4541/1
Percubaan
SPM
Chemistry
2010
Paper 1
1¼ hours

PEPERIKSAAN PERCUBAAN
SIJIL PELAJARAN MALAYSIA
NEGERI PERAK
2010

CHEMISTRY

PAPER 1

One hour and fifteen minutes
Satu jam lima belas minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. Kertas soalan ini adalah dalam dwibahasa

2. Soalan dalam bahasa Inggeris mendahului soalan yang sepadan dalam Bahasa Melayu.

3. Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini.

Kertas soalan ini mengandungi 20 halaman bercetak.

1 What is the process in which a liquid changes to gas?
Apakah proses di mana suatu cecair bertukar kepada gas?

A Condensation
Kondensasi
B Evaporation
Penyejatan
C Sublimation
Pemejalwapan
D Freezing
Pembekuan

2 Diagram 1 shows the cooling curve of a molten substance.
Rajah 1 menunjukkan lengkung penyejukan bagi suatu bahan leburan.

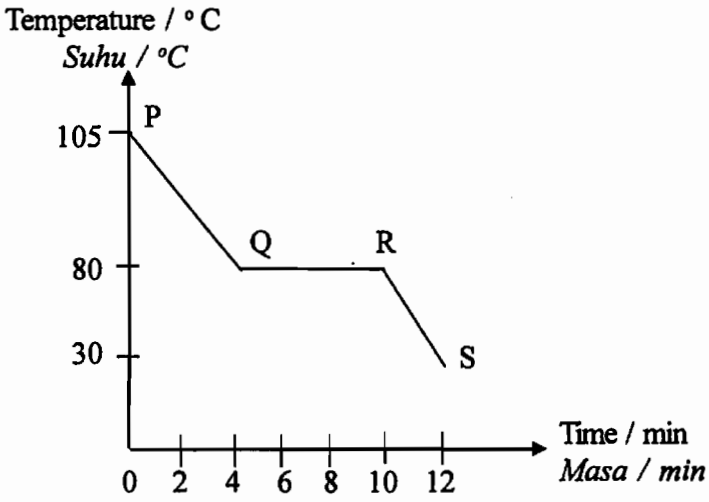


Diagram 1
Rajah 1

Which statements are true?
Pernyataan manakah yang benar?

A It is a solid at 40 °C
Bahan ini adalah pepejal pada 40 °C
B Its freezing point is 105 °C
Takat beku bahan ini ialah 105 °C
C At point R, it starts to change to the solid state
Pada titik R, bahan ini mula bertukar kepada keadaan pepejal
D At the sixth minute, the substance is in a liquid state
Pada minit keenam, bahan ini dalam keadaan cecair

3 The formula for a carbonate ion is CO_3^{2-} and for a nitrate ion is NO_3^-. If the formula for a carbonate salt of *P* is PCO_3, what is the formula of the nitrate salt of *P*?
Formula bagi ion carbonate ialah CO_3^{2-} dan bagi ion nitrat ialah NO_3^- . Jika formula bagi garam carbonate untuk adalah PCO_3, apakah formula bagi garam nitrat untuk P?

A PNO_3
B P_2NO_3
C $P(NO_3)_2$
D $P(NO_3)_3$

4 The following statement refers to the contributions of a scientist in the development of the Periodic Table.
Pernyataan berikut merujuk kepada sumbangan seorang ahli sains dalam membangunkan Jadual Berkala.

> Elements are arranged in order of increasing atomic mass in The Periodic Table and grouped them according to similar chemical properties.
> *Unsur-unsur disusun mengikut jisim atom menaik dalam Jadual Berkala dan mengumpulkan unsur-unsur itu mengikut sifat kimia yang sama.*

Who was the scientist?
Siapakah ahli sains itu?

A Johann Dobereiner
B John Newlands
C Lothar Meyer
D Dimitri Mendeleev

5 Which of the following is **true** about elements in the Periodic Table?
*Antara yang berikut manakah **benar** tentang unsur-unsur dalam Jadual Berkala?*

A The metallic properties increases from left to right across a period.
Sifat kelogaman bertambah apabila merentasi Jadual Berkala dari kiri ke kanan.
B Elements of the same group have the same physical properties.
Unsur-unsur dalam kumpulan yang sama mempunyai sifat fizik yang sama.
C Group 18 elements have low melting and boiling points.
Unsur-unsur kumpulan 18 mempunyai takat lebur dan takat didih yang rendah.
D Group 17 elements exist naturally as monoatoms.
Unsur-unsur kumpulan 17 wujud semulajadi sebagai monoatom.

6 M is an ionic compound and dissolves in water to form a solution that conducts electricity.
M adalah sebatian ionik dan larut dalam air untuk menghasilkan larutan yang boleh mengalirkan arus elektrik.

Which of the following could be compound M?
Yang manakah antara berikut adalah sebatian M ?

A Sodium chloride
Natrium klorida
B Silver chloride
Argentum klorida
C Barium sulphate
Barium sulfat
D Lead(II) sulphate
Plumbum(II) sulfat

7 Table 1 shows the proton number of five atoms U, V, W, X and Y.
Jadual 1 menunjukkan nombor proton bagi lima atom U, V, W, X dan Y.

Atom / *Atom*	**Proton number / *Nombor Proton***
U	10
V	12
W	14
X	17
Y	19

Table 1
Jadual 1

Which of the following pairs formed a compound with high melting and boiling points?
Antara pasangan berikut yang manakah membentuk sebatian yang mempunyai takat lebur dan takat didih yang tinggi?

A U and W
U dan W

B V and Y
V dan Y

C X and Y
X dan Y

D W and X
W dan X

8 Which of the following is true about electrolytes?
Antara berikut yang manakah benar tentang elektrolit?

A Elements that conduct electricity in molten state
Unsur yang boleh mengalir arus elektrik dalam keadaan leburan

B Compounds that conduct electricity in solid state
Sebatian yang boleh mengalir arus elektrik dalam keadaan pepejal

C Elements that conduct electricity in solid or molten state
Unsur yang boleh mengalir arus elektrik dalam keadaan pepejal dan leburan

D Compounds that conduct electricity in molten state or aqueous solution
Sebatian yang boleh mengalir arus elektrik dalam keadaan leburan dan larutan akues

9. Which of the following is a weak acid?
Antara berikut yang manakah asid lemah?

A Nitric acid
Asid nitrik

B Ethanoic acid
Asid etanoik

C Sulphuric acid
Asid sulfurik

D Hydrochloric acid
Asid hidroklorik

10 Which of the following salt dissolves in water?
Antara garam berikut, yang manakah larut dalam air?

A Sodium carbonate
Natrium karbonat

B Magnesium carbonate
Magnesium karbonat

C Calcium sulphate
Kalsium sulfat

D Lead(II) chloride
Plumbum(II) klorida

11 Which of the following pairs of solutions form a precipitate when mixed together?
Yang manakah antara pasangan larutan-larutan berikut membentuk mendakan apabila dicampurkan?

A Dilute hydrochloric acid and silver nitrate solution
Asid hidroklorik cair dan larutan argentum nitrat
B Dilute nitric acid and potassium carbonate solution
Asid nitrik cair dan larutan kalium karbonat
C Dilute nitric acid and calcium carbonate solution
Asid nitrik cair dan larutan kalsium karbonat
D Dilute hydrochloric and magnesium carbonate solution
Asid hidrokloric cair dan larutan magnesium karbonat

12 Diagram 2 shows a motorcycles' helmet which is made from a composite material.
Rajah 2 menunjukkan topi keledar motosikal yang diperbuat daripada bahan komposit.

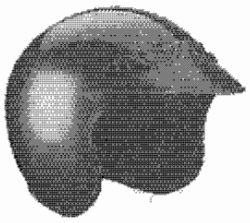


Diagram 2
Rajah 2

Which of the following is the property of the composite material?
Di antara berikut yang manakah ciri-ciri bahan komposit?

A High tensile strength
Kemuluran yang tinggi
B Hard and brittle
Keras dan rapuh
C Heat resistant
Tahan haba
D Transparent
Lutsinar

13 The reaction between zinc and hydrochloric acid is represented by the following chemical equation:
Tindakbalas antara zink dengan asid hidroklorik diwakili oleh persamaan kimia berikut

$$Zn + 2HCl \rightarrow ZnCl_2 + H_2$$

Which of the following methods is the **most** suitable to determine the rate of the above reaction?
Antara kaedah berikut yang manakah paling sesuai untuk menentukan kadar bagi tindak balas di atas?

A Determine the change in temperature of the solution with time
Menentukan perubahan suhu larutan berkadar dengan masa
B Determine the change in the concentration of zinc chloride with time
Menentukan perubahan kepekatan zink berkadar dengan masa
C Determine the volume of hydrogen gas given off with time
Menentukan isipadu gas hidrogen yang dihasilkan berkadar dengan masa
D Determine the change in the concentration of hydrochloric acid with time
Menentukan perubahan kepekatan asid hidroklorik berkadar dengan masa

14 Diagram 3 shows a curve *P* is obtained when excess sulphuric acid solution is mixed with 2 g of marble chips.
Rajah 3 menunjukkan lengkung P yang diperoleh apabila larutan asid sulfurik berlebihan dicampurkan dengan 2 g ketulan marmar.

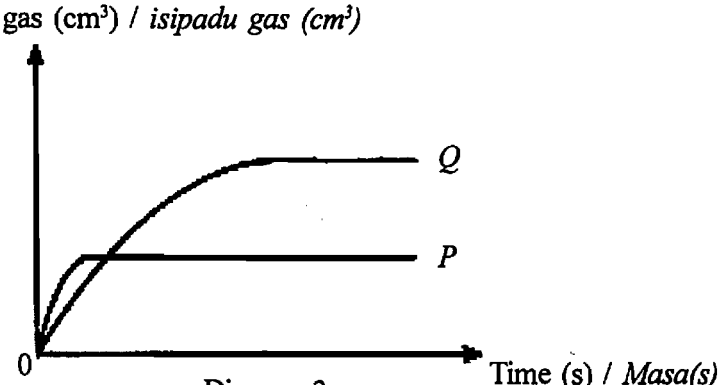


Diagram 3
Rajah 3

Which of the following change (s) will give rise to curve *Q*?
Di antara berikut perubahan manakah akan menghasilkan lengkung Q?

I Add distilled water into an acid and increase the mass of marble chips
Tambahkan air suling ke dalam asid dan menambahkan jisim ketulan marmar
II Increase the concentration of sulphuric acid
Meningkatkan kepekatan acid sulfurik
III Use marble chips with larger size
Gunakan ketulan marmar bersaiz besar
IV Use small size of marble chips
Gunakan saiz ketulan marmar yang kecil

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

15 The following equation shows an esterification reaction :
Persamaan berikut menunjukkan tindakbalas pengesteran :

Propanoic acid + ethanol → ester X + H_2O
Asid propanoik *etanol* *ester X* *air*

What is the molecular formula of ester X?
Apakah formula molekul bagi ester X?

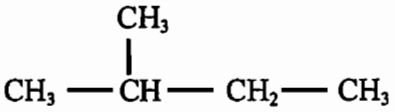
A $C_3H_7COOC_2H_5$
B $C_2H_5COOC_3H_7$
C $C_2H_5COOC_2H_5$
D $C_5H_{11}COOH$

16. The structural formula of organic compound is as follows:
Formula struktur sebatian organik adalah seperti berikut:

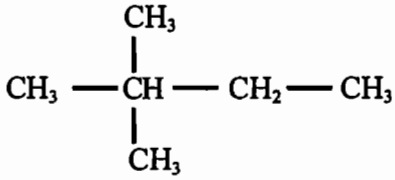
$CH_3 - CH_2 - CH_2 - CH_3$

Which of the following is the isomer for the above structure?
Antara yang berikut, yang manakah isomer bagi struktur di atas?

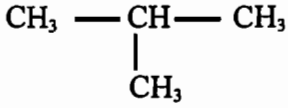
A



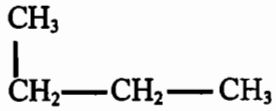
B



C



D



17 Which of the following is an oxidizing agent?
Antara berikut, yang manakah suatu agen pengoksidaan?

A Zinc
Zink

B Sulphur dioxide gas
Gas sulfur dioksida

C Potassium bromide solution
Larutan kalium bromida

D Acidified potassium dichromate(VI) solution
Larutan kalium dikromat(VI) berasid

18 Diagram 4 shows an energy level diagram.
Rajah 4 menunjukkan gambarajah aras tenaga.

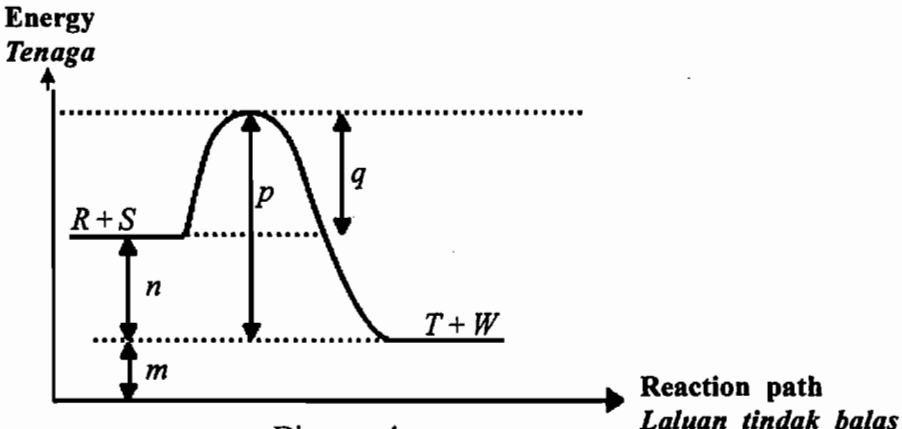


Diagram 4
Rajah 4

What is the activation energy for this reaction?
Apakah tenaga pengaktifan bagi tindak balas ini?

A *m*
B *n*
C *p*
D *q*

19. The following equation shows the reaction between potassium hydroxide solution and nitric acid.
Persamaan berikut menunjukkan tindak balas antara larutan kalium hidroksida dan asid nitrik.

$$KOH(aq) + HNO_3(aq) \longrightarrow KNO_3(aq) + H_2O(l) \qquad \Delta H = -57 kJ\ mol^{-1}$$

Which of the following statements is true?
Antara pernyataan berikut, yang manakah benar?

A The reaction is endothermic
Tindak balas ini adalah endotermik
B The heat is absorbed from the surroundings
Haba diserap dari persekitaran
C The temperature of the mixture rises
Suhu larutan campuran meningkat
D 57 kJ of heat energy is absorbed to form 1 mole of water
57 kJ tenaga haba diserap untuk membentuk 1 mol air

20 Which of the following is an analgesic?
Antara berikut yang manakah analgesic?

A Insulin
Insulin
B Penicillin
Penisilin
C Cortisone
Kortison
D Paracetamol
Parasetamol

21 Which of the following has the most number of atoms?
Antara berikut, yang manakah mempunyai bilangan atom paling banyak?

