4541/1
Chemistry
Paper 1
September
2011
1 ¼ hours

YAYASAN PERAK

JABATAN PELAJARAN NEGERI PERAK

PEPERIKSAAN PERCUBAAN SIJIL PELAJARAN MALAYSIA NEGERI PERAK 2011

CHEMISTRY

PAPER 1

Satu jam lima belas minit

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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.

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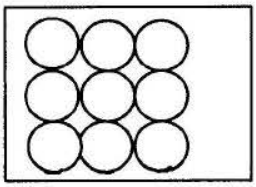
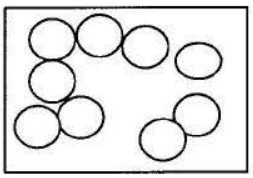
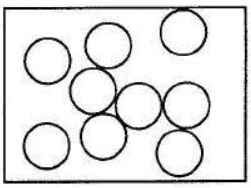
1 Which isotope is used to determine the age of fossils?
Isotop manakah digunakan untuk menentukan usia fosil?

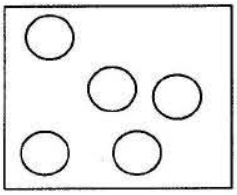
A Sodium-24
Natrium-24
B Carbon-12
Karbon-12
C Cobalt-60
Kobalt-60
D Iodine-131
Iodin-131

2 Which diagram shows the strongest attraction force between the particles?
Rajah manakah menunjukkan daya tarikan antara zarah yang paling kuat?

A 

B 

C 

D 

3 What is the meaning of one mole of substance?
Apakah maksud satu mol bagi suatu bahan?

A The number of particle of any substance.
Bilangan zarah bagi suatu bahan.
B One mole of substance contains 6.02×10^{20} particles.
Satu mol bahan mengandungi 6.02×10^{20} zarah.
C The mass of one mole of any substance is call relative atomic mass.
Jisim satu mol suatu bahan dipanggil jisim atom relatif.
D The amount of substance that contains as many particles as the number of atoms in exactly 12 g of carbon-12.
Jumlah suatu bahan yang mengandungi bilangan zarah sama dengan bilangan atom dalam 12g karbon-12.

4 What is the vertical column in the Periodic Table?
Apakah lajur menegak dalam Jadual Berkala?

A Shell
Petala
B Period
Kala
C Group
Kumpulan
D Transition
Peralihan

5 Elements in the Periodic Table are arranged according to the
Unsur-unsur dalam Jadual Berkala disusun berdasarkan

A proton number
nombor proton
B nucleon number
nombor nukleon
C number of neutrons
bilangan neutron
D number of electrons
bilangan elektron

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6 Which elements form a covalent compound?
Unsur-unsur manakah menghasilkan sebatian kovalen?

A Copper and zinc
Kuprum dan zink

B Carbon and oxygen
Karbon dan oksigen

C Sodium and chlorine
Natrium dan klorin

D Magnesium, sulphur and oxygen
Magnesium, sulfur dan oksigen

7 What happen to the metal atom and non-metal atom during the formation of ionic bond?
Apakah yang terjadi kepada atom logam dan atom bukan logam semasa pembentukan ikatan ionik?

	Metal atom ***Atom logam***	**Non-metal atom** ***Atom bukan logam***
A	Donate all the electrons *Mendermakan semua elektronnya*	Receive electron to complete the outermost shell *Menerima elektron untuk melengkapkan petala paling luarnya*
B	Donate their valence electron *Mendermakan elektron valennya*	Accept electron to complete the octet electron arrangement *Menerima elektron untuk melengkapkan susunan electron oktet.*
C	Share their electron in the outermost shell *Berkongsi elektron di petala paling luarnya*	Share the valence electron *Berkongsi elektron valennya*
D	Receive electron to complete the outermost shell *Menerima elektron untuk melengkapkan petala paling luarnya*	Donate their valence electron *Mendermakan elektron valennya*

8 Which substance conduct electricity in molten state?
Bahan manakah mengkonduksi elektrik dalam keadaan leburan?

A Glucose
Glukosa

B Sulphur
Sulfur

C Naphthalene
Naftalen

D Pottasium iodide
Kalium iodida

9 $KOH(aq) + HCl(aq) \rightarrow KCl(aq) + H_2O(l)$

The chemical equation above represents a reaction.
What is the type of the reaction?
Persamaan kimia di atas mewakili suatu tindak balas
Apakah jenis tindak balas itu?

A Neutralisation
Peneutralan

B Combustion
Pembakaran

C Displacement of metal
Penyesaran logam

D Precipitation
Pemendakan

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10 Which substance is a salt?
Bahan manakah suatu garam?

A Zinc oxide
Zink oksida
B Calcium sulphide
Kalsium sulfida
C Magnesium chloride
Magnesium klorida
D Aluminium hydroxide
Aluminium hidroksida

11 Which salt solution is colourless?
Larutan garam manakah tidak berwarna?

A Iron(III) sulphate
Besi(III) sulfat
B Aluminium nitrate
Aluminium nitrat
C Copper(II) chloride
Kuprum(II) klorida
D Potassium dichromate(VI)
Kalium dikromat(VI)

12 What is the catalyst used in Contact process to produce sulphuric acid?
Apakah mangkin yang digunakan dalam Proses Sentuh untuk menghasilkan asid sulfurik?

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

13 Which factor does **not** affect the rate of a reaction?
*Faktor manakah **tidak** mempengaruhi kadar sesuatu tindak balas?*

A The presence of catalyst
Kehadiran mangkin
B The concentration of reactant
Kepekatan bahan tindak balas
C The total surface area of solid reactant
Jumlah luas permukaan bahan tindak balas pepejal
D The mass of solid reactant
Jisim bahan tindak balas pepejal

14 The reaction between magnesium and hydrochloric acid is represented by the following equation:
Tindak balas di antara magnesium dan asid hidroklorik diwakili oleh persamaan berikut:

$$Mg_{(s)} + 2HCl_{(aq)} \rightarrow MgCl_{2(aq)} + H_{2(g)}$$

Which method is the **most** suitable to determine the rate of this reaction?
*Kaedah manakah yang **paling** sesuai untuk menentukan kadar bagi tindak balas ini?*

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

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15 Propene and butene are hydrocarbon from the same homologous series.
Propena dan butena adalah hidrokarbon daripada siri homolog yang sama.
Which statement is true for both propene and butene?
Pernyataan manakah benar bagi kedua-dua propena dan butena?

A Soluble in water
Larut dalam air
B Undergo substitution reaction
Menjalani tindak balas penukargantian
C Able to conduct electricity
Boleh mengkonduksi elektrik
D Have higher melting and boiling points compared to water
Mempunyai takat lebur dan takat didih yang lebih tinggi berbanding air

16 Diagram 16 shows the structural formula of a polymer.
Rajah 16 menunjukkan formula struktur suatu polimer.

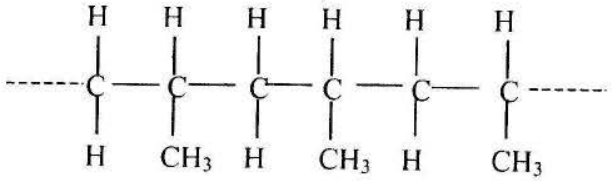
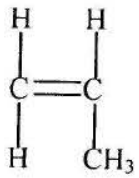
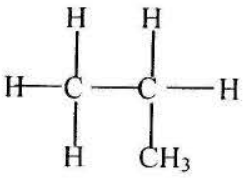
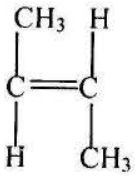


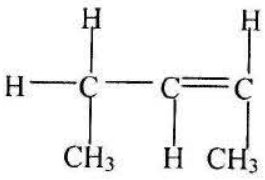
Diagram 16
Rajah 16

What is the structural formula of its monomer?
Apakah formula struktur monomernya?

A 

C 

B 

D 

17 What happen to a substance when undergoes a reduction?
Apakah yang berlaku kepada suatu bahan apabila menjalani penurunan?

A loses electron
kehilangan elektron
B gains electron
mendapat elektron
C loses protons
kehilangan proton
D gains protons
mendapat proton

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18 Diagram 18 shows the energy level diagram for the reaction A + B ⟶ C.
Rajah 18 menunjukkan gambar rajah aras tenaga bagi tindak balas A + B ⟶ C.

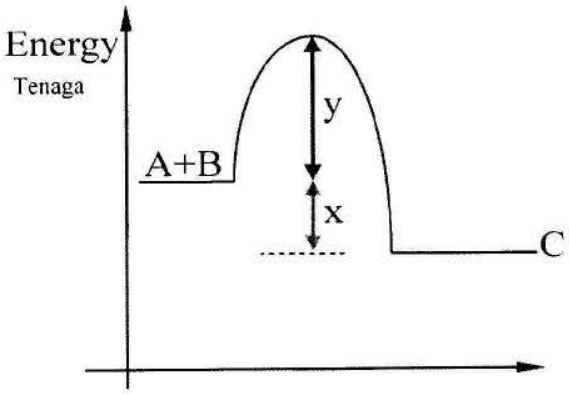

Diagram 18
Rajah 18

What is the value of the activation energy for the reaction?
Apakah nilai tenaga pengaktifan bagi tindak balas itu?

A x
B y
C (x + y)
D (y – x)

19 Diagram 19 shows the energy level diagram for the precipitation reaction of calcium carbonate.
Rajah 19 menunjukkan gambar rajah aras tenaga bagi tindak balas pemendakan kalsium karbonat.

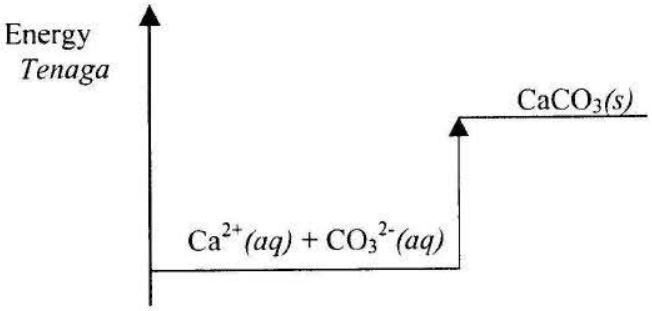

Diagram 19
Rajah 19

Which statements are **correct** based on the energy level diagram?
*Pernyataan manakah **betul** berdasarkan gambarajah aras tenaga itu?*

I. The reaction is endothermic
Tindak balas adalah endotermik
II. The reaction is exothermic
Tindak balas adalah eksotermik
III. The total energy content of the reactants is lower than that of the products.
Jumlah kandungan tenaga bahan tindak balas adalah lebih rendah daripada hasil tindak balas.
IV. Temperature of the mixture increases in this reaction.
Suhu campuran meningkat dalam tindak balas ini.

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

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20 Which statement is true about antibiotics?
Pernyataan manakah benar tentang antibiotik?

A Antibiotics can relief pain
Antibiotik boleh menghilangkan rasa sakit

B Antibiotics can slow down the growth of bacteria
Antibiotik boleh memperlahankan pertumbuhan bakteria

C Antibiotics can cure infections caused by viruses such as flu
Antibiotik boleh menyembuhkan penyakit yang disebabkan virus seperti selesema

D Antibiotics stimulate the production of hormones in our body
Antibiotik merangsang penghasilan hormon dalam badan kita.

21 Diagram 21 shows the electron arrangement of atom W.
Rajah 21 menunjukkan susunan elektron bagi atom W.

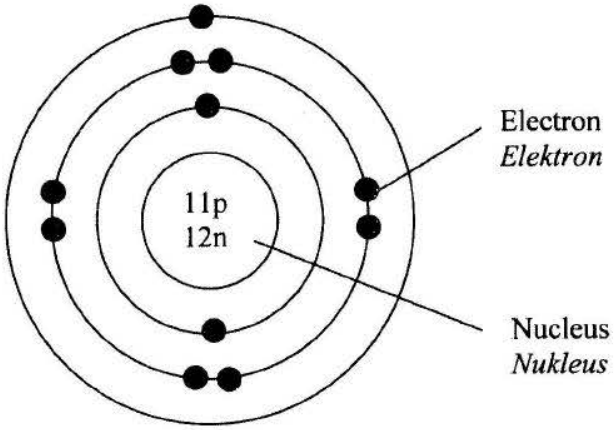

Diagram 21
Rajah 21

What is the standard representation of atom W?
Apakah perwakilan piawai bagi atom W?

A $^{11}_{23}W$

B $^{12}_{23}W$

C $^{23}_{12}W$

D $^{23}_{11}W$

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22 Diagram 22 shows the arrangement of electron of a compound.
Rajah 22 menunjukkan susunan elektron bagi satu sebatian.

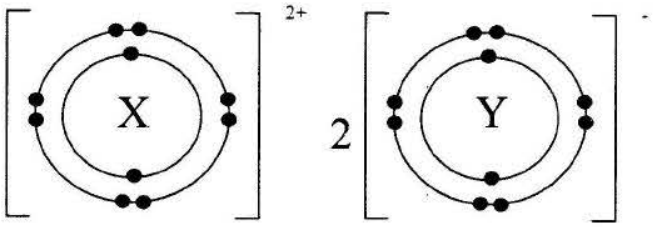

Diagram 22
Rajah 22

What is the chemical formula of the compound?
Apakah formula kimia bagi sebatian itu?

A X_2Y
B XY_2
C YX_2
D YX

23 What are the special characteristics of transition metals?
Apakah ciri-ciri istimewa bagi logam peralihan?

I Can show different oxidation numbers.
Boleh menunjukkan nombor pengoksidaan berbeza.
II Form coloured ions.
Menghasilkan ion berwarna.
III Can be used as catalysts.
Digunakan sebagai mangkin.
IV Alkali metals.
Logam alkali.

