*
I	
II	
III	

Diagram 1.2
Rajah 1.2

(a) State **one** observation that can be obtained from each experiment.
Nyatakan satu pemerhatian yang dapat diperoleh daripada setiap set eksperimen ini.

Experiment I :.....

Experiment II :.....

Experiment III :.....

[3 marks]

(b) Based on your observations in (a), state the inference for these experiments.
Berdasarkan pemerhatian anda di (a), nyatakan inferens bagi eksperimen ini.

.....

.....

[3 marks]

(c) State the operational definition for the electrical conductivity.
Nyatakan definisi secara operasi bagi kekonduksian elektrik.

.....

.....

[3 marks]

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

.....

.....

[3 marks]

(c) State all the variables for this experiment.
Nyatakan semua pembolehubah-pembolehubah bagi eksperimen ini.

Manipulated variable:
Pemboleh ubah dimanipulasikan:

.....

Responding variable:
Pemboleh ubah bergerak balas:

.....

Fixed variable:
Pemboleh ubah dimalarkan

.....

[3 marks]

(f) Compounds can be classified into ionic compound and covalent compound.
Based on the compounds in Diagram 1.2, complete Table 1 by classifying the compounds into ionic or covalent compounds.

Sebatian boleh dikelaskan kepada sebatian ion dan sebatian kovalen.
Berdasarkan sebatian dalam Rajah 1.2 , lengkapkan Jadual 1 dengan mengelaskan sebatian tersebut kepada sebatian ion atau sebatian kovalen.

Ionic compound ***Sebatian ionik***	**Covalent compound** ***Sebatian kovalen***

Table 1
Jadual 1

[3 marks]

2. An experiment was carried out to construct an ionic equation for the precipitation of silver chloride according to the following steps:
Satu eksperimen telah dijalankan untuk membina persamaan ion bagi pemendakan argentum klorida mengikut langkah berikut:

Step I : 5.00 cm^3 of 1.0 mol dm^{-3} potassium chloride solution was poured into 7 test tubes labelled P, Q, R, S, T, U and V.

Langkah I : 5.00 cm^3 *larutan kalium klorida* 1.0 mol dm^{-3} *dimasukkan ke dalam* 7 *tabung uji berlabel* P, Q, R, S, T, U *dan* V.

Step II : 1.00 cm^3 of 1.0 mol dm^{-3} silver nitrate solution was added to test tube P from burette.

Langkah II : 1.00 cm^3 *larutan argentum nitrat* 1.0 mol dm^{-3} *ditambahkan ke dalam tabung uji* P *menggunakan buret.*

Step III : Step II was repeated for test tubes Q, R, S, T, U and V using different volumes of silver nitrate solution.

Langkah III : *Langkah* II *diulangi bagi tabung uji* P, Q, R, S, T, U *dan* V *menggunakan isipadu larutan argentum nitrat yang berlainan.*

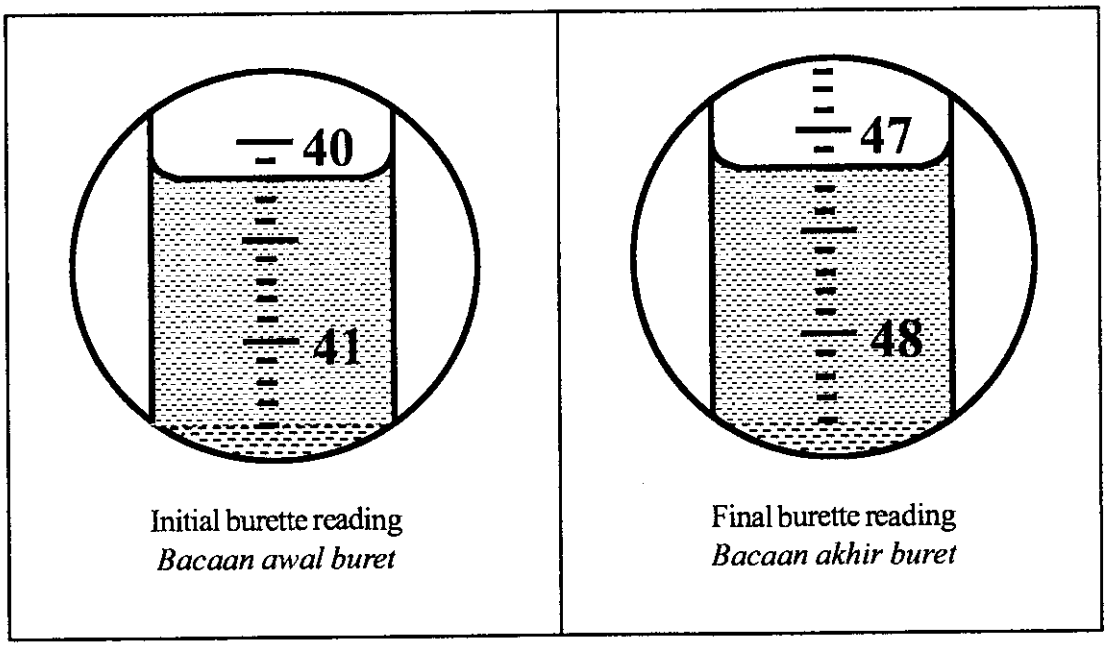
Step IV : All the test tubes were put in the rack to allow silver chloride precipitate to settle. Height of precipitate formed is recorded in Table 1.