[Relative atomic mass: H, 1; C, 12; O, 16; S, 32]
[*Jisim atom relatif:* H, 1; C, 12; O, 16; S, 32]

A 2.0 g of hydrogen
2.0 g hidrogen
B 18.0 g of carbon
18.0 g karbon
C 30.0 g of oxygen
30.0 g oksigen
D 32.0 g of sulphur
32.0 g sulfur

22 Table 2 shows two elements and their respective relative atomic mass. The letters used are not the actual symbol of the elements.
Jadual 2 menunjukkan dua unsur dan jisim atom relatif masing-masing. Huruf yang digunakan adalah bukan simbol yang sebenar bagi unsur itu.

Element/ ***Unsur***	**Relative atomic mass/** ***Jisim atom relatif***
X	24
M	12

Table 2
Jadual 2

Which of the following is true about the atoms of elements X and M?
Antara berikut yang manakah benar tentang atom bagi unsur X dan M?

A The mass of 1 mol of X is twice the mass of 1 mol of M
Jisim 1 mol bagi X adalah dua kali jisim 1 mol bagi M

B 1 mol of X has the same mass as 1 mol of M
Jisim 1 mol bagi X adalah sama jisim 1 mol bagi M

C The mass of an atom of X is 24 g and the mass of an atom of M is 12 g
Jisim 1 atom bagi X adalah 24 g dan jisim 1 atom bagi M adalah 12 g

D The number of mole in 12 g of atom X is equal to the number of mole in 12 g of atom M
Bilangan mol dalam 12 g bagi atom X adalah sama dengan bilangan mol dalam 12 g bagi atom M

23 A new element called Newbie, Nw is discovered. It is above Flourine in Group 17 of the Periodic Table of Element.
Which of the following statements are **correct** about Newbie?
Satu unsur baru dinamakan Newbie, Nw telah ditemui. Ia terletak di atas Florin dalam Kumpulan 17 dalam Jadual Berkala Unsur.
*Antara pernyataan berikut, yang manakah **benar** tentang Newbie?*

I It is a non-metal
Ia adalah bukan logam

II It is the most reactive element in Group 17.
Ia adalah unsur paling reaktif dalam Kumpulan 17.

III It is the most electronegative element in Group 17.
Ia adalah unsur yang paling elektronegatif dalam Kumpulan 17.

IV It exist as gaseous at room conditions.
Ia adalah gas pada keadaan bilik.

A I and II only
I dan II sahaha

B II and III only
II dan III sahaja

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

D I, II, III and IV
I, II, III dan IV

24 The number of valence electrons for atoms X and Y are 5 and 7 respectively.
Which of the following chemical formula and type of bonding formed between X and Y?
Bilangan elektron valens bagi atom X dan Y ialah 5 dan 7 masing-masing.
Antara berikut yang manakah formula kimia dan jenis ikatan yang terbentuk antara X dan Y?

	Chemical Formula/ ***Formula kimia***	**Type of bonding/** ***Jenis ikatan***
A	XY_2	Ionic/ *ionik*
B	XY_2	Covalent/ *Kovalen*
C	XY_3	Ionic/ *ionik*
D	XY_3	Covalent/ *Kovalen*

25 Diagram 5 shows that the set up of the apparatus to build a chemical cell.
Rajah 5 menunjukkan susunan radas untuk membina sebuah sel kimia.

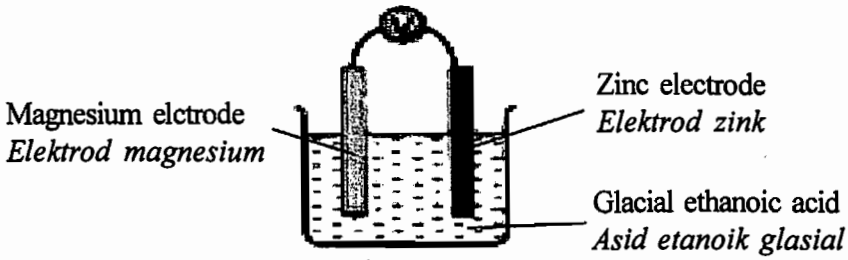


Diagram 5
Rajah 5

It was found that there is no deflection on the voltmeter needle.
What should be done to make sure that the voltmeter needle deflects?
Didapati bahawa jarum voltmeter tidak terpesong.
Apakah yang perlu dilakukan supaya jarum voltmeter terpesong?

A Add water into the glacial ethanoic acid.
Tambahkan air ke dalam asid etanoik glasial.
B Add the number of dry cells in the circuit.
Tambahkan bilangan sel kering di dalam litar.
C Substitute the zinc electrode with an aluminium electrode.
Gantikan elektrod zink dengan elektrod aluminium.
D Substitute the magnesium electrode with an iron electrode.
Gantikan elektrod magnesium dengan elektrod besi.

26 Which of the following is true about acid?
Antara pernyataan berikut, yang manakah benar tentang asid?

A Turns red litmus paper to blue
Menukarkan kertas litmus merah ke biru
B React with alkali to release oxygen gas
Bertindak balas dengan alkali membebaskan gas oksigen
C React with magnesium hydroxide to release hydrogen gas
Bertindak balas dengan magnesium hidroksida membebaskan gas hidrogen
D Reacts with calcium carbonate to release carbon dioxide gas
Bertindak balas dengan kalsium karbonat membebaskan gas karbon dioksida

27 Which of the following acids produce the highest rate of reaction when reacts with 1 g of zinc powder?
Antara asid berikut yang manakah menghasilkan kadar tindak balas yang paling tinggi apabila bertindak balas dengan 1 g serbuk zink?

A 50 cm^3 of 1.0 mol dm^{-3} nitric acid
50 cm^3 asid nitrik 1.0 mol dm^{-3}
B 50 cm^3 of 1.0 mol dm^{-3} sulphuric acid
50 cm^3 asid sulfurik 1.0 mol dm^{-3}
C 50 cm^3 of 1.0 mol dm^{-3} ethanoic acid
50 cm^3 asid etanoik 1.0 mol dm^{-3}
D 50 cm^3 hydrochloric acid 1.0 mol dm^{-3}
50 cm^3 asid hidroklorik 1.0 mol dm^{-3}

28 Diagram 6 shows the atomic arrangements of substances X and Y
Rajah 6 menunjukkan susunan atom bahan X dan Y

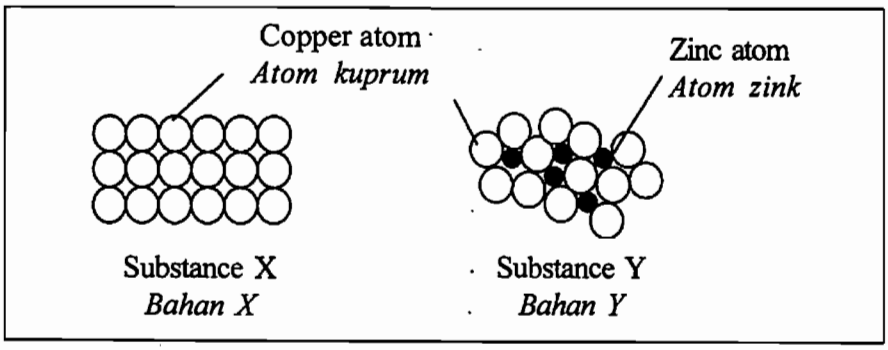


Diagram 6
Rajah 6

Substance Y is harder than substance X because atoms in Y
Bahan Y lebih keras daripada bahan X kerana atom-atom dalam Y

A are closer to each other
rapat antara satu sama lain
B are properly arranged
tersusun secara teratur
C do not slide easily
tidak menggelongsor dengan mudah
D are strongly bonded to each other
terikat dengan kuat antara satu sama lain

29 Which of the following chemical substances can be use to verify the cation and anion in a sample of ammonium chloride salt solution?
Antara berikut, bahan kimia yang manakah boleh digunakan untuk mengesahkan kation dan anion dalam satu sampel larutan ammonium klorida?

	Cation *Kation*	Anion *Anion*
A	Nessler reagent *Reagen Nessler*	Dilute nitric acid and silver nitrate *Asid nitrik cair dan argentum nitrat*
B	Nessler reagent *Reagen Nessler*	Dilute hydrochloric acid and barium chloride *Asid hidroklorik cair dan barium klorida*
C	Potassium thiocyanate *Kalium thiosianat*	Dilute nitric acid and silver nitrate *Asid nitrik cair dan argentum nitrat*
D	Potassium thiocyanate *Kalium thiosianat*	Dilute hydrochloric acid and barium chloride *Asid hidroklorik cair dan barium klorida*

30 Diagram 7 shows the arrangement of apparatus to study the transfer of electrons at a distance.
Rajah 7 menunjukkan susunan radas yang digunakan untuk mengkaji pemindahan elektron pada satu jarak.

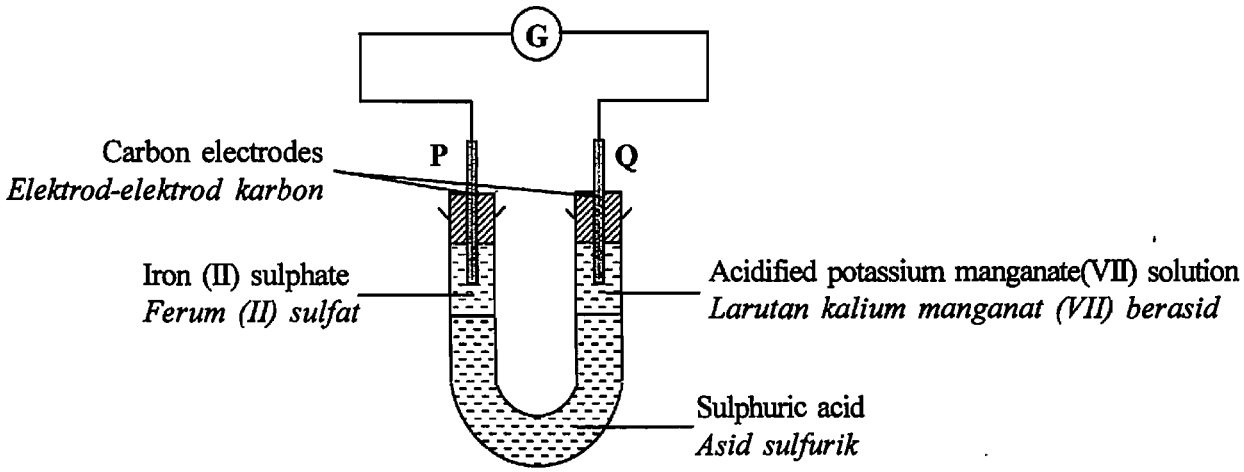


Diagram 7
Rajah 7

What is the colour of solution at electrode P and electrode Q at the end of the experiment?
Apakah warna larutan pada elektrod P dan elektrod Q pada akhir eksperimen itu?

	Electrode P	Electrode Q
A	Yellow *Kuning*	Colourless *Tidak berwarna*
B	Yellow *Kuning*	Hijau *Green*
C	Green *Hijau*	Orange *Jingga*
D	Green *Hijau*	Purple *Ungu*

31 Diagram 8 shows the graph of the volume of gas produced against time for the reaction between calcium carbonate and hydrochloric acid.
Rajah 8 menunjukkan graf isipadu gas yang terhasil melawan masa untuk tindak balas antara kalsium karbonat dan asid hidroklorik.

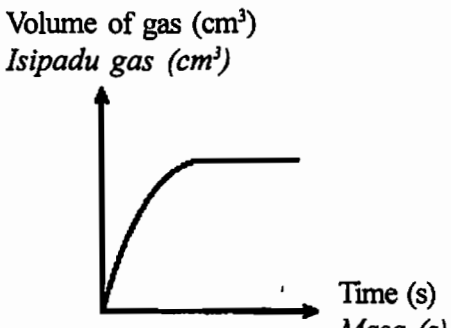


Diagram 8
Rajah 8

The gradient of the curve decreases with time because
Kecerunan lengkung berkurang dengan masa kerana

A hydrochloric acid is a type of monoprotic acid
asid hidroklorik adalah sejenis asid monobes
B temperature of reaction decreases
suhu tindak balas berkurang
C volume of mixture decreases
isipadu campuran berkurang
D concentration of hydrochloric acid decreases
kepekatan asid hidroklorik berkurang

32 The following chemical equation shows a reaction for ethanol.
Persamaan kimia berikut menunjukkan satu tindak balas bagi etanol.

$$C_2H_5OH \longrightarrow C_2H_4 + H_2O$$

What is the name of the reaction?
Apakah nama bagi tindak balas itu?

A Oxidation
Pengoksidaan
B Reduction
Penurunan
C Dehydration
Pendehidratan
D Fermentation
Penapaian

33 Which of the following chemical equation represent a redox reaction?
Antara persamaan kimia berikut, yang manakah mewakili tindak balas redoks?

A $Zn + 2HNO_3 \rightarrow Zn(NO_3)_2 + H_2$
B $Ca(OH)_2 + 2HNO_3 \rightarrow Ca(NO_3)_2 + 2H_2O$
C $MgCO_3 + 2HNO_3 \rightarrow Mg(NO_3)_2 + H_2O + CO_2$
D $CuO + 2HNO_3 \rightarrow Cu(NO_3)_2 + H_2O$

34 Diagram 9 shows a label on a bottle of 'Orange Juice SEGAR'
Rajah 9 menunjukkan satu label pada satu botol 'Jus Oren SEGAR'

Orange Juice SEGAR
Ingredients : water, sugar, ascorbic acid, sulphur dioxide, Aspartame, E110, E102, vitamin A and D.
Best before : 15 Dec 2010

Diagram 9
Rajah 9

What is the function of sulphur dioxide?
Apakah fungsi sulfur dioksida?

A To make the drink more concentrated
Menjadikan minuman lebih pekat
B To give colour to the drink
Memberi warna kepada minuman
C To give orange flavor to the drink
Memberi rasa oren kepada minuman
D To make the drink last longer
Menjadikan minuman tahan lama

35 Diagram 10 shows the structure of anion of soap.
Rajah 10 menunjukkan struktur anion bagi sabun

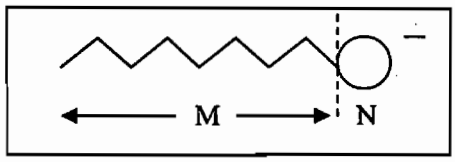


Diagram 10
Rajah 10

Which of the following is true about part M?
Antara berikut yang manakah benar tentang bahagian M?

A M is alkaline
M bersifat alkali
B Soluble in grease
Larut dalam gris
C M is hydrophilic
M bersifat hidrofilik
D Increase the surface tension of water
Meningkatkan ketegangan permukaan air

36 1.72 g of an oxide of metal P contains 0.8 g oxygen.
What is the empirical formula for the P oxide?
1.72 g oksida logam P mengandungi 0.8 g oksigen.
Apakah formula empirik bagi oksida P itu?
[Relative atomic mass : P= 46 ; O = 16]

A PO_2
B P_2O
C P_2O_3
D P_2O_5

37 A substance has a molar mass of 34 g mol^{-1}. What is the mass of 0.75 moles of the substance?
Satu sebatian mempunyai jisim molar 34 g mol^{-1}. Berapakah jisim bagi 0.75 mol sebatian tersebut?