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

24 How many pairs of electrons are shared between nitrogen atoms in a nitrogen molecule?
Berapakah bilangan pasangan elektron yang dikongsi antara atom-atom nitrogen dalam satu molekul nitrogen.

A. One
Satu
B. Two
Dua
C Three
Tiga
D Four
Empat

25 What is the gas produce at the anode in electrolysis of copper(II) nitrate solution?
Apakah gas yang terhasil di anod dalam elektrolisis larutan kuprum(ll) nitrat?

A Oxygen
Oksigen
B Hydrogen
Hidrogen
C Nitrogen
Nitrogen
D Nitrogen dioxide
Nitrogen dioksida

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26 Which substance turns red litmus paper to blue?
Bahan manakah yang menukarkan kertas litmus merah kepada biru?

A Carbon dioxide gas in water
Gas karbon dioksida di dalam air

B Ammonia in benzene
Amonia di dalam benzena

C Ammonia in water
Amonia di dalam air

D Hydrogen chloride in water
Hidrogen klorida di dalam air

27 Substance Y reacted with dilute nitric acid solution to produce a colourless gas. A 'pop' sound is heard when the gas is tested with a lighted wooden splinter.
Bahan Y bertindak balas dengan larutan asid nitrik cair menghasilkan satu gas tidak berwarna. Bunyi 'pop' didengar apabila gas itu diuji dengan kayu uji menyala.
What is substance Y?
Apakah bahan Y?

A Magnesium
Magnesium

B Magnesium carbonate
Magnesium karbonat

C Copper
Kuprum

D Sodium carbonate
Natrium karbonat

28 When glass *X* is heated to a very high temperature and dipped into cold water, glass X does not crack.
Apabila kaca X dipanaskan pada suhu yang sangat tinggi dan dicelupkan ke dalam air sejuk, kaca X tidak retak.
What type of glass *X*?
Apakah jenis kaca X?

A Fused glass
Kaca terlakur

B Lead-crystal glass
Kaca plumbum

C Borosilicate glass
Kaca borosilikat

D Soda-lime glass
Kaca soda kapur

29 Diagram 29 shows part of the procedures in the preparation of a salt in laboratory.
Rajah 29 menunjukkan sebahagian daripada prosedur penyediaan suatu garam dalam makmal

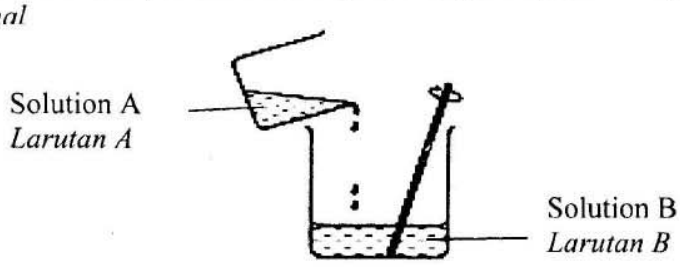

Diagram 29
Rajah 29

Which salt can be prepared by this method?
Garam manakah boleh disediakan melalui kaedah ini?

A Barium chloride
Barium klorida

B Lead(II) iodide
Plumbum(II) iodida

C Copper(II) sulphate
Kuprum(II) sulfat

D Magnesium nitrate
Magnesium nitrat

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30 The ionic equation below represents a redox reaction.
Persamaan ionik di bawah mewakili satu tindak balas redoks.

$$2\,Fe^{2+} + Br_2 \longrightarrow 2\,Fe^{3+} + 2\,Br^-$$

Which statement is true?
Pernyataan manakah benar?

A Iron(II) ion, Fe^{2+} is oxidized
Ion ferum(II), Fe^{2+} dioksidakan

B Iron(III) ion, Fe^{3+} is reduced
Ion ferum(III), Fe^{3+} diturunkan

C Bromine is the reducing agent
Bromin adalah agen penurunan

D Oxidation number of bromine increases from 0 to –2
Nombor pengoksidaan bromin bertambah daripada 0 kepada –2

31 Curve **L** in Diagram 31 is the graph for the reaction between 25 cm^3 of 0.1 mol dm^{-3} nitric acid with excess zinc.
Lengkung **L** *dalam Rajah 31 adalah graf bagi tindak balas antara 25 cm^3 asid nitrik 0.1 mol dm^{-3} dengan zink berlebihan*

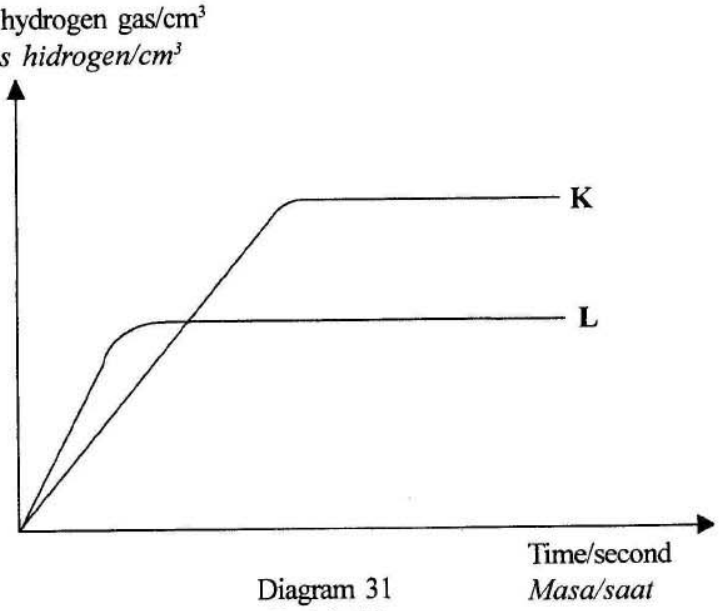

Diagram 31
Rajah 31

If the experiment is repeated, which solution will produce curve **K**?
Jika eksperimen itu diulang, larutan manakah yang akan menghasilkan lengkung **K**?

A 25 cm^3 of 0.2 mol dm^{-3} nitric acid solution
25 cm^3 larutan asid nitrik 0.2 mol dm^{-3}

B 30 cm^3 of 0.1 mol dm^{-3} nitric acid solution
30 cm^3 larutan asid nitrik 0.1 mol dm^{-3}

C 50 cm^3 of 0.05 mol dm^{-3} nitric acid solution
50 cm^3 larutan asid nitrik 0.05 mol dm^{-3}

D 100 cm^3 of 0.05 mol dm^{-3} nitric acid solution
100 cm^3 larutan asid nitrik 0.05 mol dm^{-3}

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32 Diagram 32 shows the structural formula of an organic compound.
Rajah 32 menunjukkan formula struktur bagi satu sebatian organik.

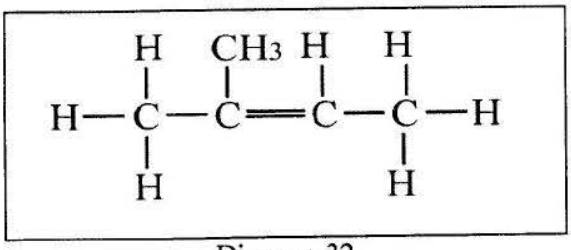

Diagram 32
Rajah 32

What is the name of the compound based on IUPAC nomenclature?
Apakah nama sebatian itu berdasarkan penamaan IUPAC?

A Pent-2-ene
B 2-methylbut -1-ene
C 2-methylbut-2-ene
D 3-methylbut-2-ene

33 Diagram 33 shows a simple chemical cell.
Rajah 33 menunjukkan satu sel kimia ringkas.

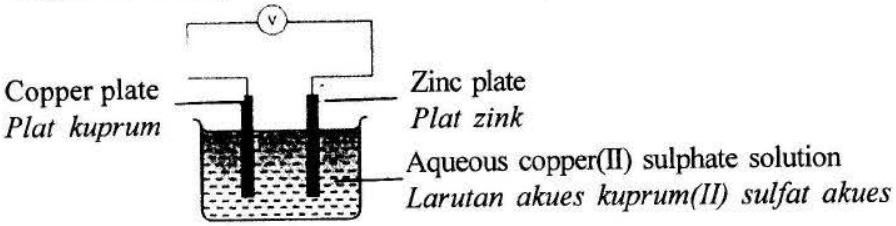

Diagram 33
Rajah 33

Which substance undergoes oxidation in the chemical cell?
Bahan manakah mengalami pengoksidaan dalam sel kimia itu?

A Zinc
Zink
B Copper
Kuprum
C Copper(II) ions
Ion kuprum(II)
D Hydrogen ions
Ion hidrogen

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34 Diagram 34 shows the molecular formula of two cleaning agent, X and Y.
Rajah 34 menunjukkan formula molekul bagi dua agen pencuci X dan Y.

$CH_3(CH_2)_{14}COONa$	$CH_3(CH_2)_{11}OSO_3Na$
Cleaning agent X *Agen pencuci X*	Cleaning agent Y *Agen pencuci Y*

Diagram 34
Rajah 34

Which statement about X and Y is correct?
Pernyataan manakah tentang X dan Y adalah betul

	X	Y
A	Non-biodegradable *Tidak terbiodegradasi*	Biodegradable *Terbiodegradasi*
B	Effective in acidic water *Berkesan dalam air berasid*	Less effective in acidic water *Kurang berkesan dalam air berasid*
C	Less effective in hard water *Kurang berkesan dalam air liat*	Effective in hard water *Berkesan dalam air liat*
D	Does not reduce the surface tension of water *Tidak mengurangkan ketegangan permukaan air*	Reduce the surface tension of water *Mengurangkan ketegangan permukaan air*

35 Diagram 35 shows a label on a bottle of fruit juice.
Rajah 35 menunjukkan label pada botol jus buah-buahan.

Diagram 35
Rajah 35

Which substance is suitable to replace citric acid?
Bahan manakah yang sesuai untuk menggantikan asid sitrik?

A Lecithin
Lesitin

B Fatty acid
Asid lemak

C Aspartame
Aspartam

D Ascorbic acid
Asid askorbik

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36 Diagram 36 shows the standard representation for atom of element X.
Rajah 36 menunjukkan perwakilan piawai bagi atom unsur X.

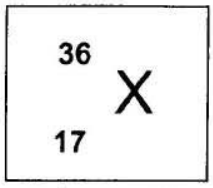

Diagram 36
Rajah 36

Which statement is **true** about atom X?
*Pernyataan manakah **benar** mengenai atom X?*

A The valence electrons is 17
Elektron valens adalah 17
B The nucleon number is 53
Nombor Nukleon adalah 53
C There are 17 protons and 36 neutrons in the nucleus of atom X
Terdapat 17 proton dan 36 neutron dalam nukleus atom X
D There are 17 electrons and 19 neutrons in atom X
Terdapat 17 elektron dan 19 neutron dalam atom X

37 Which statements are **correct** about Group 17 elements in the Periodic Table?
*Pernyataan manakah **betul** tentang unsur Kumpulan 17 dalam Jadual Berkala?*

I Known as halogens.
Dikenali sebagai halogen.
II Monoatomic.
Monoatom.
III Bromine is a reddish-brown liquid.
Bromin adalah cecair perang kemerahan.
IV Iodine is in solid state at room conditions.
Iodin adalah pepejal pada keadaan bilik.

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

38 What is the volume of carbon dioxide gas produced when 1200 cm^3 of ethane gas is burnt completely in air.
[1 mol of gas occupied 24 dm^3 at room condition]
Apakah isipadu gas karbon dioksida yang terhasil apabila 1200 cm^3 gas etana dibakar dengan lengkap dalam udara.
[1 mol gas menempati 24 dm^3 pada keadaan bilik]

A 1.20 cm^3
B 2.40 cm^3
C 1200 cm^3
D 2400 cm^3

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39 Which pair is **correct** about the Periodic Table of Elements?
*Pasangan manakah yang **betul** tentang Jadual Berkala Unsur?*

	Situation *Keadaan*	**Explanation** *Penerangan*
A	When going down Group 1, the reactivity of the element increases. *Apabila menuruni kumpulan 1, kereaktifan unsur bertambah.*	The size of atom becomes bigger. The nuclei attraction to the valence electrons becomes stronger. *Saiz atom semakin besar. Tarikan nucleus terhadap electron valen semakin kuat.*
B	When going down Group 17, the reactivity of the element decreases. *Apabila menuruni kumpulan 17, kereaktifan unsur berkurang.*	The atomic size becomes smaller. The nuclei attraction to the valence electrons becomes stronger. *Saiz atom semakin kecil. Tarikan nucleus terhadap electron valen semakin kuat.*
C	When going across period 3 from left to right, the atomic size decreases. *Apabila merentasi kala 3 dari kiri ke kanan, saiz atom semakin berkurang.*	The nuclei attraction to the electron becomes stronger. *Tarikan nucleus terhadap elektron semakin kuat.*
D	When going across period 3 from left to right, electronegativity increases. *Apabila merentasi kala 3 dari kiri ke kanan, keelektronegatifan semakin berkurang.*	The atom of the element becomes harder to attract electrons. *Atom-atom unsur semakin susah menarik elektron.*

40 Which substance is a liquid at room temperature ?
Bahan manakah adalah cecair pada suhu bilik?

Substance *Bahan*	Melting point / °C *Takat lebur/ °C*	Boiling point / °C *Takat didih/ °C*
A	– 25	5
B	50	300
C	– 256	– 192
D	10	140

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41 Diagram 41 shows the apparatus set-up for electrolysis of molten lead(II) bromide using carbon electrodes.
Rajah 41 menunjukkan susunan radas bagi menjalankan elektrolisis leburan plumbum(II) bromida menggunakan elektrod karbon.