Langkah IV : *Semua tabung uji diletakkan di atas rak supaya argentum klorida termendak. Ketinggian mendakan dicatat dalam Jadual* 1.

Test tube	P	Q	R	S	T	U	V
Volume of silver nitrate (cm^3) *Isipadu argentum nitrat*	1.00	2.00	3.00	4.00	5.00	6.00	X
Height of precipitate (cm) *Ketinggian mendakan*	1.0	2.0	3.0	4.0	5.0	5.0	5.0

Table 1
Jadual 1

(a) Diagram 1 shows the initial and final burette reading for test tube V.
Rajah 1 menunjukkan bacaan awal dan akhir buret bagi tabung uji V.



Initial burette reading
Bacaan awal buret

Final burette reading
Bacaan akhir buret

Diagram 1
Rajah 1

Based on Diagram 1, determine value X in Table 1.
Berdasarkan Rajah 1, tentukan nilai X dalam Jadual 1.

X = final burette reading - initial burette reading
Bacaan akhir buret - bacaan awal buret

= ..... - .....

= ..... cm^3

[3 marks]

(b) Based on Table 1, plot a graph of height of preeipitate against volume of silver nitrate solution on the graph provided.
Berdasarkan Jadual 1, plotkan graf ketinggian mendakan melawan isipadu larutan argentum nitrat yang digunakan pada kertas graf yang disediakan.

[3 marks]

(c) (i) On the graph, mark and write the minimum volume of silver nitrate solution needed for complete reaction with 5.00 cm^3 of 1.0 mol dm^{-3} potassium chloride solution.
Pada graf, tanda dan tuliskan isipadularutan argentum nitrat yang diperlukan untuk bertindak balas lengkap dengan 5.00 cm^3 larutan kalium klorida 1.0 mol dm^{-3}.

[3 marks]

(ii) Using the volume obtained in (c) (i), calculate the number of moles of silver ions and chloride ions used. Then calculate the number of moles of chloride ions that will react with 1.0 mole of silver ions.
Menggunakan isipadu di (c) (i), hitungkan bilangan mol ion argentum dan ion klorida yang digunakan. Kemudian, hitungkan bilangan mol ion klorida yang akan bertindak balas dengan 1.0 mol ion argentum.

[3 marks]

(d) Predict the height of precipitate when 3.50 cm^3 silver nitrate solution is added into 5.00 cm^3 potassium chloride solution.
Ramalkan ketinggian mendakan apabila 3.50 cm^3 *larutan argentum nitrat ditambahkan ke dalam* 5.00 cm^3 *larutan kalium klorida.*

.....

[3 marks]

3. Diagram 3 shows rusting of iron naturally occurs when iron is exposed to air.
Rajah 3 menunjukkan pengaratan besi berlaku secara semulajadi apabila besi terdedah kepada udara.

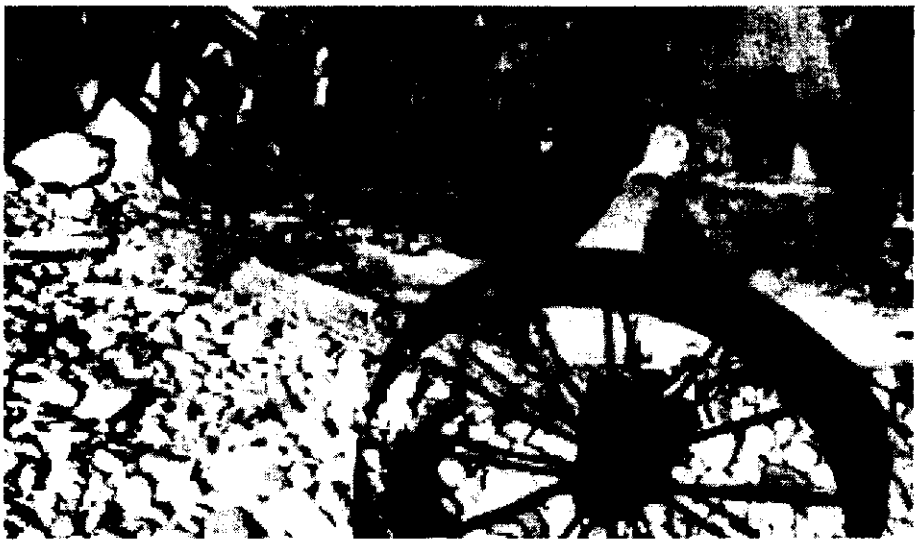


Diagram 3
Rajah 3

The rusting of iron can be affected by the present of other metal that is in contact with iron.
Pengaratan besi boleh dipengaruhi oleh kehadiran logam lain yang bersentuhan dengan besi.