A 0.02 g
B 19.8 g
C 25.5 g
D 45.3 g

38 Calculate the number of moles of calcium which has twice the number of atoms as in 12 g of magnesium?
Hitungkan bilangan mol kalsium yang mempunyai dua kali bilangan atom seperti dalam 12 g of magnesium?
[Relative atomic mass : N, 14]

A 0.5
B 1.0
C 2.0
D 4.0

39 Diagram 11 shows the electron arrangement of a compound formed between element T and element Q.
Rajah 11 menunjukkan susunan elektron bagi sebatian yang terbentuk antara unsur T dan unsur Q.

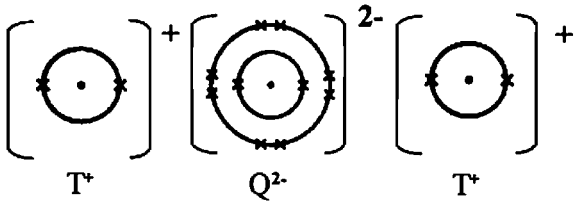


Diagram 11
Rajah 11

In which group is element Q located in the Periodic Table of Elements?
Dalam kumpulan manakah unsur Q terletak dalam Jadual Berkala Unsur?

A 2
B 8
C 16
D 18

40 What is the percentage of nitrogen by mass in ammonium nitrate, NH_4NO_3?
Apakah peratus nitrogen dalam ammonium nitrat NH_4NO_3 mengikut jisim?

[Relative atomic mass : H= 1, N = 14 ,O= 16]
[Jisim atom relatif : H= 1, N = 14, O= 16]

A 3.50 %
B 8.75 %
C 17.50 %
D 35.00 %

41 Table 3 shows the information of simple voltaic cells with four different pairs of metals.
Jadual 3 menunjukkan maklumat bagi sel kimia ringkas menggunakan empat pasangan logam berlainan.

Pair of metals *Pasangan logam*	**Potential difference (V)** *Beza upaya (V)*	**Metal at negative terminal** *Logam terminal negatif*
P and zinc *P dan zink*	1.50	Zinc *Zink*
Q and zinc *Q dan zink*	0.07	Zinc *Zink*
R and zinc *R dan zink*	0.50	*R*
S and zinc *S dan zink*	1.80	*S*

Table 3
Jadual 3

Which of the following is the arrangement of the metals in decreasing order of electropositivity?
Antara berikut yang manakah susunan logam-logam itu mengikut turutan ke elektropositifan menurun?

A P, Q, Zinc, R, S
P, Q, Zink, R, S
B R, S, Zinc, P, Q
R, S, Zink, P, Q
C Zinc, S, R, Q, P
Zink, S, R, Q, P
D S, R, Zinc, Q, P
S, R, Zink, Q, P

42 Table 4 shows the observation at the anode and cathode for the electrolysis of molten compound *X* using carbon electrodes.
Jadual 4 menunjukkan pemerhatian pada anod dan katod bagi elektrolisis leburan sebatian X menggunakan elektrod-elektrod karbon.

Cathode *Katod*	**Anode** *Anod*
A grey solid is deposited. *Pepejal kelabu terenap*	A brown gas is produced. *Gas perang terbebas*

Table 4
Jadual 4

What is compound *X*?
Apakah sebatian X?

A Copper(II) chloride
Kuprum(II) klorida
B Copper(II) bromide
Kuprum(II) bromida
C Lead(II) bromide
Plumbum(II) bromida
D Lead(II) chloride
Plumbum(II) klorida

43 An aqueous solution Q has pH value of 3.
Which of the following is true about Q?
Larutan akues Q mempunyai nilai pH 3.
Antara berikut yang manakah benar tentang Q?

A Q produces a high concentration of OH^- ion in water
Q menghasilkan kepekatan ion OH^- yang tinggi di dalam air
B Q reacts with an alkali to produce salt and water
Q bertindak balas dengan alkali menghasilkan garam dan air
C Q turns colourless phenolphthalein to pink
Q menukarkan larutan fenoltalein yang tidak berwarna kepada merah jambu
D Q ionizes completely in water
Q mengion lengkap di dalam air

44 Which of the following oxidation number of manganese in manganate ion, MnO_4^- and chromium in dichromate ion, $Cr_2O_7^{2-}$ is **correct** ?
Antara nombor pengoksidaan mangan dalam manganat ion, MnO_4^- dan kromium dalam dikromat ion, $Cr_2O_7^{2-}$ berikut yang manakah betul?

	$\underline{Mn}O_4^-$	$\underline{Cr}_2O_7^{2-}$
A	+4	+3
B	+7	+6
C	+6	+7
D	+3	+4

45 The following chemical equation represents a reaction between magnesium oxide and sulphuric acid.
Persamaan kimia berikut mewakili tindak balas antara magnesium oksida dan asid sulfurik.

$$MgO + H_2SO_4 \longrightarrow MgSO_4 + H_2O$$

What is the mass of magnesium sulphate formed when 2.0 g of magnesium oxide is reacted with excess sulphuric acid?
Apakah jisim magnesium sulfat yang terbentuk apabila 2.0 g magnesium oksida bertindak balas dengan asid sulfurik berlebihan?

(Molar mass : MgO = 40; $MgSO_4$ = 120)
(*Jisim molar : MgO = 40; $MgSO_4$ = 120*)

A 3.6 g
B 6.0 g
C 9.6 g
D 12.0 g

46 Diagram 12 shows the steps involved in the manufacture of sulphuric acid.
Rajah 12 menunjukkan langkah pembuatan asid sulfurik.

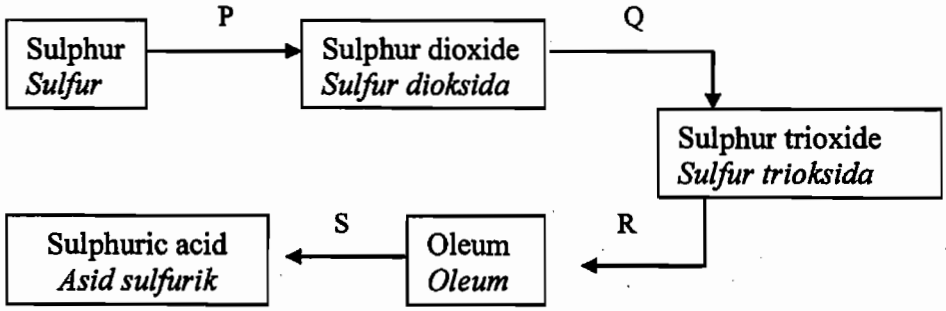


Diagram 12
Rajah 12

Which of the following steps requires the use of a catalyst?
Manakah antara langkah berikut yang memerlukan mangkin?

A P
B Q
C R
D S

47 Table 5 shows the volume of gas release at interval time of 30 seconds in an experiment to determine the rate of reaction.
Jadual 5 menunjukkan isipadu gas yang terbebas pada sela masa 30 saat dalam satu eksperimen untuk menentukan kadar tindak balas.

Time / s *Masa / s*	0	30	60	90	120	150
Volume of gas / cm^3 *Isipadu gas / cm^3*	0.0	8.5	15.0	19.0	22.0	25.0

Table 5
Jadual 5

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

A 0.06 cm^3s^{-1}
B 0.12 cm^3s^{-1}
C 0.37 cm^3s^{-1}
D 7.00 cm^3s^{-1}

48 Diagram 13 shows part of a polymer chain.
Rajah 13 menunjukkan sebahagian daripada rantai polimer.

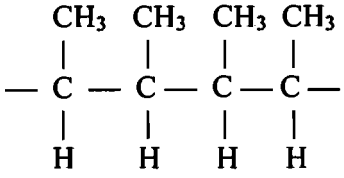


Diagram 13
Rajah 13

Which of the following is the monomer of the polymer?
Antara berikut yang manakah adalah monomer untuk polimer ini?

A $CH_3CH = CHCH_3$
B $CH_3CH = CH_2$
C $CH_2 = CHCH_3$
D $(CH_3)_2C = CH_2$

49 The heat energy required to raise the temperature of 1.0 g of water by 1°C is 4.2 J.
What is the amount of heat energy needed to raise the temperature of 100 g of water from 28°C to 40°C?

Tenaga haba yang diperlukan untuk menaikan suhu 1.0 g air sebanyak 1°C ialah 4.2 J. Berapakah jumlah tenaga yang diperlukan untuk menaikan suhu 100 g air daripada 28°C kepada 40°C?

A 4.2 J
B 5.04 J
C 42 J
D 50.4 J

50 25 cm^3 of zinc sulphate solution is added to 25 cm^3 of lead(II) nitrate solution.
1050 J of heat energy is given out during this reaction.
Calculate the temperature increase in the reaction?
[Specific heat capacity of solution = 4.2 $Jg^{-1}°C^{-1}$; Density of solution =1 gcm^{-3}]

25 cm^3 larutan zink sulfat ditambahkan kepada 25 cm^3 larutan plumbum(II) nitrat.
Sebanyak 1050J tenaga haba dibebaskan semasa tindak balas ini.
Hitungkan kenaikan suhu dalam tindak balas ini?
[Muatan haba tentu larutan = 4.2 $Jg^{-1}°C^{-1}$; Ketumpatan larutan = 1 gcm^{-3}]

A 2.5°C
B 5°C
C 10°C
D 15°C

END OF THE QUESTION PAPER
KERTAS SOALAN TAMAT

INFORMATION FOR CANDIDATES
MAKLUMAT UNTUK CALON

1. This question paper consists of 50 questions.
Kertas soalan ini mengandungi 50 soalan.

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

3. Answer each question by blackening the correct space on the answer sheet.
Jawab dengan menghitamkan ruangan yang betul pada kertas jawapan.

4. Blacken only **one** space for each question.
*Hitamkan **satu** ruangan sahaja bagi setiap soalan.*

5. If you wish to change your answer, erase the blackened mark that you have made. Then blacken the space for the new answer.
Sekiranya anda hendak menukarkan jawapan, padamkan tanda yang telah dibuat. Kemudian hitamkan jawapan yang baru.

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

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

4541/2
Percubaan
SPM
Chemistry
2010
Paper 2
2½ hours

NAMA : .....

ANGKA GILIRAN:

PEPERIKSAAN PERCUBAAN SIJIL PELAJARAN MALAYSIA NEGERI PERAK 2010

CHEMISTRY

Paper 2

Two hours and thirty minutes

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. Tuliskan Nama dan Angka Giliran anda pada ruangan yang disediakan.
2. Kertas soalan ini adalah dalam dwibahasa.
3. Soalan dalam Bahasa Inggeris mendahului soalan yang sepadan dalam Bahasa Melayu.
4. Calon dibenarkan menjawab keseluruhan atau sebahagian soalan samada dalam Bahasa Inggeris atau Bahasa Melayu.
5. Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini.

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

Kertas soalan ini mengandungi 20 halaman bercetak.

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 menunjukkan pembuatan ammonia

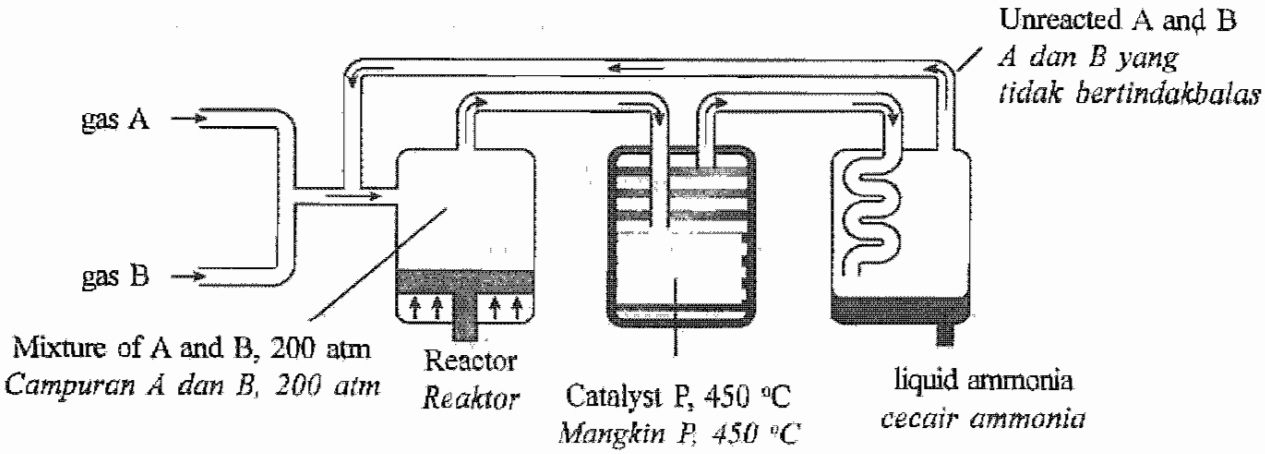


DIAGRAM 1.1
RAJAH 1.1

(i) What is the name of this process?
Apakah nama proses ini?

.....

[1 *mark*]

(ii) State the name of gas A and gas B.
Nyatakan nama gas A dan gas B.

.....

[1 *mark*]

(iii) State the name of catalyst P.
Nyatakan nama mangkin P.

.....

[1 *mark*]

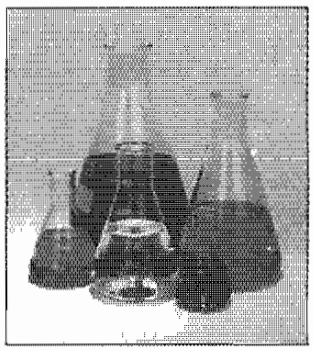
(iv) List **two** physical properties of ammonia
*Senaraikan **dua** sifat fizik ammonia.*

.....

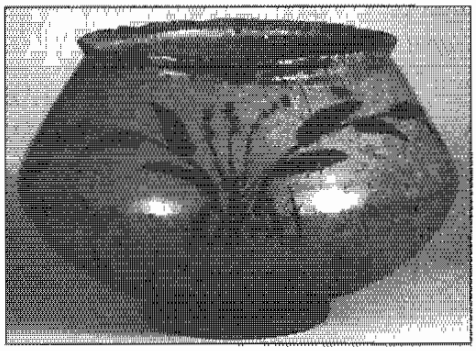
.....

[2 *marks*]

(b) Diagram 1.2(i) and 1.2(ii) shows two objects which are made from glass and ceramics respectively.
Rajah 1.2(i) dan 1.2(ii) menunjukkan dua objek yang diperbuat daripada kaca dan seramik masing-masing.



(i)



(ii)

DIAGRAM 1.2
RAJAH 1.2

(i) State the type of glass in Diagram 1.2(i)
Nyatakan jenis kaca dalam rajah 1.2(i)

.....

[1 *mark*]

(ii) What is the property of glass which is suitable for making the apparatus in Diagram 1.2(i).
Apakah sifat kaca yang menyebabkan sesuai untuk membuat radas dalam rajah 1.2(i)

.....

[1 *mark*]

(iii) State two properties of object in Diagram 1.2(ii)
Nyatakan dua sifat objek pada Rajah 1.2(ii)

.....

.....

.....