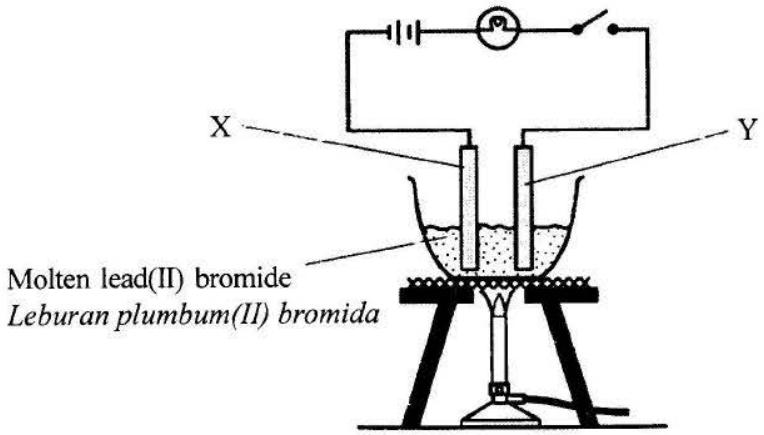

Diagram 41
Rajah 41

What happen when the switch is turned on?
Apakah yang berlaku apabila suis dihidupkan?

A Hydrogen gas is released at X
Gas hydrogen terbebas pada X

B Bromine gas is formed at Y
Gas bromine terbentuk pada Y

C Lead atom becomes lead(II) ion at Y
Atom plumbum menjadi ion plumbum (II) pada Y

D The molten electrolyte consists of lead(II) ions, hydrogen ions, bromide ions and hydroxide ions.
Leburan elektrolit mengandungi ion plumbum, ion hidrogen, ion bromida dan ion hidroksida.

42 The chemical equations below represent displacement reactions of metals P, Q, R and S from its salt solution.
Persamaan kimia di bawah mewakili tindak balas penyesaran logam P, Q, R dan S daripada larutan garamnya.

$$P_{(s)} + Q^{2+}_{(aq)} \longrightarrow P^{2+}_{(aq)} + Q_{(s)}$$

$$Q_{(s)} + R^{2+}_{(aq)} \longrightarrow Q^{2+}_{(aq)} + R_{(s)}$$

$$S_{(s)} + P^{2+}_{(aq)} \longrightarrow S^{2+}_{(aq)} + P_{(s)}$$

Which metal is the most electropositive?
Logam manakah paling elektropositif

A P
B Q
C R
D S

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43 5.6 g of potassium hydroxide is dissolved in distilled water to form 250 cm^3 solution. What is the concentration of the ~~sodium~~ hydroxide solution?
[Relative atomic mass : H,1 ; O, 16 ; K, 39]
5.6 g kalium hidroksida dilarutkan ke dalam air suling menghasilkan 250 cm^3 larutan. Apakah kepekatan larutan kalium hidroksida itu?
[Jisim atom relatif : H,1 ; O, 16 ; K, 39]

A 0.1 mol dm^{-3}
B 0.4 mol dm^{-3}
C 0.25 mol dm^{-3}
D 0.02 mol dm^{-3}

44 Which chemical equation **is not** a redox reaction?
*Persamaan kimia manakah **bukan** suatu tindak balas redoks?*

A $Ba^{2+}_{(aq)} + SO_4^{2-} \longrightarrow BaSO_{4(s)}$

B $Br_{2(g)} + 2I^-_{(aq)} \longrightarrow 2Br_{(aq)} + I_{2(s)}$

C $Cl_{2(g)} + S^{2-}_{(aq)} \longrightarrow S + 2Cl^-_{(aq)}$

D $Cu^{2+}_{(aq)} + Zn_{(s)} \longrightarrow Cu_{(s)} + Zn^{2+}_{(aq)}$

45 Table 45 shows the observations for the reaction involves salt Y.
Jadual 45 menunjukkan pemerhatian bagi tindak balas melibatkan garam Y.

Reaction *Tindak balas*	Observation *Pemerhatian*
Acid solution is added to salt Y. *Larutan asid ditambah pada garam Y*	Gas bubbles that turns the lime water chalky *Gelembung gas yang menukarkan air kapur menjadi keruh*
Salt Y is heated. *Garam Y dipanaskan.*	Residue is yellow when it is hot and white when it is cold. *Baki berwarna kuning bila panas dan putih bila sejuk*

Table 45
Jadual 45

What is salt Y?
Apakah garam Y?

A Zinc nitrate
B Lead(II) nitrate
C zinc carbonate
D Lead(II) carbonate

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46 Diagram 46 shows the apparatus set-up for an experiment to prepare ammonium sulphate salt.
Rajah 46 menunjukkan susunan radas bagi satu eksperimen untuk menyediakan garam ammonium sulfat.

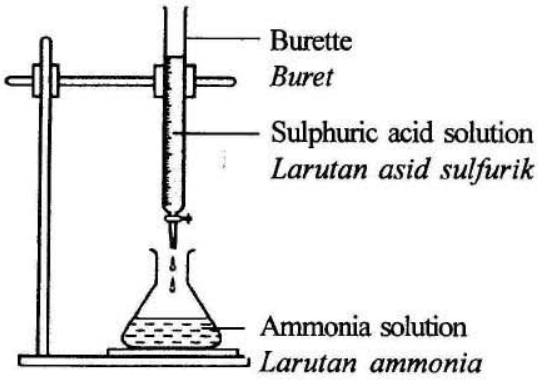

Diagram 46
Rajah 46

What is the percentage composition by mass of nitrogen in the salf?
[Relative atomic mass : H,1 ; N,14 ; O,16 ; S,32]
Apakah peratus komposisi mengikut jisim bagi nitrogen dalam sampel baja itu?
[Jisim atom relatif : H,1 ; N,14 ; O,16 ; S,32]

A 21.54 %
B 21.21 %
C 12.28 %
D 12.38 %

47 Table 47 shows the volume of carbon dioxide gas, CO_2, collected in the reaction between calcium carbonate and dilute hydrochloric acid.
Jadual 47 menunjukkan isipadu gas karbon dioksida, CO_2, yang dikumpul dalam tindak balas antara kalsium karbonat dan asid hidroklorik cair.

Time/ minute *Masa/ minit*	0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5
Volume of CO_2/ cm^3 *Isipadu CO_2/ cm^3*	0.0	4.5	7.5	10.0	12.5	14.5	16.0	17.0

Table 47
Jadual 47

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

A 1.50 cm^3 min^{-1} *1.50 cm^3 min^{-1}*
B 3.50 cm^3 min^{-1} *3.50 cm^3 min^{-1}*
C 5.00 cm^3 min^{-1} *5.00 cm^3 min^{-1}*
D 5.33cm^3 min^{-1} *5.33cm^3 min^{-1}*

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48 Organic compound Z has the following properties:
Bahan organik Z mempunyai sifat-sifat berikut:

- releases a gas which turns lime water chalky when it is added with calcium carbonate.
  membebaskan gas yang mengeruhkan air kapur apabila dicampurkan dengan kalsium karbonat.
- produces a substance which has a sweet smell when it is reacted with an alcohol.
  menghasilkan bahan yang berbau wangi apabila ditindakbalaskan dengan suatu alkohol.

What is substance Z?
Apakah bahan Z?

A Propene
Propena
B Propanol
Propanol
C Propanoic acid
Asid propanoik
D Propyl propanoate
Propil propanoat

49 The thermochemical ionic equation below represents the reaction between magnesium powder and copper(II) sulphate solution.
Persamaan ion termokimia berikut mewakili tindak balas antara serbuk magnesium dan larutan kuprum(II) sulfat.

$$Mg(s) + Cu^{2+}(aq) \longrightarrow Mg^{2+}(aq) + Cu(s) \quad \Delta H = -189 \text{ kJ mol}^{-1}$$

Calculate the increase in temperature of the mixture when excess magnesium powder is added into 40 cm^3 of 0.8 mol dm^{-3} copper (II) sulphate solution.
Hitungkan kenaikan suhu campuran apabila serbuk magnesium yang berlebihan ditambah kepada 40 cm^3 larutan kuprum(II) sulfat 0.8 mol dm^{-3}.
[Specific heat capacity of solution = 4.2 $Jg^{-1}\ °C^{-1}$, density of solution = 1 g cm^{-3}]
[Muatan haba tentu larutan = 4.2 $Jg^{-1}\ °C^{-1}$, ketumpatan larutan = 1 g cm^{-3}]

A 6.5 °C
B 13.5 °C
C 18.0 °C
D 36.0 °C

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50 Diagram 50 shows the energy level diagram for the reaction between an acid and an alkali.
Rajah 50 menunjukkan gambar rajah aras tenaga bagi tindak balas antara suatu asid dan suatu alkali.

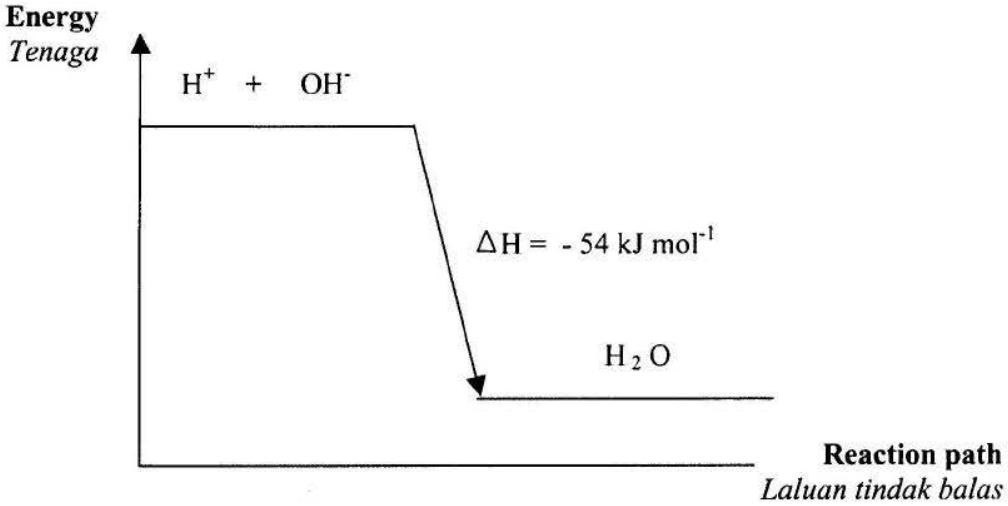

Diagram 50
Rajah 50

Calculate the amount of heat released when 100 cm^3 of 1.0 mol dm^{-3} sulphuric acid reacts with 100 cm^3 of 1.0 mol dm^{-3} sodium hydroxide solution.
Hitungkan jumlah haba yang dibebaskan apabila 100 cm^3 asid sulfurik 1.0 mol dm^{-3} bertindak balas dengan 100 cm^3 larutan natrium hidroksida 1.0 mol dm^{-3}.

A 5.40 kJ
B 10.8 kJ
C 27.0 kJ
D 54.0 kJ

END OF THE QUESTION PAPER
KERTAS SOALAN TAMAT

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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.

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SULIT 4541/2

4541/2
Percubaan
SPM
Chemistry
Paper 2
2011
2½ hours

NAMA : .....

ANGKA GILIRAN

YAYASAN PERAK

JABATAN PELAJARAN NEGERI PERAK

PEPERIKSAAN PERCUBAAN SIJIL PELAJARAN MALAYSIA NEGERI PERAK 2011

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

Kertas soalan ini mengandungi 20 halaman bercetak.

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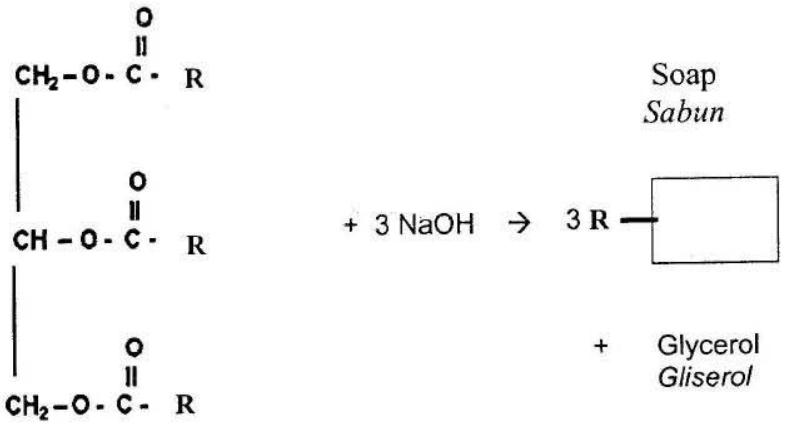
Section A
Bahagian A
[60 *marks*]
[60 *markah*]
Answer **all** questions in this section.
*Jawab **semua** soalan dalam bahagian ini.*

1 (a) Diagram 1 shows an equation for reaction in the preparation of a sample of soap from palm oil.
Rajah 1 menunjukkan persamaan tindak balas bagi penyediaan satu contoh sabun daripada minyak sawit.



Palm Oil
Minyak sawit

Diagram 1
Rajah 1

(i) State the homologous series of palm oil.
Nyatakan siri homolog bagi minyak sawit.

.....

[1 mark]
[*1 markah*]

(ii) Name the process to produce soap.
Namakan process menghasilkan sabun.

.....

[1 mark]
[*1 markah*]

(iii) Complete the structural formula of soap particle formed in Diagram 1.
Lengkapkan formula struktur bagi zarah sabun dalam Rajah 1.

[1 mark]
[*1 markah*]

(iv) State **two** ions in hard water that form scum with soap anion.
*Nyatakan **dua** ion dalam air liat yang membentuk kekat dengan anion sabun.*

.....