Table 3 shows the results when metal P and metal Q are in contact with iron
Jadual 3 menunjukkan keputusan apabila logam P dan logam Q bersentuhan dengan besi.

Metal in contact with iron *Lagam yang bersentuhan dengan besi*	Results *Keputusan*
Metal P *Logam P*	Iron does not rust *Besi tidak berkarat*
Metal Q *Logam Q*	Iron rust *Besi berkarat*

Table 3
Jadual 3

Referring to the information above, plan a laboratory experiment to investigate the effect of named metals P and Q on the rusting of iron and arrange the position of metal P, Q and iron in electrochemical series.

Merujuk kepada maklumat di atas, rancangkan satu eksperimen dalam makmal untuk mengkaji kesan logam-logam P *dan* Q *yang dinamakan ke atas pengaratan besi dan susunkan kedudukan lagam P,Q dan besi dalam siri elektrokimia.*

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

(a) Aim of the experiment
Tujuan eksperimen.

(b) All the variables
Semua pembolehubah

(c) Hypothesis
Hipotesis

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

(e) Procedure
Prosedur

(f) Tabulation of data
Penjadualan data

[17 marks]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

SKEMA KERTAS KIMIA
PEPERIKSAAN PERCUBAAN SPM 2011 - KELANTAN

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

21	B
22	D
23	C
24	D
25	B
26	D
27	C
28	C
29	C
30	A
31	D
32	C
33	B
34	D
35	D
36	D
37	A
38	A
39	D
40	C

41	A
42	D
43	D
44	B
45	C
46	B
47	B
48	B
49	C
50	C

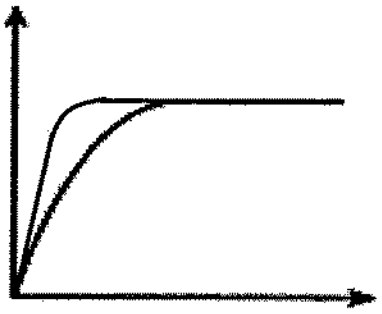
PAPER 2

NO			Description	Mark
1	(a)	(i)	Saponification	1
		(ii)	Concentrated sodium hydroxide solution	1
		(iii)	to lower the solubility of soap	1
		(v)	Grease: y	1
	(b)	(i)	Insoluble salt/a precipitate formed when soap reacts with hard water/calcium ion/magnesium ion //magnesium stearate//calcium stearate	1
		(ii)	Maagnesium ion//Calcium ion	1
	(c)	(i)	silicon dioxide	1
		(ii)	inert towards chemicals	1
		(iii)	Borosilicate glass	1
			Total	9

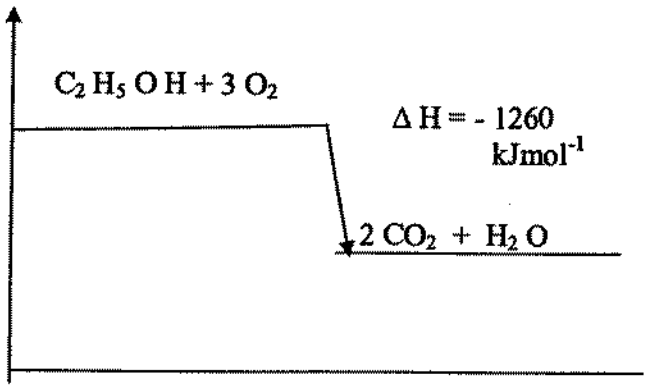
2	(a)	(i)	Cl	1
		(ii)	Ne	1
		(iii)	Al	1
	(b)		Ne, C, Cl, Al, Na	1
	(c)	(i)	1- correct number of electrons in the shell 2-correct ratio of atoms, labelled nucleus and the charge of ions.	1 1
		(ii)	Ionic compound	1
		(iii)	Electrostatic force	1
		(iv)	High melting/boiling point//Soluble in water// Conduct electricity in molten state and aqueous solution	1
			Total	9