[2 *marks*]

2 Table 2 shows the symbol for elements in a period of the Periodic Table of elements.
Jadual 2 menunjukkan simbol bagi unsur-unsur dalam suatu kala Jadual Berkala Unsur.

Element *Unsur*	Na	Mg	Al	Si	P	S	Cl	Ar
Proton number *Nombor proton*	11	12	13	14	15	16	17	18

TABLE 2
JADUAL 2

(a) State the period for the elements in the Periodic Table.
Nyatakan kala bagi unsur-unsur dalam Jadual Berkala Unsur.

.....

[1 *mark*]

(b) State one element exists as gas in room temperature
Nyatakan satu unsur yang wujud sebagai gas pada suhu bilik.

.....

[1 *mark*]

(c) State one use of silicon in industry
Nyatakan satu kegunaan silicon dalam industri

.....

[1 *mark*]

(d) (i) Write the electron arrangement for an atom of :
Tulis susunan elektron bagi atom :

Magnesium / *Magnesium*

.....

Chlorine / *Klorin*

.....

[2 *marks*]

(ii) Explain what happen to magnesium atom and chlorine atom during the formation of chemical bond between magnesium and chlorine
Jelaskan apa yang berlaku pada atom magnesium dan atom klorin semasa pembentukan ikatan kimia antara magnesium dan klorin.

.....

.....

[2 *marks*]

(e) The atomic size of the atoms decrease from sodium to argon. Explain.
Saiz atom berkurang daripada natrium ke argon, Terangkan.

.....

.....

[2 *marks*]

3

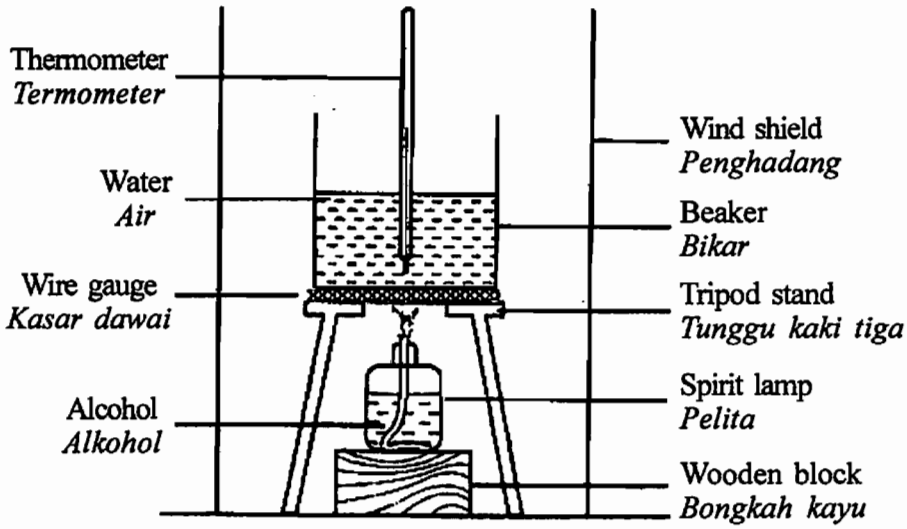


DIAGRAM 3
RAJAH 3

Diagram 3 shows the set up of apparatus to determine the heats of combustion of alcohols.
Rajah 3 menunjukkan susunan radas untuk menentukan haba pembakaran beberapa alkohol.

(a) State **two** mistakes in the set up of apparatus in Diagram 3.
*Nyatakan **dua** kesilapan susunan radas dalam Rajah 3.*

.....

.....

.....

[2 *marks*]

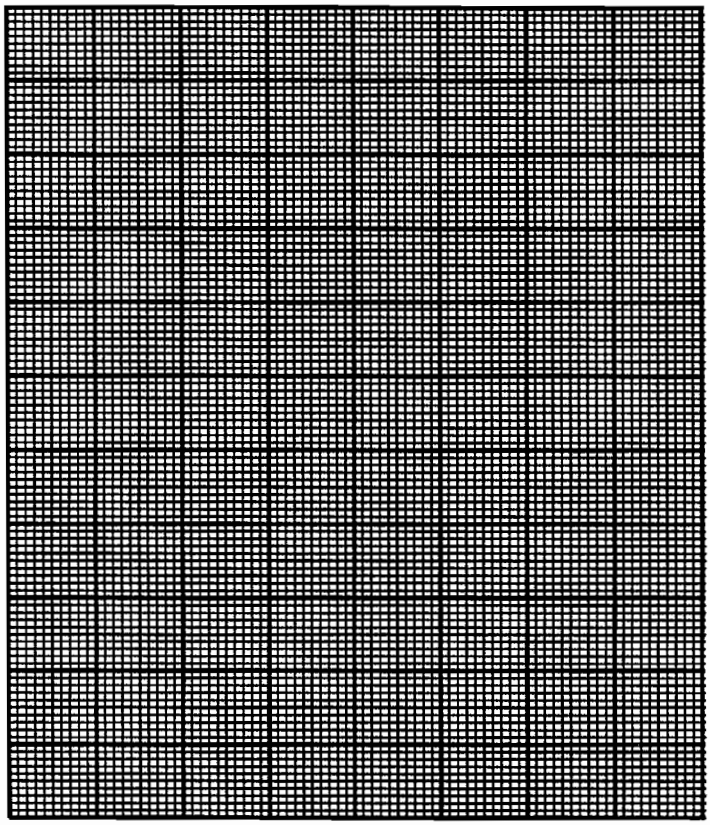
(b) Table 3 shows the heat of combustion of three types of alcohol.
Jadual 3 menunjukkan haba pembakaran bagi tiga jenis alkohol

Name of alcohol *Nama alkohol*	Molecular formula *Formula molekul*	Number of carbon atoms per molecule *Bilangan atom karbon per molekul*	Heat of combustion / kJ mol^{-1} *Haba pembakaran / kJ* mol^{-1}
Methanol *Metanol*	CH_3OH	1	725
Ethanol *Etanol*	C_2H_5OH	2	1 376
Propanol *Propanol*	C_3H_7OH	3	2 015

TABLE 3
JADUAL 3

(i) By using the data in Table 3 draw a graph of the heat of combustion against number of carbon atoms in the graph below.
Dengan menggunakan data dalam Jadual 3 lukiskan graf haba pembakaran melawan bilangan atom karbon pada graf di bawah.

[3 *marks*]



(ii) Based on the graph in (b)(i), as the number of carbon atoms increases, the heat of combustion increases. Explain.
Berdasarkan graf di (b)(i), apabila bilangan atom karbon bertambah, haba pembakaran juga bertambah. Terangkan.

.....

.....

[2 *marks*]

(c) The thermochemical equation for the combustion of butanol is given as follows:
Persamaan termokimia bagi pembakaran butanol diberi seperti berikut:

$$C_4H_9OH + 6O_2 \rightarrow 4CO_2 + 5H_2O \quad \Delta H = -2676 \text{ kJ mol}^{-1}$$

(i) Based on the thermochemical equation given, calculate the heat released when 3.7 g of butanol is completely burnt in air.
(Relative atomic mass: H = 1, C = 12, O = 16)
Berdasarkan kepada persamaan termokimia yang diberikan, hitungkan haba yang dibebaskan apabila 3.7 g butanol terbakar lengkap.
(*Jisim atom relatif:* H = 1, C = 12, O = 16)

[2 *marks*]

(ii) Draw the energy level diagram for the combustion of butanol.
Lukiskan gambarajah aras tenaga bagi pembakaran butanol

[2 *marks*]

4 Diagram 4 shows two chemical reactions involving salt J.
Rajah 4 menunjukkan dua tindak balas kimia melibatkan garam J.

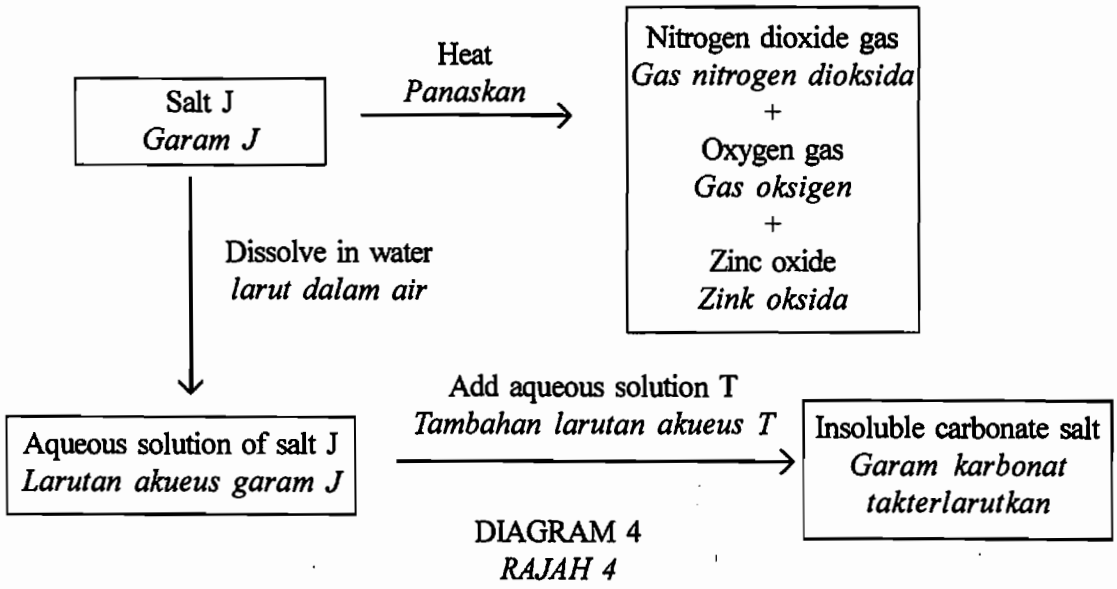


DIAGRAM 4
RAJAH 4

Use the information in Diagram 4 to answer the following questions.
Gunakan maklumat dalam Rajah 4 untuk menjawab soalan-soalan berikut.

(a) State the name of salt J.
Nyatakan nama garam J.

.....

[1 *mark*]

(b) Explain how you would carry out a simple test to confirm oxygen gas is produced when salt J is heated in a test tube.
Terangkan bagaimana anda boleh menjalankan satu ujian ringkas untuk mengesahkan gas oksigen terhasil apabila garam J dipanaskan.

.....

.....

[2 *marks*]

(c) State two observations when salt J is heated in a test tube?
Nyatakan dua pemerhatian apabila garam J dipanaskan dalam sebuah tabung uji?

.....

.....

[2 *marks*]

(d) Write a chemical equation for the decomposition of salt J by heat.
Tuliskan persamaan kimia bagi penguraian garam J oleh haba.

.....

[2 *marks*]

(e) (i) Name aqueous solution T
Namakan larutan akueus T.

.....

[1 *mark*]

(ii) What is the name for the type of reaction between solution J with solution T?
Apakah nama bagi jenis tindakbalas antara larutan J dengan larutan T?

.....

[1 *mark*]

(f) What is observed when an acidified solution of salt J is shaken with iron(II) sulphate solution in a test tube and then concentrated sulphuric acid is added slowly down the side of the test tube.
Apakah yang diperhatikan apabila larutan garam J berasid ditambahkan larutan ferum(II) sulfat dalam sebuah tabung uji dan kemudian asid sulfurik pekat ditambahkan dengan perlahan ke bawah melalui sisi tabung uji itu.

.....

[1 *mark*]

5 Table 5 shows the reactants used in Experiment I and Experiment II to investigate the rate of decomposition of hydrogen peroxide.
Jadual 5 menunjukkan bahan tindak balas yang digunakan dalam Eksperimen I dan Eksperimen II untuk mengkaji kadar penguraian hidrogen peroksida.

Experiment *Eksperimen*	Reactant *Bahan tindak balas*
I	1.0 g manganese(IV) oxide powder + 10 cm^3 of **10-volume** hydrogen peroxide *1.0 g serbuk mangan(IV) oksida + 10 cm^3* ***10-isipadu*** *hidrogen peroksida*
II	1.0 g manganese(IV) oxide powder + 10 cm^3 of **30-volume** hydrogen peroxide *1.0 g serbuk mangan(IV) oksida + 10 cm^3* ***30-isipadu*** *hidrogen peroksida*

TABLE 5
JADUAL 5

The volume of gas liberated was recorded at intervals of 30 seconds.
Isipadu gas yang terbebas direkodkan pada selang masa 30 saat.

(a) Draw a labeled diagram to carry out this experiment.
Lukiskan rajah berlabel untuk menjalankan eksperimen ini.

[2 *marks*]

(b) (i) Name the gas liberated when hydrogen peroxide decomposes.
Namakan gas yang terbebas apabila hidrogen peroksida terurai.

.....

[*1 mark*]

(ii) Write the chemical equation for the decomposition of hydrogen peroxide.
Tuliskan persamaan kimia bagi penguraian hidrogen peroksida.

.....

[*2 marks*]

(c) (i) Which experiment will give the higher rate of reaction?
Eksperimen manakah yang memberikan kadar tindak balas yang lebih tinggi?

.....

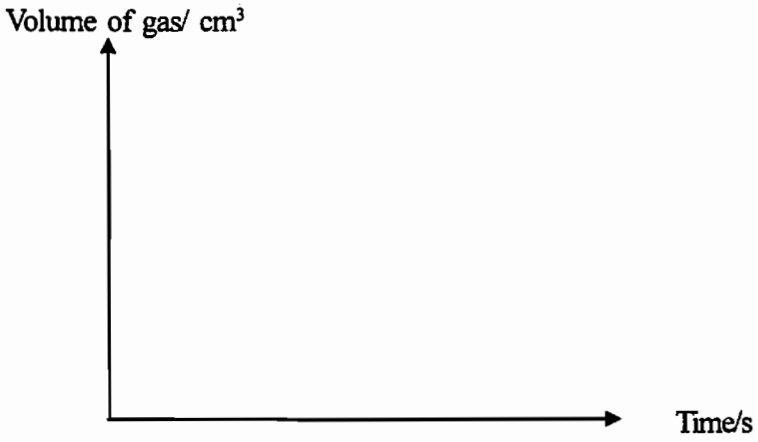
[1 *mark*]

(ii) Explain your answer in (c) (i)
Jelaskan jawapan anda di (c) (i)

.....

[1 *mark*]

(iii) Sketch a graph of volume of gas liberated against time for experiment I and II on the same axes below.
Lakarkan graf isipadu gas terbebas melawan masa bagi eksperimen I dan II di atas paksi yang sama di bawah.



[2 *mark*]

(d) Manganese(lV) oxide acts as a catalyst.
By using Collision Theory explain how manganese(IV) oxide increase the decomposition of hydrogen peroxide.
Mangan(lV)oksida bertindak bagai mangkin.
Dengan menggunakan Teori Perlanggaran jelaskan bagaimana mangan(IV) oksida meningkatkan penguraian hidrogen peroksida.

.....

.....

.....

[2 *marks*]

6 (a) Diagram 6.1 shows the set up of apparatus of an experiment to investigate the reaction between iron(II) sulphate solution and acidified potassium manganate(VII) solution through the transfer of electrons at a distance.
Rajah 6.1 menunjukkan susunan radas bagi satu ekperimen untuk mengkaji tindak balas antara larutan ferum(II) sulfat dengan larutan kalium manganat(VII) berasid melalui pemindahan elektron pada suatu jarak.