[1 mark]
[*1 markah*]

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(b) Sodium alkylbenzene sulphonate is an example of detergent, a non-soap cleaning agent. Diagram 1(b) shows the structural formula of the anion of the detergent.
Natrium alkilbenzena sulfonat adalah satu contoh detergen, iaitu bahan pencuci bukan sabun. Rajah 1(b) menunjukkan formula struktur bagi anion detergen tersebut.

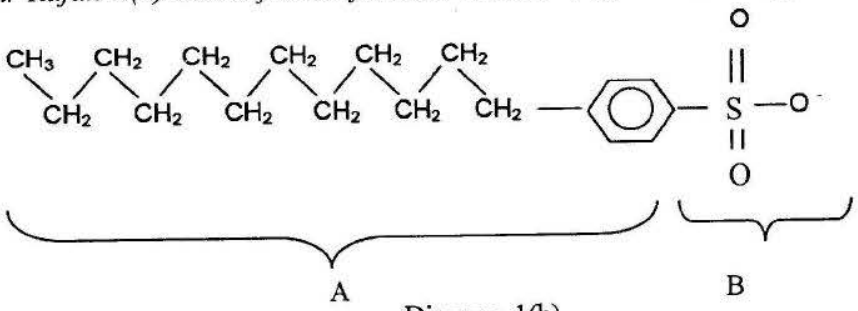

Diagram 1(b)
Rajah 1(b)

(i) Which part of the structure in the diagram 1(b) is hydrophilic, A or B?
Bahagian manakah struktur dalam rajah tersebut adalah hidrofilik, A atau B?

.....

[1 mark]
[*1 markah*]

(ii) State an example of additive in detergent.
Nyatakan satu contoh bahan tambah dalam detergen.

.....

[1 mark]
[*1 markah*]

(c) Table 1 shows two types of modern medicines.
Jadual 1 menunjukkan dua jenis ubatan moden.

Type *Jenis*	Example *Contoh*
Analgesic	P
Q	Barbiturate

Table 1 / *Jadual 1*

(i) State P and Q.
Nyatakan P dan Q.

P : .....

Q : .....

[2 marks]
[*2 markah*]

(ii) State the function of barbiturate.
Nyatakan fungsi barbiturat.

.....

[1 mark]
[*1 markah*]

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2 Diagram 2 shows the standard representation of five atom of elements.
Rajah 2 menunjukkan perwakilan piawai bagi lima atom bagi unsur.

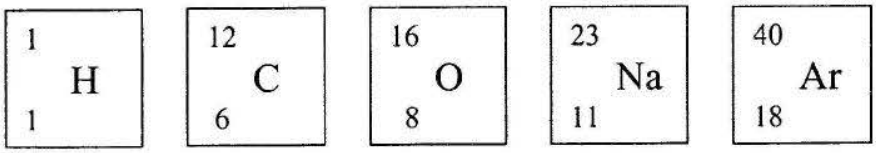

Diagram 2
Rajah 2

(a) (i) State the name of element for the symbol Ar.
Nyatakan nama bagi unsur yang mempunyai simbol Ar.

.....

[1 mark]
[*1 markah*]

(ii) Write the electron arrangement of Ar atom.
Tulis susunan elektron bagi atom Ar.

.....

[1 mark]
[*1 markah*]

(iii) Which period is element Ar placed in the Periodic Table? Explain.
Kala manakah unsur Ar terletak di dalam Jadual Berkala Unsur? Terangkan.

.....

.....

[2 marks]
[*2 markah*]

(b) (i) What is meant by nucleon number?
Apakah maksud nombor nukleon?

.....

[1 mark]
[*1 markah*]

(ii) Calculate the number of neutron for carbon-12.
Kira bilangan neutron bagi karbon-12.

.....

[1 mark]
[*1 markah*]

(iii) State one use of isotope of carbon-12.
Nyatakan satu kegunaan isotop karbon-12.

.....

[1 mark]
[*1 markah*]

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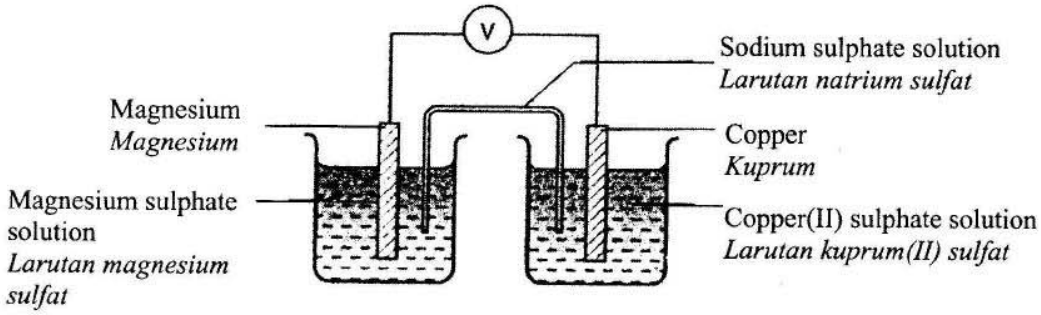
(c) Oxygen atom and sodium atom combine to form an ionic compound.
Draw the electron arrangement of the compound formed.
Atom oksigen dan atom klorin berpadu membentuk satu sebatian ion.
Lukis susunan elektron bagi sebatian yang terbentuk.

[2 marks]
[*2 markah*]

3 Diagram 3(a) shows the apparatus set-up of cell X.
Rajah 3(a) menunjukkan susunan radas bagi sel X.



Cell X
Sel X

Diagram 3(a)
Rajah 3(a)

(a) Name cell X.
Namakan sel X.

.....

[1 mark]
[1 *markah*]

(b) Write the chemical formula of sodium sulphate.
Tuliskan formula kimia bagi natrium sulfat.

.....

[1 mark]
[1 *markah*]

(c) (i) Draw the direction of flow of electrons in cell X.
Lukis arah aliran elektron dalam sel X.

[1 mark]
[1 *markah*]

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(ii) State the process that occur at
Nyatakan proses yang berlaku pada

Magnesium electrode :.....
Elektrod magnesium :

Copper electrode :.....
Elektrod kuprum :

[2 marks]
[2 *markah*]

(d) Write an ionic equation for the overall reaction in cell X.
Tuliskan persamaan ion bagi keseluruhan tindak balas dalam sel X.

.....

[1 mark]
[1 *markah*]

(e) Diagram 3(b) shows the apparatus set-up of cell Y.
Rajah 3(a) menunjukkan susunan radas bagi sel Y.

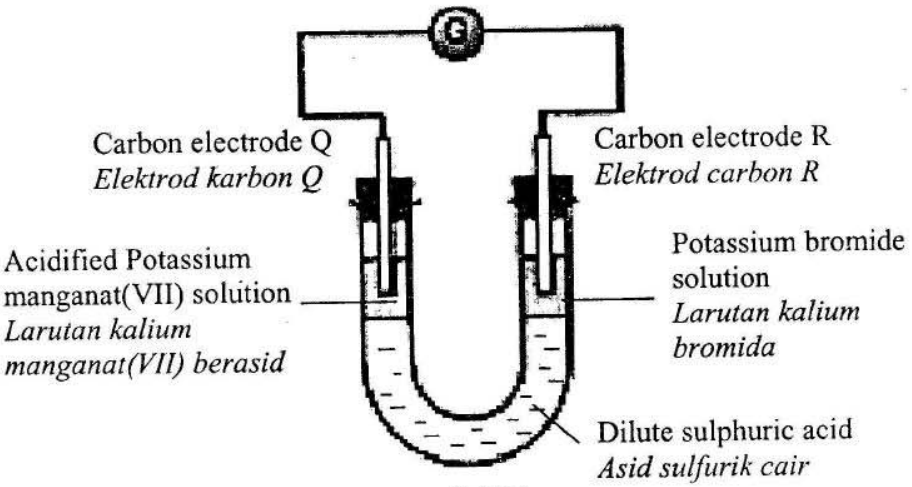

Diagram 3(b)
Rajah 3(b)

(i) State the observation at electrode R after a few minutes.
Nyatakan pemerhatian pada elektrod R selepas beberapa minit.

.....

[1 mark]
[*1 markah*]

(ii) Write the half equation for the reaction at electrode R.
Tuliskan setengah persamaan bagi tindak balas pada elektrod R.

.....

[1 mark]
[*1 markah*]

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(f) The product formed at electrode R was added to iron(II) sulphate solution. Iron(II) sulphate solution change colour from green to brown. Explain briefly why the changes occurred.
Hasil yang terbentuk pada elektrod R telah ditambahkan kepada larutan ferum(II) sulfat. Warna larutan ferum(II) sulfat telah berubah daripada hijau kepada perang. Terangkan secara ringkas mengapa perubahan ini berlaku.

.....

.....

.....

[2 marks]
[*2 markah*]

4 (a) Salts can be prepared by the following methods:
Garam boleh disediakan melalui kaedah-kaedah berikut:

Method **A** : Neutralisation reaction between base and acid *Kaedah* **A** : *Tindak balas peneutralan antara bes dan asid*
Method **B** : Double decomposition reaction involving two solutions of soluble salts *Kaedah* **B** : *Tindak balas penguraian ganda dua yang melibatkan dua larutan garam yang terlarut*

A student is carried out an experiment to prepare two salts, lead(II) sulphate and copper(II) sulphate.
Seorang pelajar menjalankan eksperimen untuk menyediakan dua garam, plumbum(II) *sulfat dan kuprum*(II) *sulfat.*

(i) Which method is used to prepare
Kaedah manakah digunakan untuk menyediakan

Lead(II) sulphate : .....
plumbum(II) *sulfat*

Copper(II) sulphate : .....
Kuprum(II) sulfat

[2 marks]
[*2 markah*]

(ii) Write the chemical equation for the preparation of copper(II) sulphate based on the method in (a)(i).
Tuliskan persamaan kimia untuk penyediaan kuprum(II) *sulfat berdasarkan kaedah dalam (a)(i).*

.....

[2 marks]
[*2 markah*]

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(iii) State the observation during the preparation of lead(II) sulphate.
Nyatakan pemerhatian semasa penyediaan plumbum(II) *sulfat.*

.....

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

(b) (i) Diagram 4 shows part of apparatus set-up of an experiment to decompose zinc carbonate.
Rajah 4 menunjukkan sebahagian susunan radas eksperimen bagi penguraian zink karbonat.

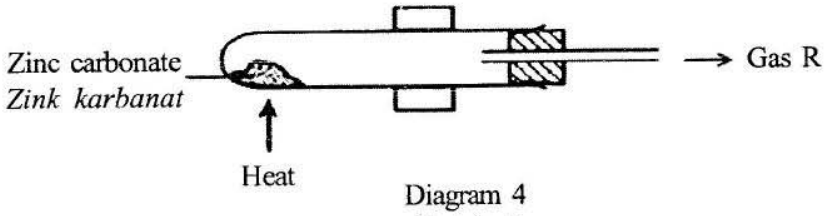

Diagram 4
Rajah 4

Describe a chemical test to identify gas R.
Huraikan satu ujian kimia untuk mengenalpasti gas R.

.....

.....

[2 marks]
[*2 markah*]

(ii) Zinc carbonate reacts with sulphuric acid to produce zinc sulphate. The chemical equation for the reaction is shown below.
Zink karbonat bertindak balas dengan asid sulfurik untuk menghasilkan zink sulfat. Persamaan kimia untuk tindak balas itu ditunjukkan di bawah.

$$ZnCO_3 + H_2SO_4 \longrightarrow ZnSO_4 + CO_2 + H_2O$$

7.5 g zinc carbonate reacts completely with excess sulphuric acid.
Calculate the mass of zinc sulphate produced.
7.5 g zink karbonat bertindak balas lengkap dengan asid sulfurik berlebihan.
Hitungkan jisim zink sulfat yang terbentuk.
[Relative atomic mass / *Jisim atom relatif* : Zn, 65 ; C, 12 ; S, 32 ; O, 16, ; H, 1]

[3 *marks*]
[3 *markah*]

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5 Three experiments were carried out to investigate factors that affect the rate of reaction. Table 5 shows the description of each experiment.
Tiga eksperimen telah dijalankan untuk mengkaji faktor yang mempengaruhi kadar suatu tindak balas.
Jadual 5 menunjukkan perincian setiap eksperimen.