3	(a)	(i)	Y	1
		(ii)	Silver nitrate	1
		(iii)	$Ag \rightarrow Ag^+ + e$	1
	(b)	(i)	P : Anode Q : Cathode	1 1
		(ii)	No change in concentration of Cu^{2+} ion. The rate of formation of copper(II) ions, Cu^{2+} at the anode is the same as the rate of discharge of copper(II) ions, Cu^{2+} at the cathode	1 1
	(c)	(i)	Aluminium	1
		(ii)	Aluminium is more electronegative tahan copper	1
		(iii)	$Cu^{2+} + 2e \rightarrow Cu$	1
			Total	10

4	(a)		zinc carbonate	1
	(b)	(i)	Hot – yellow Cold - white.	1+1
		(ii)	The lime water turns chalky.	1
	(c)	(i)	Neutralization	1
		(ii)	Colourless	1
		(iii)	$ZnO + 2HNO_3 \rightarrow Zn(NO_3)_2 + H_2O$	1
	(d)		Name of the reagent Procedure of the test. Observation.	1 1 1
			Total	10

5	(a)	(i)	$Zn + 2HCl \rightarrow ZnCl_2 + H_2$	1+1
		(ii)	Mol = 0.2 x 25 /1000//0.005 Mol H_2 = 0.005/2//0.0025 Volume of H_2 = 0.0025 x 24000//60cm^3	1 1 1
	(b)	(i)	 Slope of the curve is steeper Maximun volume is the same	 1 + 1
		(ii)	Size of zinc//Total surface area of the zinc	1

		(iii)	Rate of experiment 2 is higher than experiment 1 When the total surface area is higher The frequency of collision between zinc atom and H^+ is increased The frequency of effective collision betwee particles is increased	1 1 1
			Total	11

6	(a)	(i)	Ethanol	1
		(ii)	The heat released when one mole of ethanol completely burnt in oxygen (under standard conditions) is 1260 kJ	1
	(b)	(i)	No of moles of alcohol = 0.23 / 46 = 0.005 mol 1 mol of alcohol burnt released 1260 kJ Thus, 0.005 mol of alcohol burnt released 6.3 kJ	1 1 1
		(ii)	mcø = 6.3 kJ mcø = 6.3 x 1000 Ø = 6300/ 200 x 4.2 = 7.5 ^{0} C	1 1
	(c)		Heat is lost to the surrounding // Heat is absorbed by the apparatus or containers // Incomplete combustion of alcohol	1
	(d)		Energy  Label energy and diagram has 2 different energy levels Balanced chemical equation	1+1
	(e)		- 2656 kJmol^{-1} // 2500-2700 kJmol^{-1}	1
			Total	11

Section B

<table>
<tr><th colspan="3">NO</th><th>Description</th><th>Mark</th></tr>
<tr><td>7</td><td>(a)</td><td>(i)</td><td>Numbor of electron: 92
Number of neutron: 146</td><td>1
1</td></tr>
<tr><td></td><td></td><td>(ii)</td><td>Number of proton for both atoms are similar
Number of neutron for both atom are different</td><td>1
1</td></tr>
<tr><td></td><td>(b)</td><td>(i)</td><td>1 - Label axis correctly and correct shape of graph
2 - Show melting point on the graph
3 - Show boiling point on the graph</td><td>1+1
1
1</td></tr>
<tr><td></td><td></td><td>(ii)</td><td>
<table>
<tr><th>At 30°C</th><th>At 80°C</th></tr>
<tr><td>Arrangement of X particles in the solid state is closely packed and in orderly manner and fixed position.</td><td>Arrangement of X particles in the liquid state is packed slightly loose and not in orderly/disorderly manner</td></tr>
<tr><td>Force of attraction between X particles is very strong.</td><td>Force of attraction between X particles is moderately strong.</td></tr>
<tr><td>X particles have low kinetic energy.</td><td>X particles have moderately high kinetic energy.</td></tr>
</table>
</td><td>1+1
1+1
1+1</td></tr>
<tr><td></td><td>7(c)</td><td colspan="2">
<table>
<tr><td>Element</td><td>Carbon, C</td><td>Hydrogen, H</td><td>Nitrogen, N</td></tr>
<tr><td>Mass/g</td><td>74.10</td><td>8.64</td><td>17.26</td></tr>
<tr><td>Number of moles</td><td>$\frac{74.10}{12}$ // 6.175</td><td>$\frac{8.64}{1}$ // 8.64</td><td>$\frac{17.26}{14}$ // 1.233</td></tr>
<tr><td>Ratio of moles</td><td>$\frac{6.175}{1.233}$ // 5</td><td>$\frac{8.64}{1.233}$ // 7</td><td>$\frac{1.233}{1.233}$ // 1</td></tr>
<tr><td>Empirical formula</td><td colspan="3">C_5H_7N</td></tr>
</table>