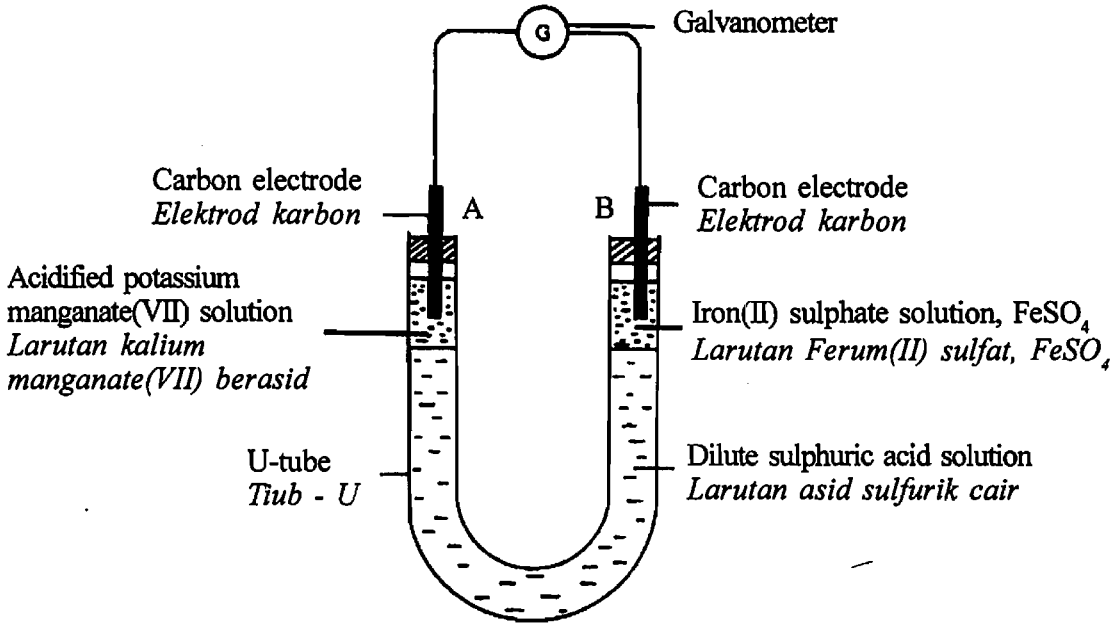


DIAGRAM 6.1
RAJAH 6.1

(i) State the name of the oxidizing agent in the experiment.
Nyatakan nama agen pengoksidaan dalam eksperimen ini.

.....

[1 *mark*]

(ii) Write the half equation for the reaction in (a) (i)
Tuliskan setengah persamaan bagi tindak balas dalam (a) (i)

.....

[2 *mark*]

(iii) What is the colour change at iron(II) sulphate solution after 30 minutes
Apakah perubahan warna yang berlaku pada larutan ferum(II) sulfat selepas 30 minit

.....

[1 *mark*]

(iv) State the change of oxidation number for iron(II) ion.
Nyatakan perubahan nombor pengoksidaan bagi ion ferum(II).

.....

[1 *mark*]

(b) Diagram 6.2 shows an experiment to investigate the oxidation and reduction in the displacement of bromide ion by chlorine
Rajah 6.2 menunjukkan satu eksperimen untuk mengkaji tindak balas pengoksidaan dan penurunan dalam penyesaran ion bromide oleh klorin.

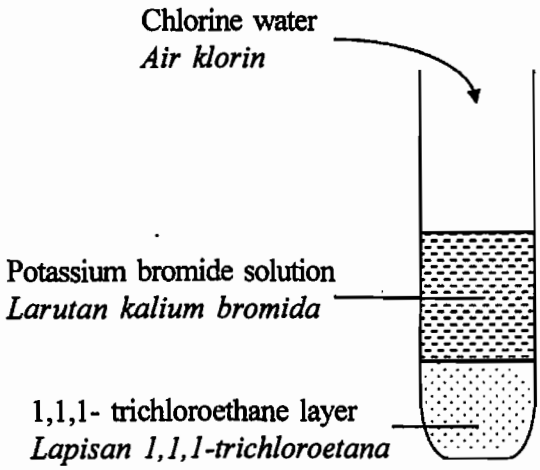


DIAGRAM 6.2
RAJAH 6.2

(i) Chlorine can displace bromine from potassium bromide solution? Give the reason
Klorin boleh menyesarkan bromine daripada larutan kalium bromide? Berikan alasan.

.....

[1 *mark*]

(ii) State the name of substance which is oxidized
Nyatakan nama bahan yang dioksidakan

.....

[1 *mark*]

(iii) What is the colour of 1,1,1-trichloroethane layer in this experiment?
Apakah warna lapisan 1,1,1-trikloroetana dalam eksperimen ini?

.....

[1 *mark*]

(iv) If chlorine water is replaced with iodine solution, state the colour of 1,1,1-trichloroethane layer. Explain your answer.
Jika air klorin digantikan dengan larutan iodin, nyatakan warna lapisan 1,1,1-trikloroetana. Jelaskan jawapan anda.

.....

.....

.....

[2 *marks*]

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

7 (a)

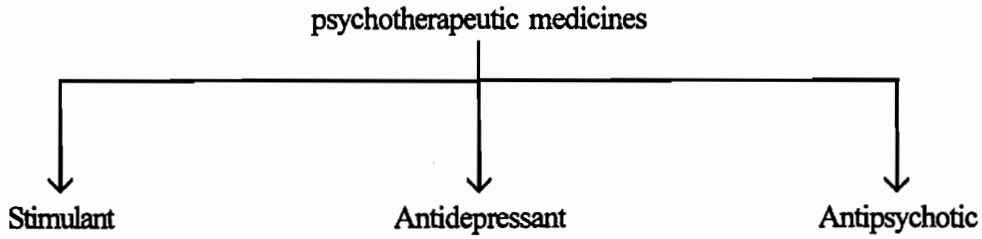


FIGURE 7a
RAJAH 7a

Figure 7a shows the classification of psychotherapeutic medicines.
Rajah 7a menunjukkan pengkelasan bagi ubat psikoterapeutik.

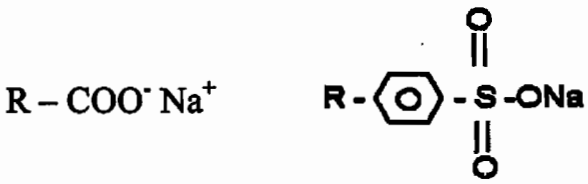
(i) What is the meaning of psychotherapeutic medicines?
Apakah maksud ubat psikoterapeutik?

[1 *mark*]

(ii) State the function of stimulant, antidepressant and antipsychotic as psychotherapeutic medicines.
Nyatakan fungsi stimulan, antidepresan dan antipsikotik sebagai ubat psikoterapeutik.

[3 *marks*]

(b)



Cleaning agent X
Agen pencuci X

Cleaning agent Y
Agen pencuci Y

DIAGRAM 7b
RAJAH 7b

Diagram 7b shows two types of cleaning agent.
Compare cleaning agents X and Y
Rajah 7b menunjukkan dua jenis agen pencuci.
Bezakan agen pencuci X dan Y.

[6 *marks*]

(c)

Salt *Garam*	Monosodium glutamate *Mononatrium glutamat*	Lecithin *Lesitin*	Vitamin C *Vitamin C*

DIAGRAM 7(c)
RAJAH 7(c)

Diagram 7 (c) shows a list of food additives in a sample of food.
Rajah 7 (c) menunjukkan satu senarai bahan tambah makanan yang terdapat dalam satu sampel makanan.

(i) Classify the ingredients above into their type of food additives.
Kelaskan bahan-bahan di atas mengikut jenis bahan tambah makanan.

[4 *marks*]

(ii) Explain how salt and monosodium glutamate functions as food additives.
Terangkan bagaimana garam dan mononatrium glutamat berfungsi sebagai bahan tambah makanan.

[6 *marks*]

8 (*a*) Octane and octene are two examples of hydrocarbon. Octane is a saturated hydrocarbon whereas octene is an unsaturated hydrocarbon.
Oktana dan oktena adalah dua contoh hidrokarbon. Oktana adalah hidrokarbon tepu manakala oktena adalah hidrokarbon tak tepu.

(i) What is the meaning of **hydrocarbon**?
*Apakah yang dimaksudkan dengan **hidrokarbon**?*

[1 *mark*]

(ii) What is the difference between saturated hydrocarbon and unsaturated hydrocarbon in terms of bonding?
Apakah perbezaan antara hidrokarbon tepu dan hidrokarbon tak tepu dari segi ikatan?

[2 *marks*]

(iii) Octane and octene are colourless liquids. Briefly describe a chemical test to differentiate the two liquids. In your description, state the reagent used and the expected observations.
Oktana dan oktena adalah dua cecair tak berwarna. Secara ringkas huraikan satu ujian kimia yang boleh membezakan kedua-dua cecair tersebut. Dalam huraian anda, nyatakan bahan uji yang digunakan dan pemerhatian yang dijangka.

[4 *marks*]

(b) Ethene and ethanol are two organic compounds from two different homologous series.
Etena dan etanol adalah dua sebatian organik dari dua siri homologus yang berbeza.

(i) State two different physical properties between ethene and ethanol.
Nyatakan dua sifat fizik yang berbeza antara etena dan etanol.

[2 *marks*]

(ii) Ethanol can be converted to ethene by dehydration of ethanol. Briefly describe how you would carry out this conversion in the laboratory. Include a labelled diagram of the set up of apparatus.
Etanol boleh ditukar kepada etena melalui tindak balas penghidratan etanol. Huraikan secara ringkas bagaimana anda dapat melakukan penukaran ini dalam makmal. Sertakan gambarajah berlabel.

[6 *marks*]

(c) Figure 8 shows the conversion of ethanol to ethanoic acid and ester.
Rajah 8 menunjukkan penukaran etanol kepada asid etanoik dan suatu ester.

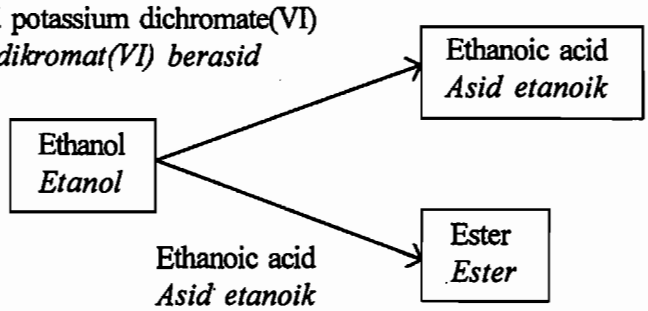


DIAGRAM 8
RAJAH 8

(i) State the change in colour when ethanol is heated with acidified potassium dichromate(VI).
Nyatakan perubahan warna apabila etanol dipanaskan bersama kalium dikromat(VI) berasid.

[1 *mark*]

(ii) State the name of ester formed when a mixture of ethanol and ethanoic acid is heated with a little concentrated sulphuric acid.
Namakan ester yang terbentuk apabila campuran etanol dan asid etanoik dipanaskan dengan sedikit asid sulfurik pekat.

[1 *mark*]

(iii) Draw the structural formulae of ethanol, ethanoic acid and the ester formed.
Lukiskan formula-formula struktur bagi etanol, asid etanoik dan ester yang terbentuk

[3 *marks*]

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

9 (*a*) By using one named example of a strong acid, explain the chemical properties of an acid. Include the chemical equations in your explanation.
Dengan menggunakan satu contoh asid kuat, terangkan sifat kimia asid. Sertakan persamaan-persamaan kimia dalam penerangan anda

[6 *marks*]

(*b*) Table 9 shows the observation when solution A and B is tested with a blue litmus paper,
Jadual 9 menunjukkan pemerhatian apabila larutan A dan larutan B diuji dengan kertas litmus biru.

	Solution / *Larutan*	Observation / *Pemerhatian*
A	Ethanoic acid in water *Asid etanoik dalam air*	Blue litmus paper turns red *Kertas litmus biru bertukar merah*
B	Ethanoic acid in propanone *Asid etanoik dalam propanon*	No change *Tiada perubahan*

TABLE 9
JADUAL 9

Based on Table 9, explain the difference in the observation
Berdasarkan Jadual 9, terangkan perbezaan dalam pemerhatian itu

[4 *marks*]

(*c*) A student wanted to prepare 250 cm^3 standard solution of sodium hydroxide with a concentration of 1.0 mol dm^{-3} in the school laboratory.
Seorang pelajar ingin menyediakan 250 cm^3 larutan piawai natrium hidroksida dengan kepekatan 1.0 mol dm^{-3} dalam makmal sekolah.

Describe how the student would prepare the solution.
Include the following in your description :
- The material and apparatus needed,
- The calculation involved,
- The steps involved in the preparation.

Huraikan bagaimana pelajar itu dapat menyediakan larutan tersebut.
Sertakan yang berikut dalam huraian anda :
- *Bahan dan radas yang perlu,*
- *Pengiraan yang terlibat,*
- *Langkah-langkah yang terlibat dalam penyediaan*

[Relative atomic mass : H, 1 ; O, 16 ; Na, 23]

[10 *marks*]

10 (a) Table 10 shows the product of electrolysis of copper(II) sulphate solution at different concentration using carbon electrodes.
Jadual 10 menunjukkan hasil daripada proses elektrolisis larutan kuprum(II) sulfat pada kepekatan yang berlainan menggunakan elektrod-elektrod karbon.

Experiment *Eksperimen*	**Solution** *Larutan*	**Product at the cathode** *Hasil di katod*	**Product at the anode** *Hasil di anod*
Set I	Copper(II) chloride 1.0 mol dm^{-3} *Kuprum(II) klorida 1.0 mol dm^{-3}*	Copper *Kuprum*	Chlorine *Klorin*
Set II	Copper(II) chloride 0.001 mol dm^{-3} *Kuprum(II) klorida 0.001 mol dm^{-3}*	Copper *Kuprum*	Oxygen *Oksigen*

TABLE 10
JADUAL 10

Explain the difference in the products at the anode.
Terangkan perbezaan dalam hasil yang di anod. [6 *marks*]

(b) Diagram 10 shows the apparatus set up of a simple voltaic cell.
Jadual 10 menunjukkan susunan radas bagi satu sel ringkas.

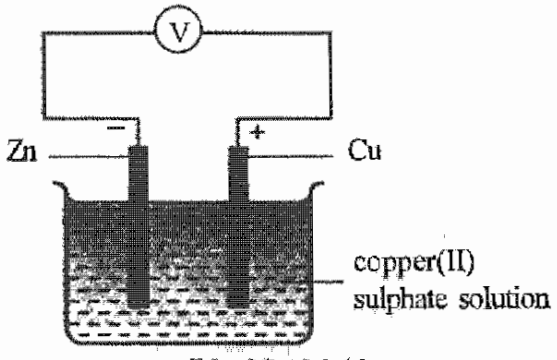


DIAGRAM 10
RAJAH 10

Based on diagram 10, briefly explain how electricity is produced.
Berdasarkan rajah 10, terangkan dengan ringkas bagaimana arus elektrik dihasilkan.
[4 *marks*]

(c) Electrolysis is used to electroplate an object to make it look more attractive and more resistant to corrosion.
Elektrolisis digunakan untuk penyaduran suatu objek supaya kelihatan lebih menarik dan tahan pengaratan.
With the aid of a label diagram, describe an experiment to electroplate an iron spoon with copper. In your description, include the observations and half equations that occur.
Dengan bantuan gambar rajah berlabel, terangkan satu eksperimen untuk menyadur sudu besi dengan kuprum. Dalam penerangan anda, nyatakan pemerhatian dan tuliskan persamaan setengah yang berlaku.