Experiment *Eksperimen*	**Reactant** *Bahan tindak balas*	**Temperature, °C** *Suhu, °C*	**Time taken for collecting 30 cm^3 of gas released, (s)** *Masa yang diambil untuk mengumpul 30 cm^3 gas yang terbebas, (s)*
I	Excess zinc powder + 20 cm^3 of 0.1 mol dm^{-3} sulphuric acid *Serbuk zink berlebihan + 20 cm^3 asid sulfurik 0.1 mol dm^{-3}*	30.0	20.0
II	Excess zinc granule + 20 cm^3 of 0.1 mol dm^{-3} sulphuric acid *Ketulan zink berlebihan + 20 cm^3 asid sulfurik 0.1 mol dm^{-3}*	30.0	32.0
III	Excess zinc powder + 20 cm^3 of 0.1 mol dm^{-3} sulphuric acid + copper(II) sulphate solution *Serbuk zink berlebihan + 20 cm^3 of 0.1 mol dm^{-3} asid sulfurik+ larutan kuprum(II) sulfat*	30.0	12.0

Table 5
Jadual 5

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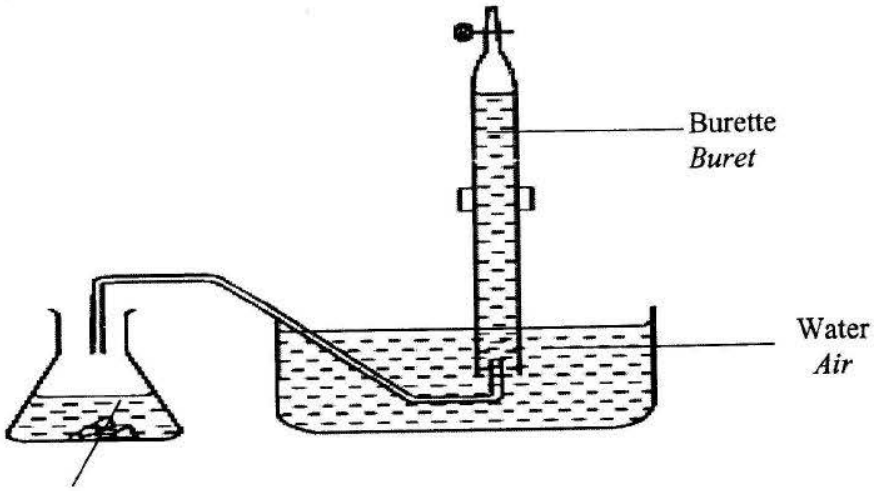
(a) Complete the diagram below with a suitable apparatus.
Lengkapkan rajah di bawah dengan radas yang sesuai.



20 cm^3 of 0.1 mol dm^{-3} of sulphuric acid + excess zinc granules
20 cm^3 asid sulfurik 0.1 mol dm^{-3} + ketulan zink berlebihan

[1 mark]
[*1 markah*]

(b) Write the chemical equation for the reaction between zinc and sulphuric acid.
Tuliskan persamaan kimia bagi tindak balas antara zink dan asid sulfurik.

.....

[1 mark]
[*1 markah*]

(c) Calculate the average rate of the reaction for experiment I, experiment II and experiment III in $cm^3\ s^{-1}$.
Hitung kadar tindak balas purata bagi eksperimen I, eksperimen II dan eksperimen III dalam $cm^3\ s^{-1}$

(i) Experiment I
Eksperimen I

(ii) Experiment II
Eksperimen II

(iii) Experiment III
Experimen III

[3 marks]
[*3 markah*]

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(d) By using collision theory,
Dengan menggunakan teori perlanggaran,

(i) Explain the difference in the rate of reaction between Experiment I and experiment II.
Terangkan mengapa terdapat perbezaan dalam kadar tindak balas antara Eksperimen I dan II.

.....

.....

.....

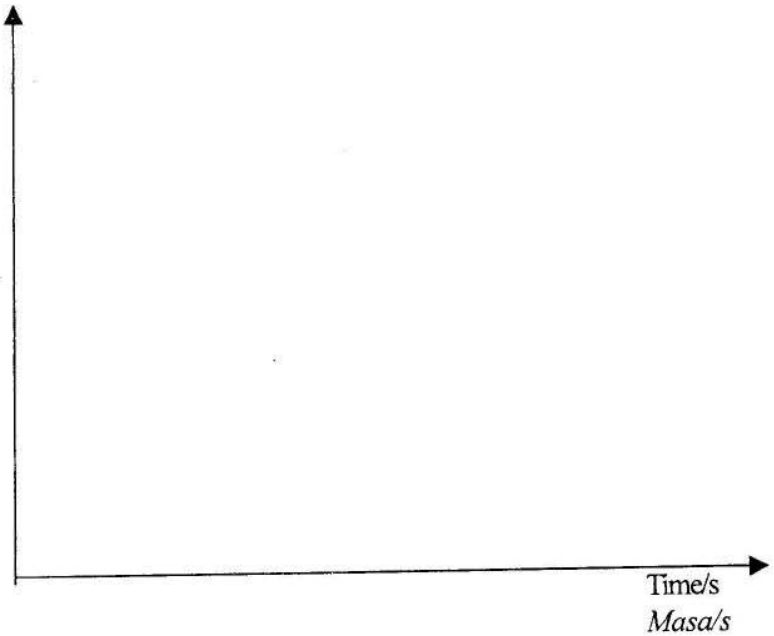
.....

.....

[3 marks]
[*3 markah*]

(ii) Sketch the graphs of volume of gas collected against time for experiment I, experiment II and experiment III in the same axis.
Lakarkan graf isipadu gas dikumpul melawan masa bagi eksperimen I, eksperimen II dan eksperimen III dalam paksi yang sama

Volume of gas collected / cm^3
Isipadu gas dikumpul /cm^3



[3 marks]
[*3 markah*]

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6 Diagram 6 shows a flow chart of reactions involving ethanol, C_2H_5OH.
Rajah 6 menunjukkan carta alir bagi tindak balas yang melibatkan etanol, C_2H_5OH.

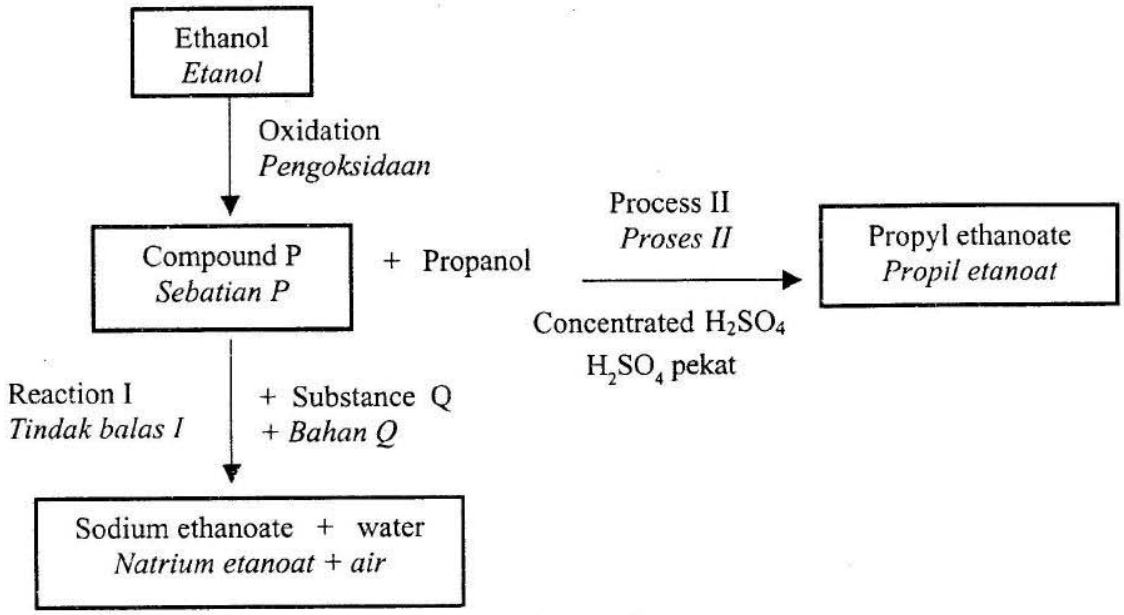

Diagram 6
Rajah 6

Based on the information in Diagram 6,
Berdasarkan maklumat dalam Rajah 6,

(a) State the general formula for the homologous series of ethanol.
Nyatakan formula am bagi siri homolog bagi etanol.

.....

[1 mark]
[*1 markah*]

(b) Oxidation of ethanol produces compound P.
Pengoksidaan etanol menghasilkan sebatian P.

(i) Name compound P
Namakan sebatian P

.....

[1 mark]
[*1 markah*]

(ii) Describe one chemical test for compound P
Huraikan satu ujian kimia untuk sebatian P

.....

.....

[2 marks]
[*2 markah*]

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(iii) Compound P reacts with substance Q in Reaction I to produce sodium ethanoate and water. What is substance Q?
Sebatian P bertindak balas dengan bahan Q dalam Tindak balas I untuk menghasilkan natrium etanoate dan air. Apakah sebatian Q?

.....

[1 mark]
[*1 markah*]

(c) The reaction between compound P and propanol produces propyl ethanoate in process II,
Tindak balas antara sebatian P dan propanol menghasilkan propil etanoat dalam proses II,

(i) Name process II.
Namakan proses II.

.....

[1 mark]
[*1 markah*]

(ii) State two physical properties of propyl ethanoate.
Nyatakan dua sifat fizik bagi propil etanoat.

.....

.....

[2 marks]
[*2 markah*]

(iii) Draw a structural formula of propyl ethanoate.
Lukiskan formula struktur bagi propil etanoat.

[1 mark]
[*1 markah*]

(d) Explain the uses of ethanol in our daily life based on its physical properties.
Terangkan kegunaan etanol dalam kehidupan harian berdasarkan sifat fiziknya.

.....

.....

.....

[2 marks]
[*2 markah*]

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Section B
Bahagian B
[20 *marks*]
[20 *markah*]

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

7 Diagram 7 shows part of the Periodic Table of Elements.
Rajah 7 menunjukkan sebahagian daripada Jadual Berkala Unsur.

1																	18
H	2											13	14	15	16	17	He
Li															O	F	
Na	Mg	3	4	5	6	7	8	9	10	11	12	Al				Cl	
K									Ni							Br	
																I	

Diagram 7
Rajah 7

(a) Helium is an element placed in Group 18 in the Periodic Table. State why helium is chemically unreactive.
Helium adalah satu unsur yang terletak dalam kumpulan 18 dalam Jadual Berkala. Nyatakan mengapa helium tidak reaktif secara kimia.

[2 marks]
[*2 markah*]

(b) When going down group 1 in the Periodic Table, the reactivity of the metal increases from lithium to potassium. Explain.
Apabila menuruni kumpulan 1 dalam Jadual Berkala, kereaktifan logam bertambah dari litium ke kalium. Terangkan.

[3 marks]
[3 *markah*]

(c) Explain why chlorine exists as diatomic molecule at room temperature.
Terangkan mengapa klorin wujud sebagai molekul dwiatom pada suhu bilik.

[4 marks]
[4 *markah*]

(d) Magnesium reacts with oxygen gas to form an oxide compound.
Magnesium bertindak balas dengan oksigen menghasilkan satu sebatian oksida.

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

[2 marks]
[*2 markah*]

(ii) What is the mass of the oxide compound produced when 18 g of magnesium react completely with oxygen gas.
[Relative atomic mass : Mg, 24; O, 16]
Berapakah jisim sebatian oksida yang terhasil apabila 18 g magnesium bertindak balas dengan lengkap dengan gas oksigen.
[Jisim atom relatif : Mg, 24 ; O, 16]

[2 marks]
[*2 markah*]

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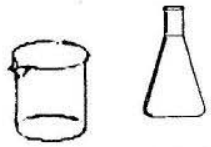
(iii) Explain the formation of chemical bond between magnesium atom and oxygen atom.
Terangkan pembentukan ikatan kimia antara atom magnesium dan atom oksigen.
[7 marks]
[*7 markah*]

8 (a) Ammonia is manufactured in industry through Haber Process. Describe briefly Haber Process.
Ammonia dihasilkan dalam industri melalui Proses Haber. Terangkan secara ringkas Proses Haber.
[4 marks]
[*4 markah*]

(b) Diagram 8 shows the products that made of glass and ceramic.
Rajah 8 menunjukkan produk yang diperbuat daripada kaca dan seramik.



Beaker and conical flask (Glass)
Bikar dan kelalang kon (kaca)

Teapot (Ceramic)
Teko (Seramik)

Diagram 8
Rajah 8

State
Nyatakan

(i) **three** properties of glass that possessed by the beaker and conical flask which suitable for them to be used in laboratory.
***tiga** sifat kaca yang dipunyai oleh bikar dan kelalang kon yang menyebabkan ia sesuai digunakan dalam makmal.*

(ii) **three** properties of ceramic that suitable for the used of teapot.
***tiga** sifat seramik yang sesuai untuk penggunaan teko.*
[6 marks]
[*6 markah*]

(c) Polychloroethene or PVC is a polymer.
The monomer of this polymer is chloroethene, CH_2CHCl.
Polikloroetena atau PVC adalah satu polimer.
Monomer bagi polimer ini ialah kloroetena, CH_2CHCl.

(i) State the meaning of polymer.
Nyatakan maksud bagi polimer.
[2 marks]
[*2 markah*]

(ii) Draw the structural formula of chloroethene and polychloroethene.
Lukiskan formula struktur bagi kloroetena dan polikloroetena.
[2 marks]
[*2 markah*]

(iii) State **three** properties of PVC. Explain how these properties can cause environmental polution
*Nyatakan **tiga** sifat PVC. Terangkan bagaimana sifat-sifat tersebut boleh mencemarkan alam sekitar.*
[6 marks]
[*6 markah*]

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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) Diagram 9 shows the apparatus set-up of an experiment for the displacement of copper from copper(II) sulphate solution.
Rajah 9 menunjukkan susunan radas bagi eksperimen untuk penyesaran kuprum daripada larutan kuprum(II) sulfat.

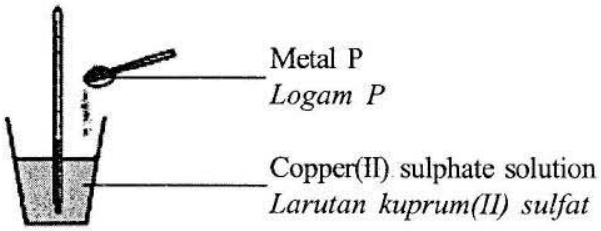

Diagram 9
Rajah 9

Metal P can displace copper from copper(II) sulphate solution.
Logam P boleh menyesarkan kuprum daripada larutan kuprum(II) sulfat.
The heat of displacement of copper in the reaction is - 210 kJ mol^{-1}
Haba Penyesaran bagi tindak balas ini ialah -210 kJ mol^{-1}

Based on the experiment,
Berdasarkan eksperimen itu,

- Suggest one possible metal for P.
  Cadangkan satu logam P yang mungkin
- State **two** observations for the experiment.
  *Nyatakan **dua** pemerhatian bagi eksperimen itu.*
- Write a balanced chemical equation for the reaction.
  Tulis persamaan kimia yang seimbang
- Explain oxidation and reduction reactions in the term of changes in oxidation number of metal P dan copper.
  Terangkan tindak balas pengoksidaan dan penurunan dari segi perubahan dalam nombor pengoksidaan bagi logam P dan kuprum
- Draw the energy level diagram for the reaction.
  Lukis gambarrajah aras tenaga bagi tindakbalas itu.