$[C_5H_7N]_n = 162$
$[5(12) + 7(1) + 14]n = 162$
$81n = 162$
$n = 2$
Molecular formula of nicotine is $C_{10}H_{14}N_2$
</td><td>1
1
1
1
1
1</td></tr>
<tr><td></td><td></td><td colspan="2">Total</td><td>20</td></tr>
</table>

NO			Description	Mark
8	(a)		1. 1 mol of hydrochloric acid produce 1 mol of hydrogen ion. 2. to neutralize 1 mol of OH^- from NaOH. 3. 1 mol of sulphuric acid produce 2 mol of hydrogen ion 4. to neutralize 2 mol of OH^- from NaOH	1 1 1 1
	(b)	(i)	1. Mole of KOH = 14.0/56 // 0.25 2. Concentration of NaOH = 0.25 x 1000/250 //1.0 mol dm^{-3}	1 1
		(ii)	1. KOH + HCl → KCl + H_2O 2. M_{HCl} = 1.0 x 25.0/24.5 // 1.02 mol dm^{-3}	1 1
		(iii)	1. Mole of KCl = mole of KOH = 1.0 x 25/1000 // 0.025 2. Mass of KCl = 0.025 x 74.5 // 1.86	1 1
	(c)	(i)	HCl: 1. Concentration of acid increases, pH values decreases. 2. The concentration of H^+ increases. 3. Acid becomes more acidic NaOH: 1. Concentration of alkali increases, pH values increases 2. The concentration of OH^- increases 3. Alkali becomes more alkaline.	 1 1 1 1 1 1
		(ii)	1. Ethanoic acid is a weak acid and hydrochloric acid is a strong acid. 2. Ethanoic acid dissociates partially and hydrochloric acid dissociates completely in water. 3. The concentration of H^+ in ehanoic acid is lower. 4. The lower the concentration of H^+ the higher the pH value.	1 1 1 1
			Total	**20 m**

Section C

NO			Description	Mark
9	(a)	(i)	Able to draw the structural formula of methane	1
		(ii)	1- C_2H_4 2- Ethene	1 1....2
		(iii)	1- Methane is saturated hydrocarbon 2- Cannot undergoes addition reaction with bromine 3- Ethene is unsaturated hydrocarbon //Ethene has double bond between carbon atom 4- Ethene undergoes addition reaction with bromine 5- To form 1,2 dibromo ethane	1 1 1 1 1.....5
	(b)	(i)	Reaction I : $C_3H_6 + [O] + H_2O \rightarrow C_3H_6(OH)_2$ 1- Correct formulae of reactants 2- Correct formula of product and balance Reaction III : $C_3H_6 + H_2 \rightarrow C_3H_8$ 1- Correct formulae of reactants 2- Correct formula of product and balance	 1 1 1 1 4
		(ii)	Able to write the correct structural formula of propane-1-ol.	1
		(iii)	1.Propene is reacted with 2-steam 3-at 300°C 4-and 60 atm 5-in presence of pbosphoric acid 6,7- $C_3H_6 + H_2O \rightarrow C_3H_7OH$ 1- Correct formulae of reactants 2- Correct formula of product and balance	1 1 1 1 1 2.....7
			Total	20

No			Description	Mark
10	(a)		1. Add chlorine/ bromine water to the solution. 2. $Cl_2 + 2Fe^{2+} \rightarrow 2Fe^{3+} + 2Cl^- // Fe^{2+} \rightarrow Fe^{3+} + e$ 3. Fe^{2+} is oxidize to Fe^{3+} 4. Fe^{2+} is green colour and Fe^{3+} brown colour.	1 1 1 1
	(b)	(i)	1. Metal X is more electropositive than copper. 2. Atom X oxidizes 3. Cu^{2+} ion reduces to copper 4. Number of Cu^{2+} decreases. 5. Metal Y is less electropositive than copper.	1 1 1 1 1
		(ii)	Y, Cu, X	1
	(c)	(i)	Materials and apparatus: 1. 1 mol dm^{-3} of P nitrate, Q nitrate, R nitrate and S nitrate solutions. 2. Metals P, Q, R and S strips. 3. Sandpaper 4. Test tubes and test tube rack Procedure: 1. Clean/rub the metal strips with the sandpaper. 2. Pour 5 cm^3 of solutions P nitrate, Q nitrate, R nitrate and S nitrate into four separate test tubes. 3. Place a strip of metal P into each of solution in the test tubes. 4. Record any observation after 5 minutes. 5. Repeats steps 2 to 4 using strips of metals Q, R and S to replace metal P.	1+1 1 1 1 1 1
		(ii)	Results; A solution containig Metal | Metal ion P | Metal ion Q | Metal ion R | Metal ion S P | | x | x | x Q | √ | | x | x R | √ | √ | | x S | √ | √ | √ | √ = reaction occurs x = no reaction Or S can displace all metals P, Q and R. P cannot displace any metals. R can displace metal Q and P.	 1 1 1