[10 *marks*]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

INFORMATION FOR CANDIDATES
MAKLUMAT UNTUK CALON

1. This question paper consists of **three** sections: **Section A, Section B** and **Section C**.
*Kertas soalan ini mengandungi **tiga** bahagian: **Bahagian A, Bahagian B dan Bahagian C.***

2. Answer **all** questions in **Section A.** Write your answers for **Section A** in the spaces provided in the question paper.
*Jawab **semua** soalan dalam **Bahagian A**. Tulis jawapan bagi **Bahagian A** dalam ruang yang disediakan dalam kertas soalan ini.*

3. Answer **one** question from **Section B** and one question from **Section C**. Write your answers for **Section B** and **Sectioin C** on the lined pages at the end of the question paper. Answer questions in **Section B** and **Section C** in detail. You may use questions, diagrams, tables, graphs and other suitable methods to explain your answer.
*Jawab satu soalan daripada **Bahagian B** dan satu soalan dari **Bahagian C**. Tulis jawapan bagi **Bahagian B** dan **Bahagian C** pada helaian tambahan yang dibekalkan oleh pengawas peperiksaan. Jawab soalan dalam **Bahagian B** dan **Bahagian C** dengan terperinci. Anda boleh menggunakan persamaan, rajah, jadual, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda.*

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

5. If you wish to cancel any answer, neatly cross out the answer.
Sekiranya anda hendak menukar jawapan, batalkan dengan kemas jawapan yang telah dibuat. Kemudian tulis jawapan yang baru.

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

7. Marks allocated for each question or part question are shown in brackets.
Markah yang diperuntukkan bagi setiap soalan atau ceraian soalan ditunjukkan dalam kurungan.

8. The time suggested to answer **Section A** is 90 minutes, **Section B** is 30 minutes and **Section C** is 30 minutes.
*Masa yang dicadangkan untuk menjawab **Bahagian A** ialah 90 minit, **Bahagian B** ialah 30 minit dan **Bahagian C** ialah 30 minit.*

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

10. Hand in this question paper at the end of the examination
Serahkan kertas jawapan anda di akhir peperiksaan.

THE PERIODIC TABLE OF ELEMENTS

1 H Hydrogen 1																	2 He Helium 4
3 Li Lithium 7	4 Be Beryllium 9											5 B Boron 11	6 C Carbon 12	7 N Nitrogen 14	8 O Oxygen 16	9 F Flourine 19	10 Ne Neon 20
11 Na Sodium 23	12 Mg Magnesium 24											13 Al Aluminium 27	14 Si Silicon 28	15 P Phosphorus 31	16 S Sulphur 32	17 Cl Chlorine 35	18 Ar Argon 40
19 K Potassium 39	20 Ca Calcium 40	21 Sc Scandium 45	22 Ti Titanium 48	23 V Vanadium 51	24 Cr Chromium 52	25 Mn Manganese 55	26 Fe Iron 56	27 Co Cobalt 59	28 Ni Nickel 59	29 Cu Copper 64	30 Zn Zinc 65	31 Ga Gallium 70	32 Ge Germanium 73	33 As Arsenic 75	34 Se Selenium 79	35 Br Bromine 80	36 Kr Krypton 84
37 Rb Rubidium 86	38 Sr Strontium 88	39 Y Yurium 89	40 Zr Zirconium 91	41 Nb Niobium 93	42 Mo Molybdenum 96	43 Tc Technetium 98	44 Ru Ruthenium 101	45 Rh Rhodium 103	46 Pd Palladium 106	47 Ag Silver 108	48 Cd Cadmium 112	48 In Indium 115	50 Sn Tin 119	51 Sb Antimony 122	52 Te Tellurium 128	53 I Iodine 127	54 Xe Xenon 131
55 Cs Cesium 133	56 Ba Barium 137	57 La Lanthanum 139	72 Hf Hafnium 179	73 Ta Tantalum 181	74 W Tungsten 184	75 Re Rhenium 186	76 Os Osmium 190	77 Ir Iridium 192	78 Pt Platinum 195	79 Au Gold 197	80 Hg Mercury 201	81 Tl Thallium 204	82 Pb Lead 207	83 Bi Bismuth 209	84 Po Polonium 210	85 At Astatine 210	86 Rn Radon 222
87 Fr Francium 223	88 Ra Radium 226	89 Ac Actinium 227	104 Unq Unnil-quadium 257	105 Unp Unnil-pentium 260	106 Unh Unnil-hexium 263	107 Uns Unnilseptium 262	108 Uno Unniloctium 265	109 Une Unilennium 266									

10 Ne Neon 20 — Proton number; Symbol; Name of element; Relative atomic mass

58 Ce Cerium 140	59 Pr Praseo-dymium 141	60 Nd Neodymium 144	61 Pm Promethium 147	62 Sm Samarium 150	63 Eu Europium 152	64 Gd Gadolinium 157	65 Tb Terbium 159	66 Dy Dysprosium 163	67 Ho Holmium 165	68 Er Erbium 167	69 Tm Thulium 169	70 Yb Ytterbium 173	71 Lu Lutetium 175
90 Th Thorium 232	91 Pa Proactinium 231	92 U Uranium 238	93 Np Neptunium 237	94 Pu Plutonium 244	95 Am Americium 243	96 Cm Curium 247	97 Bk Berkelium 247	98 Cf Californium 249	99 Es Ein-steinium 254	100 Fm Fermium 253	101 Md Mendele-vium 256	102 No Nobelium 254	103 Lr Lawrensium 257

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

NAMA : .....

NO KAD PENGENALAN : .....

ANGKA GILIRAN : .....

4541/3
Kimia
Kertas 3
Peperiksaan
Percubaan
SPM
2010
1½ hours

PEPERIKSAAN PERCUBAAN SIJIL PELAJARAN MALAYSIA NEGERI PERAK 2010

CHEMISTRY
KIMIA

PAPER 3
KERTAS 3

One hour and thirty minutes
Satu jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Tuliskan* **NAMA, NOMBOR KAD PENGENALAN** *dan* **ANGKA GILIRAN** *anda pada ruang yang disediakan.*
2. *Kertas soalan ini adalah dalam dwibahasa.*
3. *Soalan di bahagian atas adalah dalam bahasa Inggeris dan di bahagian bawah adalah 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.*

Kegunaan Pemeriksa		
No soalan	Markah Penuh	Markah Diperolehi
1	33	
2	17	
Jumlah		

Kertas soalan ini mengandungi 8 halaman bercetak.

1. A group of student carried out an experiment to determine the end-point of titration. Table 1 describe the activity in this experiment.
Sekumpulan pelajar telah menjalankan satu eksperimen untuk menentukan takat akhir pentitratan. Jadual 1 menghuraikan aktiviti dalam eksperimen ini.

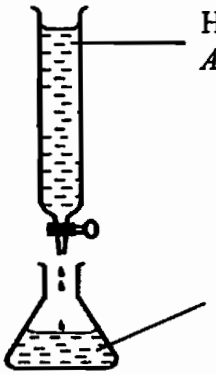
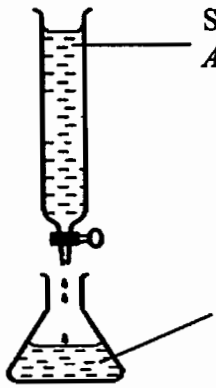
Activity I *Aktiviti I*	Titration between 25.0 cm^3 of 0.1 mol dm^{-3} sodium hydroxide solution with hydrochloric acid by using phenolphthalein as the indicator. *Pentitratan di antara 25.0 cm^3 larutan natrium hidroksida berkepekatan 0.1 mol dm^{-3} dengan asid hidroklorik dan menggunakan fenolftalein sebagai penunjuk.*  Hydrochloric acid *Asid hidroklorik* Sodium hydroxide solution + phenolphthalein indicator *Larutan natrium hidroksida + penunjuk fenolftalein*
Activity II *Aktiviti II*	Titration between 25.0 cm^3 of 0.1 mol dm^{-3} sodium hydroxide solution with sulphuric acid by using methyl orange as the indicator. *Pentitratan di antara 25.0 cm^3 larutan natrium hidroksida berkepekatan 0.1 mol dm^{-3} dengan asid sulfurik dan menggunakan metil jingga sebagai penunjuk.*  Sulphuric acid *Asid sulfurik* Sodium hydroxide solution + methyl orange indicator *Larutan natrium hidroksida + penunjuk metil jingga*

Table 1
Jadual 1

Table 2 shows the reading of burette for the titrations that have been conducted for activity I.
Jadual 2 menunjukkan tiga bacaan buret bagi pentitratan yang telah dijalankan dalam aktiviti I

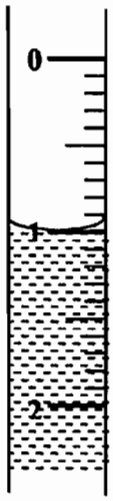
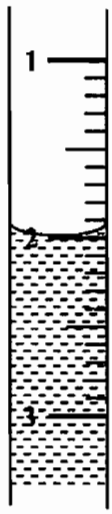
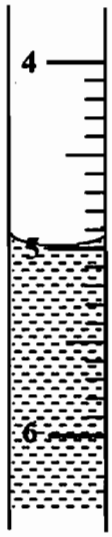
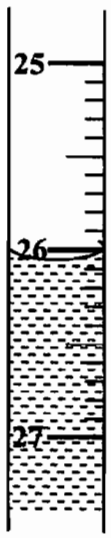
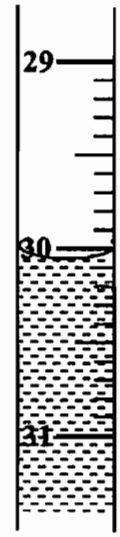
Titration number	1	2	3
Initial burette reading *Bacaan awal buret*	 1.00 cm^3	 2.00 cm^3	 5.00 cm^3
Final burette reading *Bacaan akhir buret*			 .....

Table 2
Jadual 2

Table 3 shows the the reading of burette for the titrations that have been conducted for activity II.
Jadual 3 menunjukkan tiga bacaan buret bagi pentitratan yang telah dijalankan dalam aktiviti II

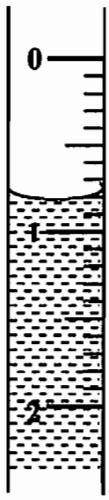
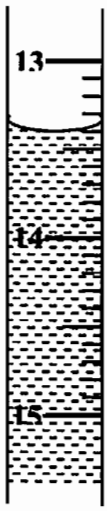
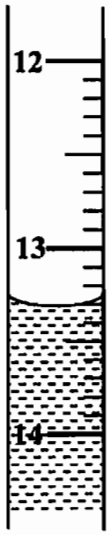
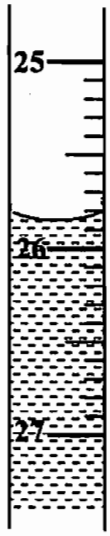
Titration number	1	2	3
Initial burette reading *Bacaan awal buret*	 0.80 cm^3	 13.40 cm^3	 25.90 cm^3
Final burette reading *Bacaan akhir buret*			 .....

Table 3
Jadual 3

(a) Record the final reading of burette for the six titrations in the spaces provided in Table 2 and Table 3.
Rekod bacaan akhir buret bagi enam pentitratan di dalam ruang yang diberikan pada Jadual 2 dan Jadual 3.

[3 *marks*]

(b) Construct a table and record the initial burette reading, final burette reading and the volume of acid used for activity II.
Bina satu jadual yang merekodkan bacaan awal buret, bacaan akhir buret dan isipadu asid yang telah digunakan bagi aktiviti II.

[3 *marks*]

(c) Based on the data from activity II, calculate the concentration of sulphuric acid that is used to neutralize the sodium hydroxide solution.
Berdasarkan data yang diperolehi daripada aktiviti II, kira kepekatan asid sulfurik yang digunakan untuk meneutralkan larutan natrium hidroksida.

[3 marks]

(d) State the observation for the changes in colour of the indicator during titration in activity I and activity II.
Nyatakan pemerhatian kepada perubahan warna penunjuk semasa pentitratan bagi aktiviti I dan aktiviti II..

Activity I :
Aktiviti I .....

Activity I :
Aktiviti II .....

[3 *marks*]

(e) Hydrochloric acid and sulphuric acid are strong acids. Based on the average volume of the acid in activity I and activity II in (c), what inference can be made for the type of acid. Give a reason for your answer.
Asid hidroklorik dan asid sulfurik adalah asid kuat. Berdasarkan kepada isipadu purata asid dalam aktiviti I dan aktiviti II di(c), apakah inferen yang boleh dibuat tentang jenis asid. Berikan satu sebab bagi jawapan anda.

Type of acid :
Jenis asid .....

Reason :
Sebab .....
[3 *marks*]

(f) In activity II, if 25.0 cm^3 sulphuric acid 0.1 mol dm^{-3} is added to the sodium hydroxide solution, state the colour of the methyl orange indicator.
Bagi aktiviti II, jika 25.0 cm^3 asid sulfurik 0.1 mol dm^{-3} ditambahkan kepada larutan natrium hidroksida, nyatakan perubahan warna penunjuk metil jingga.

.....
[3 *marks*]

(g) If the activity I is repeated by replacing of hydrochloric acid with the same concentration of ethanoic acid, **predict** the volume of ethanoic acid needed to reach the end-point of titration.
Jika sekiranya aktiviti I diulang dengan menggantikan asid hidroklorik dengan asid etanoik yang sama kepekatannya, ramalkan isipadu asid etanoik yang diperlukan untuk mencapai takat akhir pentitratan.

.....
[3 *marks*]

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

(i) The manipulated variable :
Pembolehubah dimanipulasikan :

.....

(ii) The responding variable :
Pembolehubah bergerak balas :

.....

(iii) The constant variable :
Pembolehubah dimalarkan :

.....
[3 *marks*]

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

.....

.....
[3 *marks*]

(j) Give the operational definition for the end-point of titration in activity I.
Berikan definasi secara operasi takat akhir tindak balas bagi aktiviti I.

.....

.....

[3 *marks*]

(k) Classify the following acids into strong acid and weak acid.
Kelaskan asid berikut kepada asid kuat dan asid lemah.

Nitric acid,	Ethanoic acid,	Ascorbic acid,	Phosphoric acid
Asid nitrik,	*Asid etanoik,*	*Asid askorbik,*	*Asid fosforik*

[3 *marks*]

2.