[10 marks]
[*10 markah*]

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(b) Metal react with oxygen to form a metal oxide.
Logam bertindak balas dengan oksigen menghasilkan suatu oksida logam.

Metal + oxygen → metal oxide *Logam + oksigen → oksida logam*

Plan **one** laboratory experiment to compare the reactivity of two named different metals when react with oxygen.
*Rancang **satu** eksperimen makmal bagi membandingkan kereaktifan dua logam berbeza yang dinamakan apabila bertindak balas dengan oksigen.*
Your answer should include the following:
Jawapan anda perlu mengandungi perkara-perkara berikut:

- A labelled diagram showing the apparatus set-up
  Gambarajah berlabel yang menunjukkan susunan radas
- Procedure of the experiment
  Prosedur eksperimen
- Observations
  Pemerhatian

[10 marks]
[*10 markah*]

10 Carbon compound can be classified into hydrocarbons and non-hydrocarbons.
Sebatian karbon boleh dikelaskan kepada hidrokarbon dan bukan-hidrokarbon.

(a) Pentane and pentene are hydrocarbons. Table 10(a) shows the observations of a test to differentiate between hydrocarbons, pentane, C_5H_{12} and pentene, C_5H_{10}.
[Molar mass : C_5H_{12} = 72 $gmol^{-1}$, C_5H_{10} = 70 $gmol^{-1}$]
Pentana dan pentena adalah hidrokarbon. Jadual 10(a) menunjukkan pemerhatian bagi satu ujian yang dijalankan untuk membezakan pentana, C_5H_{12} dan pentena, C_5H_{10}.
[Jisim molar: C_5H_{12} = 72 $gmol^{-1}$, C_5H_{10} = 70 $gmol^{-1}$]

Reaction ***Tindakbalas***	**Observation** ***Pemerhatian***	
	Pentane ***Pentana***	**Pentene** ***Pentena***
Burnt in air *Terbakar dalam udara*	Burns in yellow flame with soot. *Terbakar dalam nyalaan kuning dengan jelaga.*	Burns in yellow flame with more soot. *Terbakar dalam nyalaan kuning dengan lebih jelaga.*

Table 10(a)
Jadual 10(a)

Explain why there is a difference in the observation.
Terangkan mengapa terdapat perbezaan dalam pemerhatian itu.

[4 marks]
[*4 markah*]

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(b) Alcohols are non-hydrocarbon compound. Alcohols are widely used as fuel in daily life.
Alkohol adalah sebatian bukan hidrokarbon. Alkohol digunakan secara meluas sebagai bahan api dalam kehidupan harian.
Table 10(b) shows the heat of combustion of various alcohols.
Jadual 10(b) menunjukkan haba pembakaran bagi pelbagai alkohol.

Number of carbon atoms *Bilangan atom karbon*	Molecular formula *Formula molekul*	Heat of combustion *Haba pembakaran* (kJ / mol^{-1})
1	CH_3OH	-728
2	C_2H_5OH	-1376
3	C_3H_7OH	-2016
4	C_4H_9OH	-2678

Table 10(b)
Jadual 10(b)

Based on the information in Table 10(b),
Berdasarkan maklumat dalam Jadual 10(b),

Describe procedures of an experiment in the laboratory to determine the heat of combustion of one named alcohol. In your answer, include the diagram of the appratus set-up, and materials used.
Huraikan prosedur bagi suatu eksperimen di dalam makmal untuk menentukan haba pembakaran bagi satu alkohol yang dinamakan. Dalam jawapan anda, hendaklah termasuk gambar rajah susunan radas dan bahan tindak balas .

[10 marks]
[*10 markah*]

(c)

Fats are non hydrocarbon compound which are found in animals and plants.
Examples of fats are palm oil and butter.
Lemak adalah sebatian bukan hidrokarbon yang boleh didapati dalam haiwan dan tumbuhan.
Contoh bagi lemak adalah minyak kelapa sawit dan mentega.

Encik Ahmad is the owner of a 'Ahmad Bakery'.
Between palm oil and butter,
Suggest which fats is better to be used in the food production at Encik Ahmad 's bakery. Explain your answer by stating the advantages of the fats that has been chosen based on health factor.
Encik Ahmad adalah pemilik 'Ahmad Bakery'.
Antara minyak kelapa sawit dan mentega,
Cadangkan lemak yang lebih baik digunakan dalam pembuatan makanan di kedai kek Encik Ahmad.
Terangkan jawapan anda dengan menyatakan kebaikan lemak yang dipilih berdasarkan faktor kesihatan.

[6 marks]
[*6 markah*]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

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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 **Section C** in the test 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 kertas jawapan ujian. 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 diakhir peperiksaan.

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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 Yttrium 89	40 Zr Zirconium 91	41 Nb Niobium 93	42 Mo Molybdenum 96	43 Tc Technetium 98	44 Ru Ruthenium 101	45 Rh Rhodium 103	46 Pd Palladium 106	47 Ag Silver 108	48 Cd Cadmium 112	49 In Indium 115	50 Sn Tin 119	51 Sb Antimony 122	52 Te Telurium 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 Unnilennium 266										

Proton number
Symbol
Name of element
Relative atomic mass

10 Ne Neon 20

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 Lutecium 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.

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SULIT **4541/3**

4541/3
Kimia
Kertas 3
Peperiksaan
Percubaan
SPM
2011
1½ hours

NAMA : .....

NO KAD PENGENALAN : .....

ANGKA GILIRAN : .....

YAYASAN PERAK

JABATAN PELAJARAN NEGERI PERAK

PEPERIKSAAN PERCUBAAN SIJIL PELAJARAN MALAYSIA NEGERI PERAK 2011

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	21	
2	12	
3	17	
Jumlah	**50**	

Kertas soalan ini mengandungi 7 halaman bercetak dan 1 halaman tidak bercetak.

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1 Table 1 shows the observation in three test tubes to investigate the effect of other metal on rusting of iron. A mixture of jelly solution and potassium hexacyanoferrate(III), $K_3Fe(CN)_6$ solution were used as medium in each test tube.
The intensity of blue colour in the medium were recorded after one day.
Jadual 1 menunjukkan pemerhatian dalam tiga tabung uji yang digunakan untuk mengkaji kesan logam lain terhadap pengaratan besi. Medium yang digunakan di dalam setiap tabung uji adalah campuran larutan agar dan larutan kalium heksasianoferat(III), $K_3Fe(CN)_6$. Keamatan warna biru dalam medium direkodkan selepas satu hari.

Test tube *Tabung uji*	Observation *Pemerhatian*
Test tube A *Tabung uji A*	Iron nail *Paku besi*  Low intensity of blue colour *Keamatan warna biru rendah*
Test tube B *Tabung uji B*	Iron nail coiled with magnesium ribbon *Paku besi dililit dengan pita magnesijm*  No blue colour *Tiada warna biru*
Test tube C *Tabung uji C*	Iron nail coiled with copper strip *Paku besi dililit dengan kepingan kuprum*  High intensity of blue colour *Keamatan warna biru tinggi*

Table 1
Jadual 1

(a) Based on the observations in Table 1, write the inferences in Table 2.
Berdasarkan pemerhatian di Jadual 1, tuliskan inferens dalam Jadual 2.

Test tube *Tabung uji*	Inference *Inferens*
A	
B	
C	

Table 2
Jadual 2

[3 marks]
[*3 markah*]

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(b) State the hypothesis for this experiment.
Nyatakan hipotesis bagi eksperimen ini.

.....

.....

[3 marks]
[3 markah]

(c) State the variables for this experiment,
N*yatakan pembolehubah bagi eksperimen ini,*

(i) The manipulated variable : .....
Pembolehubah dimanipulasi

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

(iii) The constant variable : .....
Pembolehubah dimalarkan

[3 marks]
[3 markah]

(d) If the experiment is repeated by coiling iron nail with silver.
Predict the observation
Jika eksperimen diulangi dengan melilitkan paku besi dengan argentum.
Ramalkan pemerhatian.

.....

[3 marks]
[3 markah]

(e) Test tube A and test tube B are left for two days.
Compare the intensity of blue colour of the medium in test tube A and test tube B.
Tabung uji A dan tabung uji B dibiarkan selama dua hari.
Bandingkan keamatan warna biru dalam medium di tabung uji A dan tabung uji B.

.....

[3 marks]
[3 markah]

(f) State the operational definition for the rusting of iron.
Nyatakan definisi secara operasi bagi pengaratan besi.

.....

.....

[3 marks]
[3 markah]

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(g) Based on this experiment, classify the metals into metals that prevent rusting and metals that speed up rusting.
Berdasarkan eksperimen ini, kelaskan logam kepada logam menghalang pengaratan dan logam yang mencepatkan pengaratan.

[3 marks]
[3 markah]

2 A student has carried out an experiment to determine the empirical formula of oxide of copper according to the following steps shown in Diagram 2.
Seorang pelajar telah menjalankan satu eksperimen untuk menentukan formula empirik oksida bagi kuprum berdasarkan langkah-langkah yang ditunjukkan dalam Rajah 2.

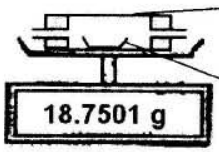
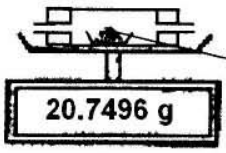
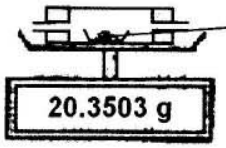
Steps *Langkah-langkah*	Set-up of apparatus *Susunan radas*
Combustion tube + porcelain dish are weighed. *Tiub pembakaran + piring porselin ditimbang.*	 Combustion tube *Tiub pembakaran* Porcelain dish *Piring porselin* Reading (a) / *Bacaan (a)*
Combustion tube + porcelain dish + oxide of copper are weighed. *Tiub pembakaran + piring porselin + oksida bagi kuprum ditimbang.*	 oxide of copper *oksida bagi kuprum* Reading (b) / *Bacaan (b)*
Combustion tube + porcelain dish + copper are weighed after cooled. *Tiub pembakaran + piring porselin + kuprum ditimbang selepas disejukkan.*	 Copper *Kuprum* Reading (c) / *Bacaan (c)*

Diagram 2 / *Rajah 2*

(a) Record the reading to two decimal places for:
Catatkan bacaan kepada dua tempat perpuluhan bagi :

Reading (a) : .....
Bacaan
(b) : .....

(c) : .....

[3 marks]
[3 markah]

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(b) Construct a table to record the readings in the experiment.
Bina satu jadual untuk merekodkan semua bacaan dalam eksperimen itu.

[3 marks]
[3 markah]

(c) (i) Calculate the mass of
Kirakan jisim bagi

copper : .....
kuprum
oxygen : .....
oksigen

(ii) Determine the empirical formula of oxide of copper.
[Relative atomic mass : Cu, 64 ; O, 16]
Tentukan formula empirik oksida bagi kuprum.
[Jisim atom relatif : Cu, 64; O, 16]

[3 marks]
[*3 markah*]

(d) State an observation in this experiment
Nyatakan satu pemerhatian dalam eksperimen ini.

.....

.....

.....

[3 marks]
[*3 markah*]

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3 Diagram 3 shows two reagent bottles containing two colourless liquid of carbon compounds P and Q respectively.
Rajah 3 menunjukkan dua botol reagen yang mengandungi dua cecair tidak berwarna bagi sebatian karbon P dan Q masing-masing.

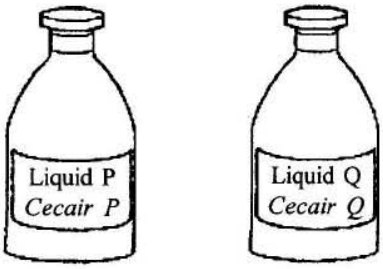

Diagram 3
Rajah 3

These two liquids are hexene and ethanoic acid.
Kedua-dua cecair ini merupakan heksena dan asid etanoik.