			Conclusion: S is most electropositive, P is least electropositive and R is more electropositive than Q.	1 Max10/ 11
			Total	20 m

Paper 3

Question	Mark Scheme	Score
1(a)	Able to state **three** observations correctly Sample answer Set I : Ammeter needle not deflect. Set II : Ammeter needle deflected. Set III : Ammeter needle not deflect.	3
	Able to state any **two** observations correctly	2
	Able to state any **one** observation correctly	1
	No response or wrong response	0

Question	Mark Scheme	Score
1(b)	Able to state the inference for the experiment correctly. Sample answer Molten lead(II) bromide can conduct electricity Molten naphthalene and sulphur cannot conduct electricity	3
	Able to state any **one** inference above	2
	Able to give idea on electrical conductivity Sample answer Electrical conductivity depends on type of compound.	1
	No response or wrong response	0

Question	Mark Scheme	Score
1(c)	Able to state the operational definition correctly. Sample answer Ammeter needle deflected when the circuit is completed.	3
	Able to state the operational definition Sample answer	2

	Ammeter needle deflected.	
	Able to give an idea of the operational definition Sample answer The flow of current.	1
	No response or wrong response	0

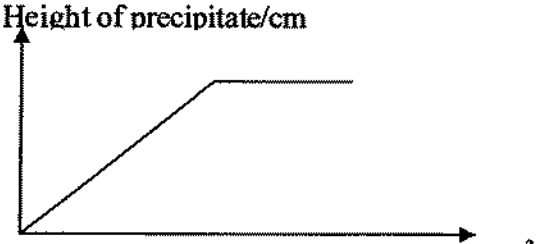
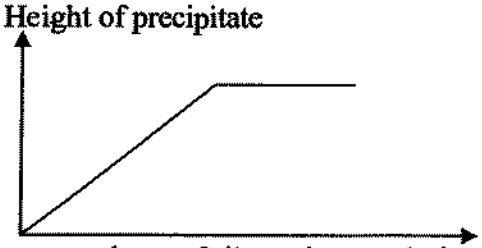
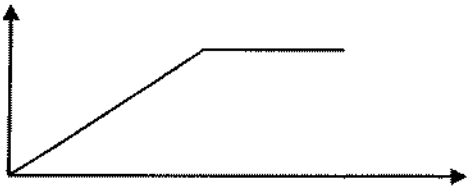
Question	Mark Scheme	Score
1(d)	Able to state the hypothesis correctly. Sample answer Electrolyte can conduct electricity while non-electrolyte cannot conduct electricity.	3
	Able to state a bypothesis. Sample answer Electrolyte can conduct electricity // Non-electrolyte cannot conduct electricity.	2
	Able to give an idea of bypothesis. Sample answer Electrical conductivity depends on the type of substances.	1
	No response given / wrong response	0

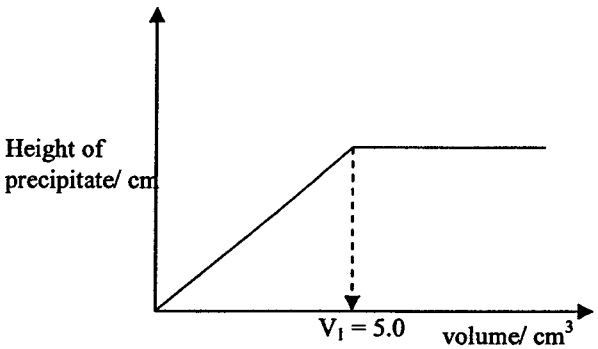
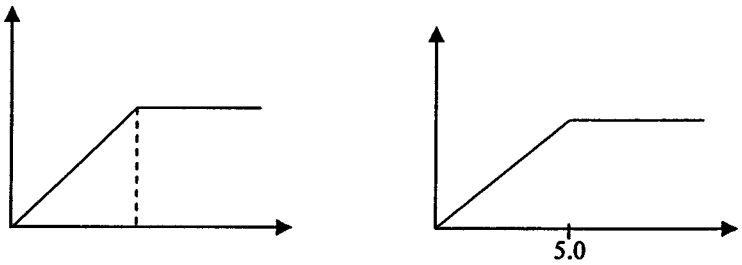
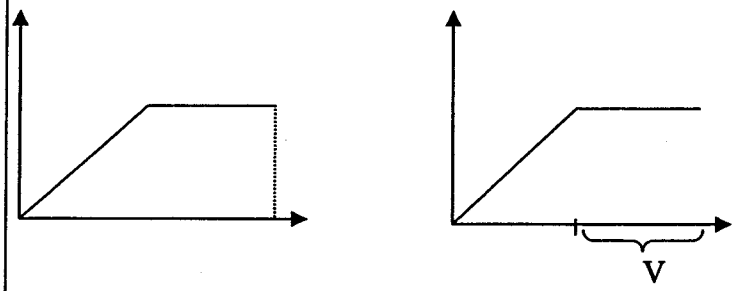
Question	Mark Scheme	Score
1(e)	Able to state the **three** variables correctly. Sample answer 1. Manipulated variable : Electrolyte and non-electrolyte 2. Responding variable : Ammeter reading 3. Constant variable: Mass of substance	3
	Able to state any **two** variables correctly.	2
	Able to state any **one** variable correctly.	1