Sodium thiosulphate solution react with sulphuric acid to produce sodium sulphate, sulphur, sulphur dioxide and water according to the chemical equation below.
Larutan natrium tiosulfat bertindak balas dengan asid sulfurik untuk menghasilkan natrium sulfat, sulfur, sulfur dioksida dan air mengikut persamaan kimia di bawah.

$$Na_2S_2O_3 + H_2SO_4 \longrightarrow Na_2SO_4 + S + SO_2 + H_2O$$

Plan a laboratory experiment to investigate the effect of temperature on the rate of reaction by using the chemical reaction.
Rancang satu eksperimen makmal untuk mengkaji kesan suhu ke atas kadar tindak balas dengan menggunakan tindak balas kimia tersebut.
Your planning should include the following aspects :
Perancangan anda hendaklah mengandungi aspek-aspek berikut:

(*a*) Statement of the problem
Pernyataan masalah

(*b*) All the variables
Semua pembolehubah

(*c*) Statement of the hypothesis
Pernyataan hipotesis

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

(*e*) Procedure of the experiment
Prosedur eksperimen

(*f*) Tabulation of data
Penjadualan data

[17 *marks*]
[17 *markah*]

ENDS OF QUESTION PAPER
KERTAS SOALAN TAMAT

INFORMATION FOR CANDIDATES
MAKLUMAT UNTUK CALON

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

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

3. Write your answer for **Question 2** on the 'helaian tambahan' provided by the invigilators. You may use equations, diagrams, tables, graphs and other suitable methods to explain your answers.
Tulis jawapan anda bagi **Soalan 2** *dalam helaian tambahan yang dibekalkan oleh pengawas peperiksaan. Anda boleh menggunakan persamaan, rajah, jadual, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda.*

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

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

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

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

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

9. You are advised to spend 45 minutes to answer **Question 1** and 45 minutes for **Question 2.**
*Anda dinasihati supaya mengambil masa 45 minit untuk menjawab **Soalan 1** dan 45 minit untuk **Soalan 2.***

10. Hand in your answer sheets at the end of the exammination.
Serahkan kertas jawapan anda di akhir peperiksaan.

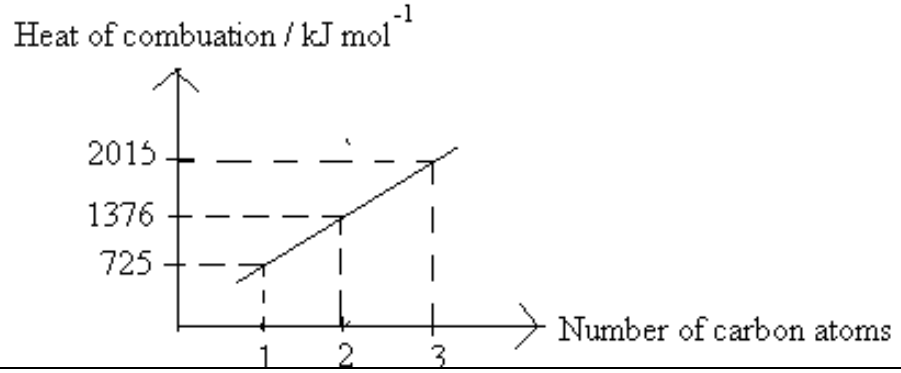
ANSWER PAPER 1 TRIAL SPM PERAK 2010

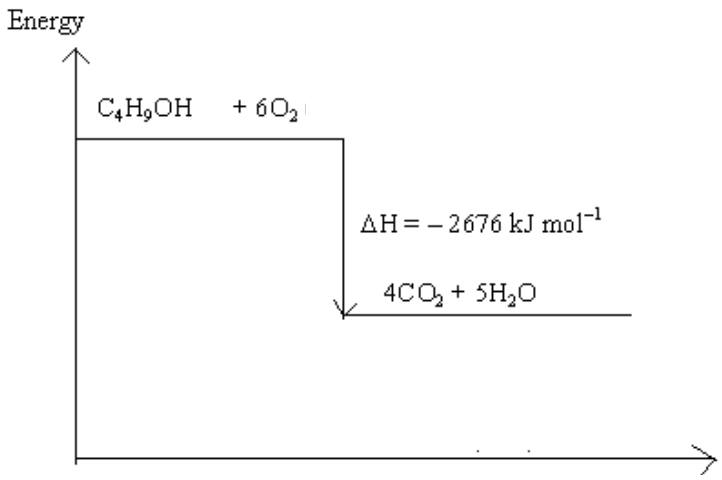
Question number	Answer	Question number	Answer
1	B	26	D
2	A	27	B
3	C	28	C
4	D	29	A
5	C	30	A
6	A	31	D
7	C	32	C
8	D	33	A
9	B	34	D
10	A	35	B
11	A	36	D
12	A	37	C
13	C	38	B
14	B	39	C
15	C	40	D
16	C	41	D
17	D	42	C
18	D	43	B
19	C	44	B
20	D	45	B
21	A	46	B
22	A	47	B
23	D	48	A
24	D	49	B
25	A	50	B

MARKING SCHEME : PAPER 2

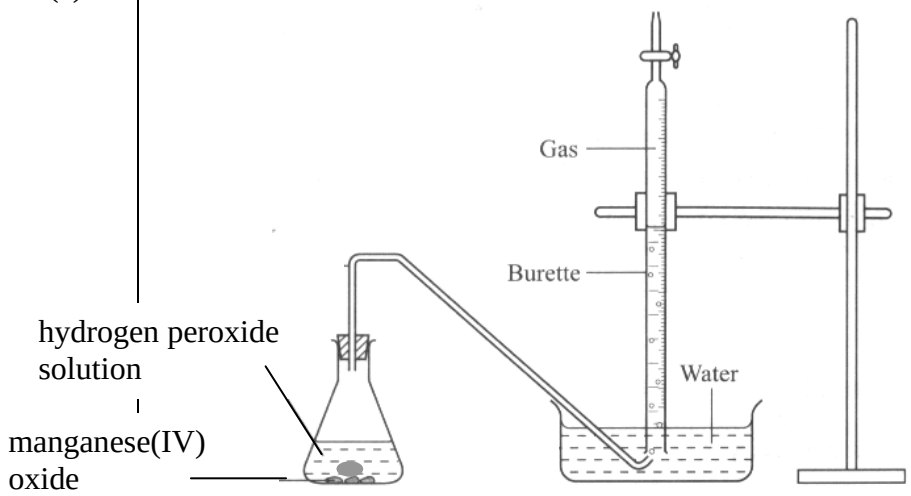
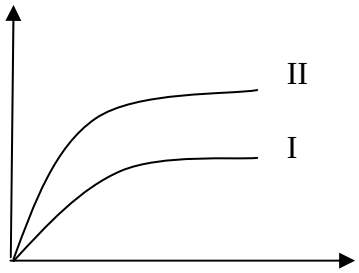
No			Answer	Mark
1	(a)	(i)	Haber process	1
		(ii)	Hydrogen ; nitrogen	1
		(iii)	Iron / Ferum	1
		(iv)	Pungent smell // dissolve in water // colourless gas // low melting point // low boiling point *Choose any 2*	2
	(b)	(i)	Fused glass	1
		(ii)	Highly heat resistant // great purity // resistance to chemical // resistance to thermal shock *Choose any 1*	1
		(iii)	Withstand high temperature // chemically inert // hard // brittle // high melting point *Choose any 2*	2
			Total	**9**

No		Answer	Mark
2	(a)	3	1
	(b)	Chlorine / Cl_2 // Argon / Ar	1
	(c)	Semiconductors/ to make diodes / transistors	1
	(d)	(i) 2. 8. 2 2. 8. 7	1 1
		(ii) Magnesium atom donates two electron, (Two) chlorine atom accept one electron	2
	(e)	The number of proton increase / The charge of the nucleus increase, The attraction force between nucleus and (valence) electron increase	1 1
		Total	**9**

Question number			Answer	Mark
3	(a)		1. Using beaker 2. Using wire gauze	1 1
	(b)	(i)	point 1 : label and unit for axis point 2 : All three points plotted correctly point 3 : Draw a best straight line.  	1 1 1
		(ii)	1. More carbon dioxide molecules formed [or more water molecules formed] 2. Hence more bonds formed // more heat released due to formation of bonds	1 1
	(c)	(i)	Number of mol of butanol = $\frac{3.7}{74}$ = 0.05 Heat released = $\frac{3.7}{74}$ x 2676 // 0.5 x 2676 = 133.8 kJ	1 1
		(ii)	point 1 : Vertical axis labelled with energy, energy levels correctly drawn point 2 : Correct writing of reactants, products and ΔH at appropriate energy levels	1 1

				
			Total	11

Question number			Answer	Mark
4	(a)		Zinc nitrate	1
	(b)		1 : Place a glowing splinter into the test tube. 2 : Glowing splinter is rekindled / relights.	1 1
	(c)		1: Brown fumes or brown gas 2: Residue (or solid) changes from yellow when hot to white when cold	1 1
	(d)		point 1: Correct reactants and products point 2: Equation is balanced $2Zn(NO_3)_2 \rightarrow 2ZnO + 4NO_2 + O_2$ / $2J(NO_3)_2 \rightarrow 2JO + 4NO_2 + O_2$	1 1
	(e)	(i)	Sodium carbonate/ potassium carbonate / Ammonium carbonate	1
		(ii)	Precipitation reaction / double decomposition reaction	1
	(f)		Brown ring	1
			Total	10

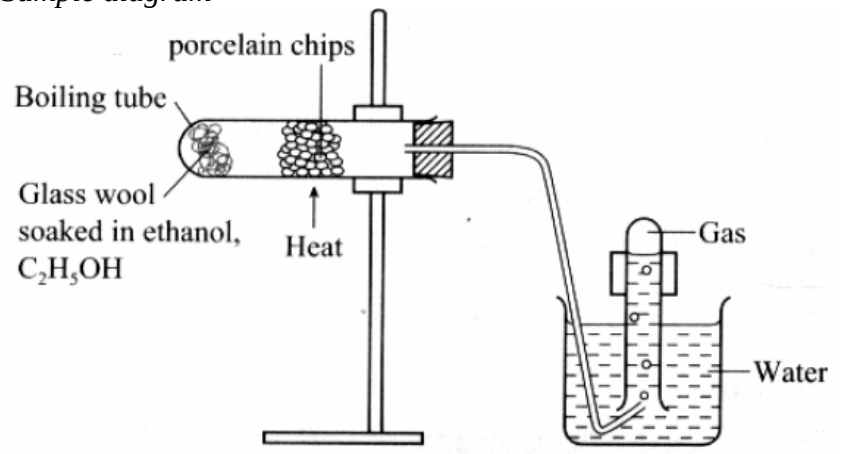
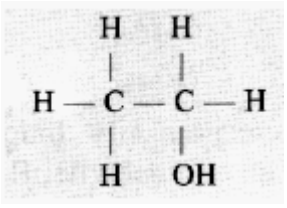
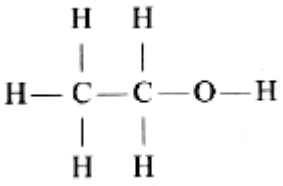
Question number	Answer	Mark
5 (a)		
	functional diagram label	1 1
(b)	(i) Oxygen	1
	(ii) $2H_2O_2 \rightarrow 2H_2O + O_2$ [formula correct and balanced] [Formula correct but not balanced, 1 mark]	2
(c)	(i) Experiment II	1
	(ii) Concentration of hydrogen peroxide in Expt II is higher than in Expt I	1
	(iii) 	2
(d)	Lower the activation energy (1) Frequency of effective collision increases (1)	2
	Total	11

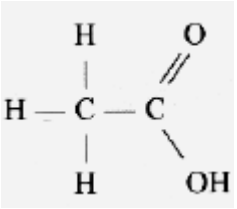
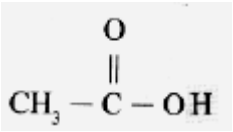
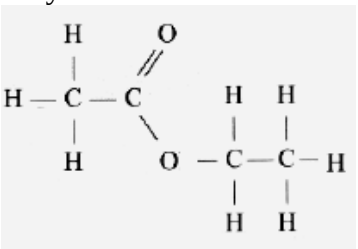
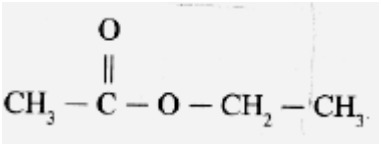
Question No	Answer	Mark
6 (a)	(i) Acidified Potassium manganate(VII) solution / manganate(VII) ion	1
	(ii) MnO_4^- + H^+ + 5 e → Mn^{2+} + H_2O - not balance MnO_4^- + 8 H^+ + 5 e → Mn^{2+} + 4 H_2O - balance	1 2 (max 2)
	(iii) green to yellow / brown	1
	(iv) +2 to +3	1
(b)	(i) chlorine is more electronegative than bromine	1
	(ii) Bromide ion	1
	(iii) brown	1
	(iv) purple Iodine cannot displace bromine from potassium bromide solution //. The purple colour is the colour of iodine in 1,1,1-trichloroethane.	1 1
	Total	10

Question number	Answer	Mark
7 (a)	(i) Psychotherapeutic medicines are the medicines that are used to alter abnormal thinking, feelings or behavior.	1
	(ii) stimulant – to reduce fatigue Antidepressant – to reduce tension and anxiety Antipsychotic – to treat psychiatric illness	1 1 1 3
(b)	<table><tr><th>X</th><th>Y</th></tr><tr><td>(i) soap (ii) effective only in soft water (iii) forms scum in hard water (iv) forms precipitate in acidic water (v) from natural sources (vi) biodegradable – cause no polution</td><td>Detergent, Effective in soft water and hard water, Does not form scum in hard water Does not form precipitate in acidic water, From synthetic sources such as petroleum. Non-biodegradable – kill aquatic lives.</td></tr></table>[Correct pairing]	6

(c)	(i) Salt – preservative Ethyl butanoate – flavour Lecithin - stabilizer Vitamin C – antioxidant (ii) Salt : - Draws the water out of the cells of microorganism, - Retard / slow down the growth of microorganism - food can be kept for longer (period) of time Monosodium glutamate: - Improve the taste of food, - Restore the taste loss because of processing, - Enhance the taste of food	1 1 1 1 4 1 1 1 1 1 1 6
	Total	20

Question number			Answer	Mark
8	(a)	(i)	Hydrocarbon is a (organic) compound/molecule containing carbon and hydrogen only.	1
		(ii)	point 1 : Saturated hydrocarbon contain only single covalent bond between carbon-carbon atom, point 2 : Unsaturated hydrocarbon contains at least one double covalent bond between carbon-carbon atom.	1 1
		(ii)	Name of reagent Procedure(s) with correct action verbs. Correct observation for octane Correct observation for octane Sample answer: Chemical test 1 1. Pour octane and octane into two separate test tubes. 2. Add a few drops of bromine water [1mark] (or bromine in 1,1,1-trichloroethane) into each test tube and shake [1mark] the test tube. 3. Octene will decolorize the brown bromine [1mark] solution and Octane shows no change [1mark] Sample answer: Chemical test 2 1. Pour octane into a test tube. 2. Add a few drops of acidified potsssium manganate(VII) [1 mark] solution and shake [1mark] the test tube 3. Repeat steps 1 and two by replacing octane with octane. 4. Octene will decolorize the purple potassiummanganate(VII) solution [1mark] solution and Octane shows no change [1mark]	1 1 1 1