Using suitable reagent, plan a laboratory experiment to identify the colour less liquids. Your planning must include the following items :
Dengan menggunakan reagen yang sesuai rancang satu eksperimen untuk mengenal pasti cecair tidak berwarna itu. Perancangan anda mestilah mengandungi perkara-perkara berikut:

(a) Statement of the problem
Pernyataan masalah
(b) Variables
Pembolehubah
(c) Hypothesis
Hipotesis
(d) Lists of materials and apparatus
Senarai bahan serta radas
(e) Procedure
Prosedur
(f) Tabulation of data
Penjadualan data

[17 marks]
[*17 markah*]

ENDS OF QUESTION PAPER
KERTAS SOALAN TAMAT

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INFORMATION FOR CANDIDATES
MAKLUMAT UNTUK CALON

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

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

3. Write your answer for **Question 3** on the 'helaian tambahan' provided by the invigilators. You may use equations, diagrams, tables, graphs and other suitable methods to explain your answers.
*Tulis jawapan anda bagi **Soalan 3** dalam helaian tambahan yang dibekalkan oleh pengawas peperiksaan. Anda boleh menggunakan persamaan, rajah, jadual, graf dan cara lain 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 1 hour to answer **Question 1** and **Question 2** and 30 minutes for **Question 3.**
*Anda dinasihati supaya mengambil masa 1 jam untuk menjawab **Soalan 1** dan **Soalan 2** dan 30 minit untuk **Soalan 3**.*

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

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JABATAN PELAJARAN NEGERI PERAK
PEPERIKSAAN PERCUBAAN SPM 2011
CHEMISTRY
PAPER 1&2&3
MARKING SCHEME

PAPER 1

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

PAPER 2

SECTION A [60 MARKS]

Question			Marking Criteria	Marks
1	(a)	(i)	Ester	1
		(ii)	Saponification	1
		(iii)	-COONa	1
		(iv)	Ca^{2+} and Mg^{2+}	1
	(b)	(i)	B	1
		(ii)	Biological enzymes//fragrances//Whitening agent//drying agent//Stabiliser//Perfume//Builder//Foam control agent	1

[Lihat halaman sebelah]

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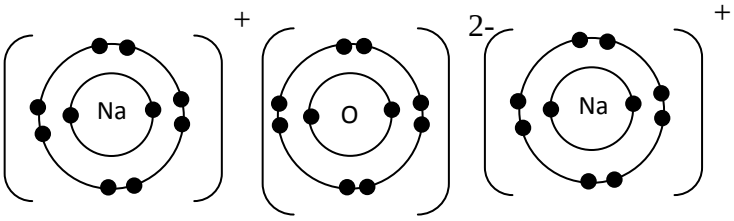
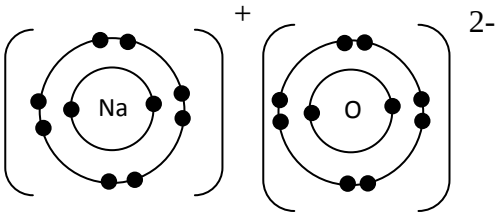
			(Any other suitable answers)	
	(c)	(i)	P – Aspirin / paracetamol / codeine Q – Psychotherapeutic	1
		(ii)	To relieve anxiety / restlessness / nervous feeling	1
			TOTAL	9
2	(a)	(i)	Argon	1
		(ii)	2.8.8	1
		(iii)	- Period 3 - It has 3 shell occupied / consist with electrons	1 1
	(b)	(i)	The sum of / The total number of protons and neutrons in the nucleus of an atom	1
		(ii)	6	1
		(iii)	Estimate the age of fossils / artifacts	1
			- Show all the number of electron of sodium ion and oxide ion correctly - show the nucleus and correct ratio of atom Sample answer:  or 2  	1 1
			TOTAL	9
3	(a)		Voltaic cell	1
	(b)		Na_2SO_4	1
	(c)	(i)	From magnesium plate to copper plate in the external circuit	1
		(ii)	Magnesium electrode : oxidation	1
	(d)	(i)	Copper electrode : reduction	1
		(ii)	$Mg + Cu^{2+} \rightarrow Mg^{2+} + Cu$	1
	(e)	(i)	Brown colour solution formed	1
		(ii)	$2Br^- \rightarrow Br_2 + 2e$	1
	(f)	(i)	Fe^{2+} ion is oxidized to Fe^{3+} ion	1
		(ii)	Bromine acts as oxidising agent / Bromine receive electron from Fe^{2+}	1
			TOTAL	10
4	(a)	(i)	Method B	1
		(ii)	Method A	1
		(iii)	$CuO + H_2SO_4 \rightarrow CuSO_4 + H_2O$	1+1
	(b)	(i)	A white precipitate is formed	1
		(ii)	- Deliver the gas produced to a test tube containing lime water,	1

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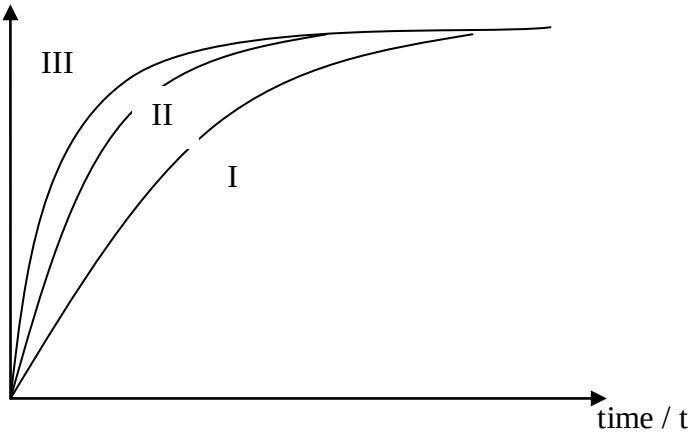
			- Lime water turns chalky / milky / cloudy	1
			Number of moles of zinc carbonate - 7.5 / 125 = 0.06 mol, Hence Number of moles of zinc sulphate = 0.06 mol Mass = 0.06 x 161 = 7.696 g (with unit)	1 1 1
			TOTAL	10
5	(a)		*Draw stopper on the mouth of conical flask	1
	(b)		$Zn + H_2SO_4 \rightarrow ZnSO_4 + H_2$	1
	(c)	(i)	Rate = 30/20 cm^3s^{-1} // 1.5 cm^3s^{-1}	1
		(ii)	Rate = 30/32 cm^3s^{-1} // 0.94 cm^3s^{-1}	1
		(iii)	Rate = 30/12 cm^3s^{-1} // 2.5 cm^3s^{-1}	1
	(d)	(i)	1. The rate of reaction in Experiment I is higher than Experiment II 2. The total surface area of zinc is larger / bigger in Experiment I 3. The frequency of collision between zinc atom and hydrogen ion / H+ is higher 4. The frequency of effective collision is higher. 5. The rate of reaction is higher - Point 1 – 1 mark - Point 2 – 1 mark - Point 3/ 4/ 5 – 1 mark	 1 1 1 [max 3]
		(ii)	*Draw three curves with different gradient * The total volume of gas release for the curves are the same Volume of gas / cm^3  	2 1
			TOTAL	11
6	(a)		$C_nH_{2n+1}OH$	1
	(b)	(i)	Ethanoic acid	1
		(ii)	- Add Magnesium / zinc / marble chips / calcium carbonate into compound P in a test tube - Gas bubbles produced	1 1
		(iii)	Sodium hydroxide	1
	(c)	(i)	Esterification	1
		(ii)	Colourless liquid // sweet fruity smell // less dense than water // does not dissolve in water	2

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<table>
<tr><td></td><td></td><td></td><td>[choose any 2]</td><td></td></tr>
<tr><td></td><td></td><td>(iii)</td><td>O
II
$CH_3 – C – O – CH_2 – CH_2 – CH_3$</td><td>1</td></tr>
<tr><td></td><td>(d)</td><td></td><td><table><tr><th>Physical properties</th><th>Uses</th></tr><tr><td>Colourless / volatile/ miscible with water / good organic solvent</td><td>As a solvent in perfumes / cosmetics / toiletries // As a thinner in varnish / ink // As a cleaner for compact disk / video cassette</td></tr><tr><td>Volatile / highly flammable / high heat content</td><td>As a fuel</td></tr><tr><td>Volatile / miscible with covalent compound / antiseptic</td><td>As a raw material to make pharmaceutical products in antiseptic / cough syrup / rubbing alcohols.</td></tr><tr><td>Chemically reactive</td><td>As a raw material in the manufacture of vinegar / fibre / explosive</td></tr></table>[any pair]</td><td>1+1</td></tr>
<tr><td></td><td></td><td></td><td>TOTAL</td><td>11</td></tr>
</table>

SECTION B [20 MARKS]

<table>
<tr><td>7</td><td>(a)</td><td></td><td>- Helium atom achieves stable duplet electron arrangement.
- Do not donate, receive or share electron.</td><td>1
1</td></tr>
<tr><td></td><td>(b)</td><td></td><td>- Size of the atom becomes bigger.
- Force of attraction between nucleus and electron valence become weaker.
- Atom become easier to donate electron</td><td>1
1
1</td></tr>
<tr><td></td><td>(c)</td><td></td><td>- Chlorine atom has electron arrangement 2.8.7.
- Unstable atom.
- Need one more electron. achieve stable octet electron arrangement
- Two chlorine atoms share one pair of electrons to form single covalent bond.</td><td>1
1
1
1</td></tr>
<tr><td></td><td>(d)</td><td>(i)</td><td>Write chemical formula of reactant and product correctly.
Balance chemical equation.

Answer : $2 Mg + O_2 \rightarrow 2 MgO$</td><td>1
1</td></tr>
<tr><td></td><td></td><td>(ii)</td><td>Calculate the number of mole of magnesium.

Answer : 18/24 // 0.75

Calculate the mass of magnesium oxide.

Answer : 0.75 X 40 // 30 g</td><td>1

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

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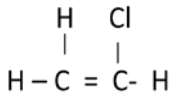
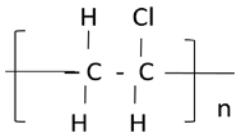
		(iii)	- Electron arrangement of magnesium atom is 2.8.2 - Magnesium atoms donate 2 electrons to achieve stable octet electron arrangement. - Form magnesium ion. - Electron arrangement of oxygen atom is 2.6 - Oxygen atoms receive 2 electrons to achieve stable octet electron arrangement. - Form oxide ion. - Between magnesium ion and oxygen ion there are electrostatic force to form ionic compound	1 1 1 1 1 1 1
			TOTAL	20
8	(a)		Nitrogen gas and hydrogen gas are heated together At temperature of 450 ^{0}C and pressure of 200 atm With iron catalyst Chemical equation: $N_2 + 3\ H_2 \rightarrow 2NH_3$	1 1 1 1
	(b)	(i)	Highly resistance to heat Inert to chemicals Transparent except to ultra violet light Undergoes small expansion and contraction even with great temperature changes. [Any 3]	1 1 1 1 1
		(ii)	A good heat insulator Inert to chemical Hard and strong	1 1 1 [max 6 m]
	(c)	(i)	Polymer is a long- chained molecules, which is consists of repeating units of monomers	
		(ii)	 Monomer  PVC	
		(iii)	Non-biodegradable Disposal into soil can retard the development of root and also hinder the flow of water // Hinder the flow of water into the underground streams that cause of flood Released toxic gases When they are burnt, they released toxic gases such as hydrogen cyanide, hydrogen chloride and carbon monoxide // Cause diseases released carbon dioxide that cause green house effect Stable and resistant to oxidation Become breeding ground for mosquitoes // Suffocate some of the aquatic animal	1 1 1 1 1 1
			TOTAL	20
9	(a)		- Zinc // magnesium // Aluminium // iron - Blue solution turns colourless	1 1

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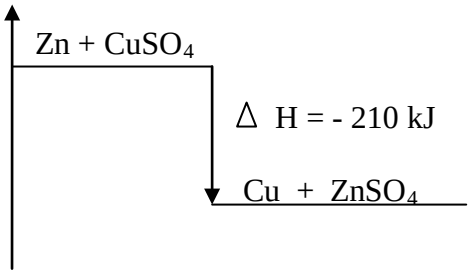
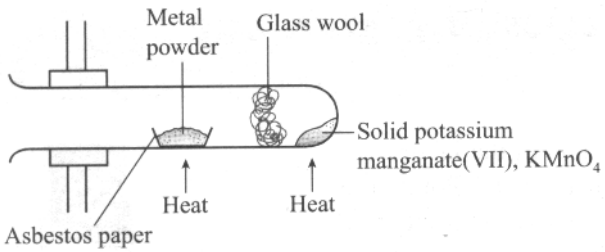
			- Brown solid deposited, - $Zn + CuSO_4 \rightarrow Cu + ZnSO_4$ - The oxidation number of zinc increase from 0 to +2 - Zinc oxidized to zinc ion - The oxidation number of copper(II) ion decreases from +2 to 0 - Copper(II) ion reduced to copper // Zinc replaced by any metal above copper, reject Na / K / Ca Energy  	1 1 1 1 1 1 1+1
	(b)		Apparatus set-up  Correct labell and functional diagram. Procedure: 1. Put one spatula of solid potassium manganate(VII) in a boiling tube, 2. Then put some glass wool into the boiling tube, 3. Clamp the boiling tube horizontally. 4. Place one spatula of magnesium powder on a piece of asbestos paper and put into the boiling tube, 5. Heat magnesium powder strongly then 6. Heat solid potassium manganate(VII) 7. Repeat the experiment using copper powder, iron fillings, lead powder and zinc powder]	 1+1 1 1 1 1 1 1 1

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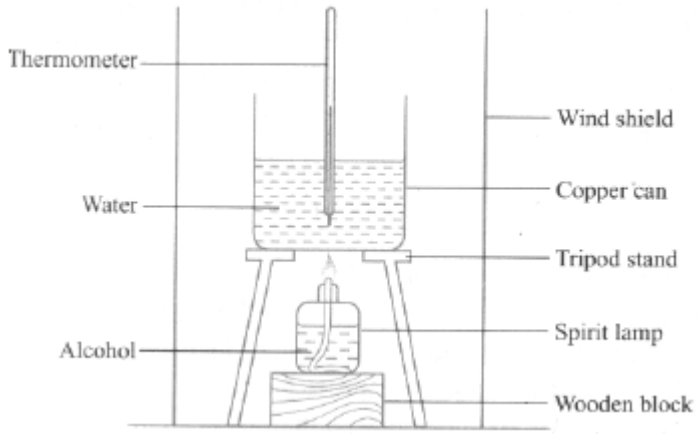
<table>
<tr><td></td><td></td><td></td><td>[Table of observation]
<table><tr><th>Reaction</th><th>Observation</th></tr><tr><td>Magnesium + oxygen // formulae</td><td>Burns brightly</td></tr><tr><td>Copper + oxygen // formulae</td><td>Glow dimly</td></tr></table></td><td>1</td></tr>
<tr><td></td><td></td><td></td><td>TOTAL</td><td>20</td></tr>
<tr><td>10</td><td>(a)</td><td></td><td>Able to calculate the percentages of carbon in pentane and pentene correctly