	No response given / wrong response	0

Question	Mark Scheme	Score
1(f)	Able to classify ionic compounds and covalent compound into their group correctly Answer *Ionic compounds*: Lead(II) bromide *Covalent compounds*: naphthalene, glucose	3
	Able to classify any **two** compounds correctly	2
	Able to classify any **one** compound correctly	1
	No response given / wrong response	0

Question	Mark Scheme	Score
2(a)	Able to record the burette readings and the volume of silver nitrate accurately. Answer: Final burette reading = 40.20 Initial burette reading = 47.20 Volume of silver nitrate(X) = 7.00	3
	Able to record the burette readings and the volume of silver nitrate correctly. Sample answer: Final burette reading = 40.2 Initial burette reading = 47.2 Volume of silver nitrate(X) = 7	2
	Able to record the burette reading or the volume of silver nitrate correctly.	1
	No response or wrong response	0

Question	Mark Scheme	Score
2(b)	Ahle to draw the grapb of height of precipitate against volume of silver nitrate solution by showing the following information. 1. The axes are labelled with unit correctly. 2. Constant scale and graph size more than 50%. 3. All the points are transffered correctly. 4. Correct and smooth graph Sample answer: Height of precipitate/cm  volume of silver nitrate solution/cm^3	3
	Ahle to draw the graph of beight of precipitate against volume of silver nitrate solution by showing the following information. 1. The axes are labelled or unit correctly. 2. Constant scale . 3. All the points are transffered correclly. 4. Correct and smooth graph Sample answer: Height of precipitate  volume of stlver nitrate solution	2
	Able to draw the graph of height of precipitate against volume of silver nitrate solution hy showing the following information. 1. Correct graph Sample answer: 	1
	No response or wrong response	0

Question	Mark Scheme	Score
2(c)(i)	Able to draw a line on the graph and state/mark the volume correctly. Answer:  	3
	Able to draw a line on the graph or state the volume correctly // 5.0 without line // draw a line without 5.0 Sample answer:  	2
	Able to give an idea to mark the volume of silver nitrate needed. Sample answer:  	1
	No response or wrong response	0

Question	Mark Scheme	Score
2(c)(ii)	Able to show the calculation number of mole Ag^+ , number of mole Cl^- and ratio number of mole . Answer: Number of mole Ag^+ = 5.0 x 1.0/1000 = 0.005 mol Number of mole Cl^- = 5.0 x 1.0/1000 = 0.005 mol No. of mole Cl^- react with 1 mol of Ag^+ = #0.005/0.005# = 1 mol	3
	Able to show the calculation/ number of mole Ag^+ and number of mole Cl^- // ratio number of mole . Sample answer: Number of mole Ag^+ = 5.0 x 1.0/1000 = 0.005 mol Number of mole Cl^- = 5.0 x 1.0/1000 = 0.005 mol OR Ag^+ : Cl^- = 5.0 x 1/1000 : 5.0 x 1/1000 // 1 : 1	2
	Able to show the calculation [number of mole Ag^+] // [number of mole Cl^-]. Sample answer: Number of mole Ag^+ = 5.0 x 1.0/1000 = 0.005 mol OR Number of mole Cl^- = 5.0 x 1.0/1000 = 0.005 mol	1
	No response or wrong response	0

Question	Mark Scheme	Score
2(d)	Able to predict the height of precipitate with unit correctly Answer: 3.5 cm	3
	Able to predict the height of precipitate without unit. Answer: 3.5	2
	Able to give an idea of predicting the height of precipitate Sample answer: More than 3 and less than 4.	1
	No response or wrong response	0