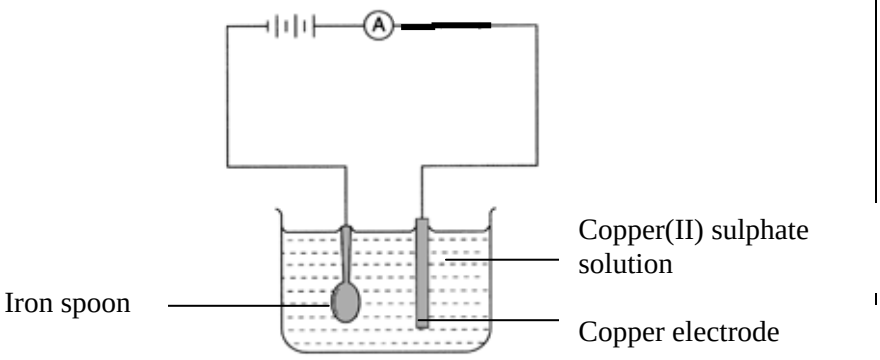
			If candidate uses combustion of hydrocarbon as a chemical test, mark accordingly but no mark for 'name of reagent'. Maximum mark in this case will be 3 only.	
	(b)	(i)	• Ethene is a gas and ethanol is a liquid • Ethene does dissolve in water and ethanol is soluble in water. • Ethene has a lower boiling point (melting point) than ethanol [*Any two correct*]	1 1 2
		(ii)	Diagram *Sample diagram*  Functional diagram label	1 1 2
			Procedure 1. Placed glass wool soaked with ethanol into the boiling tube 2. Place porcelain chips into the mid-section of the boiling tube 3. Heat the porcelain strongly and then glass wool. 4. Collect the gas over water.	1 1 1 1 4
	(c)	(i)	Orange to green	1
		(ii)	Ethyl ethanoate	1
		(iii)	Ethanol  or 	1

			Ethanoic acid  or  Ethyl ethanoate  or 	1 1
			Total	20

Question number		Answer	Mark
9	(a)	Hydrochloric acid // Nitric acid // Sulphuric acid,	1
		Acid reacts with a base / alkali to produce salt and water // Hydrochloric acid reacts with sodium hydroxide / (any base/alkali) to produce sodium chloride and water.	1
		$HCl + NaOH \rightarrow NaCl + H_2O$	1
		Acid reacts with a reactive metal to produce salt and hydrogen // Hydrochloric acid reacts with Magnesium / Zinc to produce Magnesium chloride/ zinc chloride and hydrogen.	1
		$Mg + 2HCl \rightarrow MgCl_2 + H_2$	1
		Acid reacts with a carbonate metal to produce salt, carbon dioxide and water // Hydrochloric acid reacts with calcium carbonate / (any metal carbonate) to produce calcium chloride , carbon dioxide and water.	1
		$CaCO_3 + 2HCl \rightarrow CaCl_2 + CO_2 + H_2O$	1 max 6
	(b)	Solution A: Ethanoic acid ionizes in water to produce hydrogen ions,	1
		The presence of hydrogen ions causes solution A / ethanoic acid to show its acidic properties	1

		Solution B Without water / in propanone ethanoic acid still exists as molecules , No hydrogen ions present , does not shows acidic property.	 1 1 4
	(c)	Materials : Solid sodium hydroxide and distilled water Apparatus : 50cm^3 beaker, 250cm^3 volumetric flask, electronic balance, glass rod, filter funnel. Calculation : Determine the mass of sodium hydroxide, NaOH: No. of moles of NaOH = $\frac{MV}{1000}$ = $\frac{1 \times 250}{1000}$ = 0.25 mol Mass of NaOH needed = No. of moles x Molar mass, of NaOH = 0.25 x [23 + 16 + 1] = 10 g Steps : 1. Using an electronic balance, 10 g of sodium hydroxide is exactly weighed and placed into a beaker, 2. Distilled water is added to the beaker to dissolve all the solid sodium hydroxide, 3. Then the solution is poured into a 250cm^3 volumetric flask. The beaker is rinsed with distilled water and the solution is poured into the volumetric flask. 4. The solution in the volumetric flask is topped up with distilled water until its calibration mark.	1 1 1 1 1 1 1 1 1 10
		Total	20

10	(a)	• Concentration of the solution effect the product of electrolysis process • Ions presence in the solutions are Cu^{2+}, Cl^-, H^+ and OH^- • In set I - ions move to anode are Cl^- and OH^- - Cl^- ions is selectively discharged at anode due to the concentration of the solution - $2Cl^- \longrightarrow Cl_2 + 2e$	1 1 1 1 1

		• In set II - Ions move to anode are Cl^- and OH^- - OH^- is selectively discharged due to the lower position in the ECS // it is easier to be discharged - $4OH^- \longrightarrow O_2 + H_2O + 4e$	1 1 1 max 6
	(b)	1. Zinc is more electropositive // Negative terminal : $Zn \longrightarrow Zn^{2+} + 2e$ 2. Copper is less electropositive // Positive terminal: $Cu^{2+} + 2e \longrightarrow Cu$ 3. The electron move (from negative terminal to the positive terminal) / (electrode zinc to electrode copper) 4. The flow of electron, produce the electric current// The needle of the voltmeter deflected, shows the electric current is produced	1 1 1 1 4
	(c)	 	
		Functional diagram : [switch on, battery, shade of the solution] Label diagram : [iron spoon at cathode, copper rod at anode, copper(II) sulphate solution]	1 1
		(i) 100 cm^3 of 1.0 $moldm^{-3}$ of copper(II) sulphate solution is poured into a beaker (ii) An iron spoon is connected to the negative terminal of the battery // is connected to the cathode (iii) Copper rod is connected to the positive terminal of the battery // is connected to the anode (iv) The switch is on // can infer from the diagram (v) The observations is recorded in the table after 15 minutes.	1 1 1 1

		(vi) **Electrodes** / **Observation** Anode / Copper electrode become thinner Cathode / Iron spoon is coated with brown solid / metal (vi) Half equations : Anode : $Cu \longrightarrow Cu^{2+} + 2e$ Cathode : $Cu^{2+} + 2e \longrightarrow Cu$	1 1 1 1 10
		JUMLAH	20

END OF MARKING SCHEME

Mark scheme paper 3 chemistry trial exam 2010

<table>
<tr><th>QUESTION</th><th>RUBRIC</th><th>SCORE</th></tr>
<tr><td rowspan="4">1 (a)</td><td>Able to record all the readings accurately to two decimal points with units.

<u>Sample answer:</u>

Activity I : 26.05 cm^3, 26.90 cm^3, 30.05 cm^3
Activity II : 13.30 cm^3, 25.85 cm^3, 38.45 cm^3</td><td>3</td></tr>
<tr><td>Able to record all the readings correctly without decimal point but with unit //
Able to record all the readings correctly without unit but with decimal point //
Able to record any 5 readings correctly with units</td><td>2</td></tr>
<tr><td>Able to state at least three readings correctly without units or decimal point
*Accept bottom burette readings</td><td>1</td></tr>
<tr><td>No response or wrong response</td><td>0</td></tr>
<tr><td colspan="3"></td></tr>
<tr><td rowspan="4">1(b)</td><td rowspan="2">Able to construct a table containing the following information:
1. Headings in the table
2. Transfer all data from 1(a) correctly
3. With units

<u>Sample answer:</u>

<table>
<tr><th>Titration number</th><th>Initial burette reading / cm^3</th><th>Final burette reading / cm^3</th><th>Volume of acid / cm^3</th></tr>
<tr><td>1</td><td>0.80</td><td>13.30</td><td>12.50</td></tr>
<tr><td>2</td><td>13.40</td><td>25.85</td><td>12.45</td></tr>
<tr><td>3</td><td>25.90</td><td>38.45</td><td>12.55</td></tr>
</table>
</td><td>3</td></tr>
<tr><td>Able to construct a table containing the following information:
1. Headings in the table
2. Transfer all data from 1(a) correctly.
3. Without units</td><td>2</td></tr>
<tr><td>Able to construct a table that contains the following information:
1. Headings in the table
2. Columns with data from 1(a)</td><td>1</td></tr>
<tr><td>No response or wrong response</td><td>0</td></tr>
</table>

1(c)	Able to show all the steps to calculate the concentration of sulphuric acid correctly. Sample answer: Step 1: Write the chemical equation: $2NaOH + H_2SO_4 \rightarrow Na_2SO_4 + 2H_2O$ Step 2: Calculating the number of moles of sodium hydroxide Number of mol of NaOH : $\frac{0.1 \times 25}{1000}$ // 0.0025 Step 3: Calculating the concentration of sulphuric acid Concentration of H_2SO_4 : ($\frac{0.0025 \times 1000}{12.50 \times 2}$) // 0.1 mol/dm^3	3
	Able to show incomplete steps. Sample answer: Step 2 and 3	2
	Able to give any one step.	1
	No response or wrong response	0
1(d)	Able to state the colour change Sample answer: Activity I : Pink change to colourless Activity II : Yellow change to orange	3
	Able to state the colour change of activity I or activity II	2
	Able to write the final colour of activity I and II	1
	No response or wrong response	0
1(e)	Able to state the correct type of acid in activity I and II and give the correct reason. Sample answer: Type of acid : Activity I use monoprotic acid. Activity II use diprotic acid. Reason : The volume of acid used in activity I is twice with the volume of acid used in activity II.	3
	Able to state the correct type of acid or the correct reason. Sample answer: Type of acid : Activity I use monoprotic acid. Activity II use diprotic acid.	2
	Able to state some idea	1
	No response or wrong response	0

1(f)	Able to state the colour change Sample answer: Yellow change to orange and finally change to red	3
	Able to state the colour change Sample answer: Yellow change to red	2
	Able to state the colour change Sample answer: Change to red	1
	No response or wrong response	0
1(g)	Able to predict the volume with the unit Sample answer: **More than** 25.00 cm^3 // 25.05 – 50.00 cm^3	3
	Able to predict the volume without the unit Sample answer: More than 25.00 // 25.05 – 50.00	2
	Able to write any other volume more than 50 cm^3	1
	No response or wrong response	0
1(h)	Able to state all the variable correctly (i) MV: Type of acid uses // type of indicator (ii) RV: Volume of acid to neutralize 25.0 cm^3 of 1.0 mol dm^{-3} sodium hydroxide solution.// Change in the colour of the indicator. (iii) CV: Concentration and volume of sodium hydroxide solution.	3
	Able to state any two variable correctly	2
	Able to state any one variable correctly	1
	No response or wrong response	0
1(i)	Able to state the hypothesis (relate the manipulated variable with the renponding variable) correctly. Sample answer: If use different type of acid to neutralize 25.0 cm^3 of 1.0 mol dm^{-3} sodium hydroxide solution, the volume of acid use also different// Different indicator used in the titration create different colour.	3
	Able to state the hypothesis (relate the manipulated variable with the renponding variable) less correct. Sample answer: If use different type of acid to neutralize sodium hydroxide solution, the volume of acid use also different.	2
	Able to give some idea	1
	No response or wrong response	0

<table>
<tr><td rowspan="4">1(j)</td><td>Able to give the operational definition for the end-point of titration in activity I correctly.
<u>Sample answer:</u>
The point that when the colour of phenolphthalein change from pink to colourless</td><td>3</td></tr>
<tr><td>Able to give the operational definition for the end-point of titration in activity I less correct.
<u>Sample answer:</u>
The point that when the colour of phenolphthalein change to colourless</td><td>2</td></tr>
<tr><td>Able to give some idea
<u>Sample answer:</u>
The point that the colour change //
The point that the alkali is neutralised with acid</td><td>1</td></tr>
<tr><td>No response or wrong response</td><td>0</td></tr>
<tr><td colspan="3"></td></tr>
<tr><td rowspan="4">1(k)</td><td>Able to classify all the acids into strong acid and weak acid correctly.
<u>Sample answer:</u>
<table>
<tr><th>Strong acid</th><th>Weak acid</th></tr>
<tr><td>Nitric acid</td><td>Ethanoic acid</td></tr>
<tr><td>Phosphoric acid</td><td>Ascorbic acid</td></tr>
</table></td><td>3</td></tr>
<tr><td>Able to classify three or two acid into strong acid or weak acid</td><td>2</td></tr>
<tr><td>Able to classify one acid into strong acid or weak acid</td><td>1</td></tr>
<tr><td>No response or wrong response</td><td>0</td></tr>
<tr><td colspan="3"></td></tr>
<tr><td colspan="2">Total mark</td><td>33</td></tr>
</table>

<table>
<tr><th>QUESTION</th><th>SAMPLE ANSWER</th><th>SCORE</th></tr>
<tr><td>2 (a)</td><td>How does the temperature affect (the rate of reaction) / (the time for mark ‘X’ to disappear from sight)?</td><td>3</td></tr>
<tr><td>2(b)</td><td>Manipulated variable : Temperature of sodium thiosulphate solution.
Responding variable : The rate of reaction // the time for mark ‘X’ to disappear from sight
Fixed variable : Volume and concentration of sodium thiosulphate solution // Volume and concentration of sulphuric acid.</td><td>3</td></tr>
<tr><td>2(c)</td><td>When the temperature of sodium thiosulphate solution increases, (the rate of reaction increases) / (the time for mark ‘X’ to disappear from sight is short)</td><td>3</td></tr>
<tr><td>2(d)</td><td>Substances : 0.2 mol dm^{-3} of sodium thiosulphate solution, 1.0 mol dm^{-3} of sulphuric acid.

Apparatus : Thermometer, stopwatch, conical flask, measuring cylinder 50 cm^3, measuring cylinder 10 cm^3, tripod stand, wire gauze, bunsen burner, white paper marked ‘X’.</td><td>3</td></tr>
<tr><td>2(e)</td><td>Procedures :
1. 50 cm^3 of 0.2 mol dm^{-3} sodium thiosulphate solution is measured by using measuring cylinder and pour into conical flask.
2. 5 cm^3 of 1.0 moldm^{-3} sulphuric acid is measured by using measuring cylinder.
3. Sodium thiosulphate solution in the conical flask is heated until the temperature is 30 ^oC
4. The conical flask is put on the white paper that have marked ‘X’.
5. The sulphuric acid is poured quickly into the conical flask and get the time for mark ‘X’ disappear from sight.
6. Repeat step 1 until 5 using different temperature.</td><td>3</td></tr>
<tr><td>2(f)</td><td><table><tr><th>Experiment</th><th>Temperature / ^oC</th><th>Time for mark ‘X’ disappear from sight / s</th></tr><tr><td>I</td><td></td><td></td></tr><tr><td>II</td><td></td><td></td></tr><tr><td>III</td><td></td><td></td></tr><tr><td>IV</td><td></td><td></td></tr><tr><td>V</td><td></td><td></td></tr></table></td><td>3</td></tr>
<tr><td></td><td>Total mark</td><td>Maximum 17</td></tr>
</table>

END OF THE MARKING SCHEME