- % carbon in hexane = 83.72%
- % carbon in hexene = 85.71%
- Percentage of in hexene is higher
- More soot formed</td><td>

1
1
1
1</td></tr>
<tr><td></td><td>(b)</td><td></td><td>Able to describe an experiment to determine the heat of combustion of named alcohol correctly]

1. [named] alcohol, water
2. Diagram using suitable apparatus – copper [metal]can, spirit lamp, pipe-clay triangle, thermometer
3. [100-300] cm^3 of water is measured using measuring cylinder and poured into a copper can
4. The copper can is placed on a tripod stand
5. The initial temperature of the water is measured and recorded
6. About 50 cm^3 of [named] alcohol is poured into a spirit lamp and the mass of the lamp and its contents is recorded
7. The lamp is put under the copper can and the wick of the lamp is lighted immediately
8. The water is stirred throughout the experiment
9. When the temperature of water increases [20 – 30^oC], the flame is put off and the highest temperature reached by the water is recorded.
10. The mass of the lamp and its contents is weighed immediately and recorded</td><td>

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

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	(c)		Able to suggest palm oil as the better fats compare to butter Able to state the advantages of palm oil to our health correctly - Palm oil - Highest amount of natural antioxidants such as vitamin E and vitamin A that prevent cancer/ aging/ arteriosclerosis/ Alzheimer's disease - Does not contain cholesterol that reduce the risk of heart attack/ / boost the immune system // fight cancer - Contains beneficial fat such as omega – 6 fatty acid that reduce cardiovascular risk factors - Has a healthy mixture of saturated and unsaturated fats that are easy to digest and absorb, so that can supply energy needed without causing a rise in LDL or insulin levels in the blood - The ability to withstand heat and resist oxidation that makes palm oil an ideal ingredient in frying oil blends	 1 1 1 1 1 1
			TOTAL	20

PAPER 3

SECTION A [33 MARKS]

<table>
<tr><th>Question</th><th>Rubric</th><th>Score</th></tr>
<tr><td rowspan="4">1 (a)</td><td>[Able to state the inference based on the observation correctly]

Example:

<table><tr><th>Test tube</th><th>Inferences</th></tr><tr><td>A</td><td>The iron nail rust</td></tr><tr><td>B</td><td>The iron nail does not rusts</td></tr><tr><td>C</td><td>The iron nail rust quickly</td></tr></table></td><td>3</td></tr>
<tr><td>[Able to state any two inferences correctly]</td><td>2</td></tr>
<tr><td>[Able to state any one inference correctly]</td><td>1</td></tr>
<tr><td>[No response given or wrong response]</td><td>0</td></tr>
<tr><td rowspan="2">1 (b)</td><td>[Able to state the relationship correctly between the manipulated variable and the responding variable]

Example:

Iron coil with magnesium will not rust / Copper speeds up rusting of iron
When a more/less electropositive metal in contact with iron, the metal inhibits/speeds up rusting</td><td>3</td></tr>
<tr><td>[Able to state the relationship incorrectly between the manipulated variable and the responding variable]

Example:</td><td>2</td></tr>
</table>

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	The rusting of iron is inhibits/speeds up, when a more/less electropositive metal in contact with iron,	
	[Able to state an idea of hypothesis] Example: The electropositivity of metals affect the rusting of iron	1
	[No response given or wrong response]	0
1 (c)	[Able to state three variables correctly] Example: Manipulated variable: Metals in contact with iron // magnesium / copper Responding variable: Intensity of blue colour Constant variable: Iron nails//temperature	3
	[Able to state any 2 variables correctly]	2
	[Able to state any 1 variable correctly]	1
	[No response or wrong response]	0
1 (d)	[Able to predict observation correctly] Example: Higher Intensity of blue colour than test tube C	3
	[Able to state the function of potassium hexacyanoferrate(III) incorrectly] Example: High Intensity of blue colour	2
	[Able to state an idea] Example: Blue colour is formed	1
	[No response given or wrong response]	0
1 (e)	[Able to state the observation correctly] Example: Intensity of blue colour become higher	3
	[Able to state the operational definition in correctly] Example: Blue colour higher	2
	[Able to state an idea] Example: Blue colour	1

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<table>
<tr><td></td><td>[No response or wrong response]</td><td>0</td></tr>
<tr><td rowspan="4">1 (f)</td><td>Able to state the operational definition for the rusting of iron nail correctly.

<u>Sample answer</u>

Blue colouration indicates rusting occurs // Rusting occurs when iron nail is in contact with copper/tin /less electropositive metal and form blue colouration.</td><td>3</td></tr>
<tr><td>Able to state the operational definition for the rusting of iron nail less accurately

<u>Sample answer</u>:

Rusting occurs when iron nail is in contact with copper / tin / less electropositive metal.</td><td>2</td></tr>
<tr><td>Able to state any idea of operational definition.

<u>Sample answer</u>:

Rusting occurs when the colour of solution changes //Rusting occurs</td><td>1</td></tr>
<tr><td>No response or wrong response</td><td>0</td></tr>
<tr><td rowspan="4">1 (g)</td><td>[Able to classify all the three metals correctly]

<table><tr><th>Metals that can provide sacrificial protection</th><th>Metals that cannot provide sacrificial protection</th></tr><tr><td>Magnesium</td><td>Copper
Silver</td></tr></table></td><td>3</td></tr>
<tr><td>[Able to classify any two metals correctly]</td><td>2</td></tr>
<tr><td>[Able to classify any one metal correctly]</td><td>1</td></tr>
<tr><td>[No response given or wrong response]</td><td>0</td></tr>
<tr><td rowspan="4">2 (a)</td><td>Able to record the masses accurately in two decimal places with unit

Answer:

18.75 g
20.75 g
20.35 g</td><td>3</td></tr>
<tr><td>Able to record the masses in two decimal places without unit</td><td>2</td></tr>
<tr><td>Able to record the masses</td><td>1</td></tr>
<tr><td>No response or wrong response</td><td>0</td></tr>
<tr><td>2 (b)</td><td>Able to construct a table that contains:

- The mass of combustion tube + porcelain dish + copper oxide and mass with correct unit.
- Transfer <u>all</u> the readings from (a) correctly.</td><td>3</td></tr>
</table>

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<table>
<tr><td></td><td>Answer:

<table><tr><th>Description</th><th>Mass (g)</th></tr><tr><td>Mass of combustion tube + porcelain dish</td><td>18.75</td></tr><tr><td>Mass of combustion tube + porcelain dish + copper oxide</td><td>20.75</td></tr><tr><td>Mass of combustion tube + porcelain dish + copper</td><td>20.35</td></tr></table></td><td></td></tr>
<tr><td rowspan="3"></td><td>Able to construct a table that contains:

- The mass of combustion tube + porcelain dish + copper oxide and mass without unit.
- Transfer <u>all</u> the readings from (j) (i) correctly.</td><td>2</td></tr>
<tr><td>Able to construct a table that contains:
1. Suitable headings.
2. Transfer <u>at least two</u> readings from (j) (i) correctly.</td><td>1</td></tr>
<tr><td>No response or wrong response</td><td>0</td></tr>
<tr><td rowspan="5">2 (c)</td><td>Able to:

- Calculate the mass of copper
- Calculate the mass of oxygen
- Show steps to determine empirical formula.

Sample answer:
Mass of copper : (20.35 – 18.75) g = 1.60 g
Mass of oxygen : (20.75 – 20.35) g = 0.40 g

<table><tr><th>Element</th><th>Magnesium</th><th>Oxygen</th></tr><tr><td>Number of mole</td><td>1.60 / 64
= 0.025</td><td>0.40 / 16
= 0.025</td></tr><tr><td>Ratio of mole</td><td>0.025 /0.025
= 1</td><td>0.025 /0.025
= 1</td></tr></table>
Empirical formula = CuO</td><td>3</td></tr>
<tr><td>Able to give any two answers above</td><td>2</td></tr>
<tr><td>Able to give any one answer above</td><td>1</td></tr>
<tr><td>Wrong or no response</td><td>0</td></tr>
<tr><td rowspan="4">2 (d)</td><td>[Able to state all the three observations metals correctly]

A: brown solid turn black
B : colourless liquid formed
C : copper glow brightly</td><td>3</td></tr>
<tr><td>[Able to classify any two metals correctly]</td><td>2</td></tr>
<tr><td>[Able to classify any one metal correctly]</td><td>1</td></tr>
<tr><td>[No response given or wrong response]</td><td>0</td></tr>
</table>

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SECTION B [17 MARKS]

3	(a)	Able to give the statement of the problem accurately and response is in question form. Sample answer: How to determine and identify hexane and ethanoic acid (liquid P and liquid Q?	3
		Able to give the aim or statement of the problem without question mark. Sample answer: To differentiate between hexane and ethanoic acid (liquid P and liquid Q) ? // How to determine and identify hexane and ethanoic acid (liquid P and liquid Q.	2
		Able to give an idea of statement of the problem correctly. Sample answer: How to identify / determine / differentiate alkene and acid? // To identify / determine / differentiate alkene and acid ?	1
		[No response given or wrong response]	0
	(b)	Able to state the three variables correctly. Sample answer: Manipulated variable: Hexene and ethanoic acid / Liquid P and Q Responding variable: Colour change of reagent / gas bubbles release Constant variable: Volume of hexene and ethanoic acid	3
		Able to state any two variables correctly	2
		Able to state any one variables correctly	1
		[No response given or wrong response]	0
	(c)	Able to state the relationship between the manipulated variable and the responding variable accurately by stating the colour change in both liquid P and Q. Sample answer: If liquid P decolourised purple colour of acidified potassium manganate(VII), so liquid P is hexene // Acid will produce gas bubbles with Magnesium (Calcium carbonate) ** Bromine water cannot be used because both liquid react with bromine water	3
		Able to state the relationship between the manipulated variable and the responding variable accurately by stating the **colour change in hexene or hexane only.** Sample answer: Hexene will decolourised colour of acidified potassium manganate (VII) // Acid will produce gas with Magnesium (Calcium carbonate)	2

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<table>
<tr><td></td><td></td><td>Able to state the idea of hypothesis correctly.

Sample answer:
Change of colour of acidified potassium manganate (VII) // gas is produce</td><td>1</td></tr>
<tr><td></td><td></td><td>[No response given or wrong response]</td><td>0</td></tr>
<tr><td></td><td>(d)</td><td>Able to give adequate list of materials and apparatus.

Sample answer:
Liquid P, Liquid Q, acidified potassium manganate (VII) solution / Magnesium ribbon, zinc power or calcium carbonate chips)
Test tube, dropper, stopper</td><td>3</td></tr>
<tr><td></td><td></td><td>Able to give a list of materials and apparatus.

Sample answer:
Liquid P, Liquid Q, acidified potassium manganate (VII) / Magnesium, zinc or calcium carbonate)
Test tube, stopper.</td><td>2</td></tr>
<tr><td></td><td></td><td>Able to give an idea of materials and apparatus.

Sample answer:
Liquid P, Liquid Q, potassium manganate / Magnesium, zinc or calcium carbonate, Beaker / any suitable container</td><td>1</td></tr>
<tr><td></td><td></td><td>[No response given or wrong response]</td><td>0</td></tr>
<tr><td></td><td>(e)</td><td>Able to state the following five steps:

Sample answer:

1. Some liquid P and liquid Q are poured into two different test tubes.
2. Three drops of acidified potassium manganate (VII) are added into the test tubes.
3. The test tubes are closed with stoppers.
4. The mixtures are shaken.
5. The observations are recorded.</td><td>3</td></tr>
<tr><td></td><td></td><td>Step 1, 2, 4 and 5</td><td>2</td></tr>
<tr><td></td><td></td><td>Step 1 and 2</td><td>1</td></tr>
<tr><td></td><td></td><td>[No response given or wrong response]</td><td>0</td></tr>
<tr><td></td><td>(f)</td><td>Able to exhibit the tabulation of data that includes the following four information :
1. Heading liquid
2. Two liquid
3. Heading for observation
4. 2x3 or 3x2 table

Sample answer :
<table><tr><th>Liquid</th><th>Observation</th></tr><tr><td>Liquid P</td><td></td></tr><tr><td>Liquid Q</td><td></td></tr></table>.</td><td>3</td></tr>
</table>

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<table>
<tr><td></td><td></td><td>Able to exhibit the tabulation of data that includes the following four information :
1. Heading for liquid
2. One liquid
3. Heading for observation
4. 2x3 or 3x2 table

Sample answer :<table><tr><th>Liquid</th><th>Observation</th></tr><tr><td>Liquid P</td><td></td></tr><tr><td></td><td></td></tr></table></td><td>2</td></tr>
<tr><td></td><td></td><td>Able to exhibit the tabulation of data that includes the following four information :
1. Heading for liquid
2. Heading for observation
3. 2x3 or 3x2 table

Sample answer :<table><tr><th>Liquid</th><th>Observation</th></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr></table></td><td>1</td></tr>
<tr><td></td><td></td><td>[No response given or wrong response]</td><td>0</td></tr>
</table>

END OF MARKING SCHEME
PERATURAN PEMARKAHAN TAMAT

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