Score	Explanation/Rubric	Maximum score
3(a)	*Able to give the aim of the experiment by relating the following 4 information correctly:* *1. different metals* *2. contact* *3. rusting* *4. arrange the position* Sample answer: To investigate the effect of different type of metals/ (metals P and Q) which is in contact with iron on the rusting of iron and arrange the position of metals P, Q and iron in electrochemical series.	3
	Able to give the aim of the experiment by relating the following 3 information correctly: *1. different metals* *2. contact* *3. rusting* Sample answer: To investigate the effect of different type of metals/ (metals P and Q/) in contact with iron affect rusting of iron. a: problem statement	2
	Able to give an idea of aim of experiment. Sample answer: To investigate the effect of different type of metals on rusting//Does metal P/Q metal affect iron rusting?	1
	No response or wrong response.	0

[KK051202-To state all variables]

Score	Explanation/Rubric	Maximum score
3(b)	*Able to state all variables correctly:* Sample answer: *Manipulated variable*: metal P and metal Q // stating 2 metals which one metal is less electropositive and one metal is more electropositive than iron.// pairs of P-Fe and Q-Fe *Responding variable*: the rusting of iron // iron rusts or does not rust // [any	3

	suitable observations: e.g. the formation of blue spot// the formation of pink colour // the formation of brown solid] *Fixed variable*: iron nail// electrolyte // agar/jelly solution //temperature// potassium hexacyanoferrate(III) solution// phenolpthacin solution	
	*Able to state **any two** variables correctly.*	2
	*Able to state **any one** variable correctly.*	1
	No response or wrong response.	0

[KK051202-To state a hypothesis]

Score	Explanation/Rubric	Maximum score
3(c)	*Able to state the relationship between the manipulated variable and the responding variable with direction correctly:* Sample answer: Metal Q causes iron nail rusting while metal P does not.// A more electropositive metal/(metal P) will prevent iron from rusting while a less electropositive metal (metal Q) will be rusting iron.	3
	Able to state the relationship between the manipulated variable and the responding variable: Sample answer: Metal Q speeds up iron nail rusting while metal P slows down rusting.	2
	Able to state an idea of hypothesis: Sample answer: Metal P / Q affect the rusting of iron.	1
	No response or wrong response.	0

[KK051203-list of materials and apparatus]

Score	Explanation/Rubric	Maximum score
3(d)	*Able to give a complete list of materials and apparatus that involves the following:*	3

	1. *iron nails* 2. *1 metal above iron in electrochemical series* 3. *1 metal below iron in electrochemical series* 4. *A suitable electrolyte, test-tubes, sand paper, test tube rack* Sample answer: Iron nails, magnesium/zinc/aluminium strip, tin/copper/lead/silver strip, [agar-agar solution + potassium hexacyanoferrate(III) solution+phenolphthalein indicator]/[any suitable electrolyte]/[water], test-tubes/boiling-tubes, sand paper	
	Able to give a list of materials and apparatus that involves the following: 1. *1 metal above iron in electrochemical series* 2. *1 metal below iron in electrochemical series* 3. *Any suitable electrolyte, any suitable container*	2
	Able to give a list of materials and apparatus that involves the following: 1. *1 metal above/below iron in electrochemical series// any suitable electrolyte.* 2. *any container*	1
	No response or wrong response.	0

[KK051203-procedure of the experiment]

Score	Explanation/Rubric	Maximum score
3(e)	*Able to state the following 6 steps:* 1. *[Clean the iron nails and metals strip with sand paper]* 2. *[Coil iron nails with the metals]* 3. *[Place iron nails in separate container]* 4. *[Pour/add/fill the [named electrolyte] into the container]* 5. *[Leave them aside for several days]* 6. *[Record your observation]* Sample answer: 1. Clean iron nails, magnesium ribbon and copper strip with sand paper. 2. Coil two iron nails tightly with magnesium ribbon and copper strip. 3. Place all the iron nails in separate test tubes. 4. Pour the bot agar containing potassium hexacyanoferrate(III) solution and phenolphthalein indicator into the test tubes. 5. Keep the test tubes in a test tube rack and leave them aside for 3 days. 6. Record your observations.	3

	Steps 2,4,6	2
	Step 2[coil iron nail with Mg/Cu], 4	1
	No response or wrong response.	0

[KK051202-To make tabulation of data]

Score	Explanation/Rubric	Maximum score
3(f)	*Able to exhibit the tabulation of data that includes the following four information.* *1. Heading for the manipulated variables* — *Set//pair of metals* *2. Examples of Sets//pair of metals* — *I, II//Mg-Fe, Cu-Fe* *3. Heading for responding variable* — *observation* *4.2x3 or 3x2 table* Sample answer: Set//Pair of metals | Observation I//Mg-Fe | II//Cu-Fe |	2
	Able to exhibit the tabulation of data that includes the following two information. *1. 1/3 from score 2* *2. 2x2 table* Sample answer: Set//Pair of metals | Observation |	1
	No response or wrong response.	0

END OF MARKING
SKEMA PEMARKAHAN TAMAT