MAJLIS PENGETUA SEKOLAH MALAYSIA
CAWANGAN MELAKA

PEPERIKSAAN PERCUBAAN TINGKATAN LIMA
TAHUN 2011

CHEMISTRY

Kertas 1

Satu jam lima belas minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Kertas soalan ini mengandungi **50** soalan.*
2. *Jawab **semua** soalan.*
3. *Jawab dengan menghitamkan ruangan yang betul pada kertas jawapan.*
4. *Hitamkan **satu** ruangan sahaja bagi setiap soalan.*
5. *Rajah tidak dilukis mengikut skala **kecuali** dinyatakan*
6. *Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogramkan*

Kertas soalan ini mengandungi 28 halaman bercetak.

1 Diagram 1 shows the change of state of matter.
Rajah 1 menunjukkan perubahan keadaan jirim.

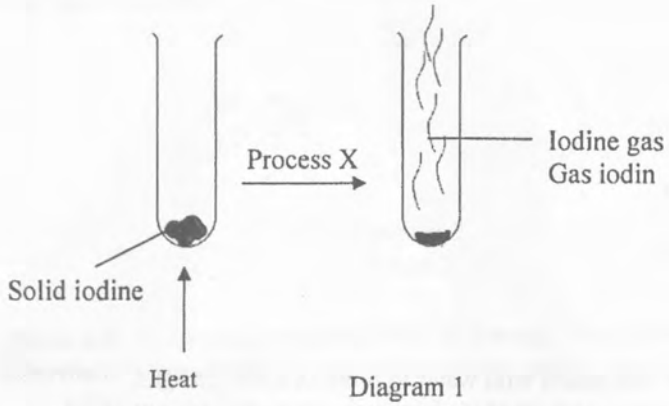


Diagram 1
Rajah 1

Which of the following is process X?
Antara berikut yang manakah proses X?

A Melting
Peleburan

B Boiling
Pendidihan

C Evaporation
Peruapan

D Sublimation
Pemejalwapan

2 Which of the following is not matched correctly?
Di antara berikut, yang manakah tidak dipadankan dengan betul?

	Substance ***Bahan***	**Formula**
A	Copper(II) oxide *Kuprum(II) oksida*	CuO
B	Copper(II) chloride *Kuprum(II) klorida*	CuCl
C	Potassium oxide *Kalium oksida*	K_2O
D	Ammonium sulphate *Ammonium nitrat*	$(NH_4)_2SO_4$

3 If the formula for carbonate salt of M is M_2CO_3, what is the formula for nitrate salt of M ?
Jika formula garam karbonat bagi M adalah M_2CO_3 , *apakah formula garam nitrat bagi M?*

A MNO_3

B $M(NO_3)_2$

C M_2NO_3

D $M(NO_3)_3$

4 Z is an element that reacts with water to produce hydrogen gas.
Which of the following is likely to be the electron arrangement of Z?
Z adalah satu unsur yang boleh bertindakbalas dengan air untuk menghasilkan gas hidrogen. Yang manakah antara berikut adalah susunan elektron Z?

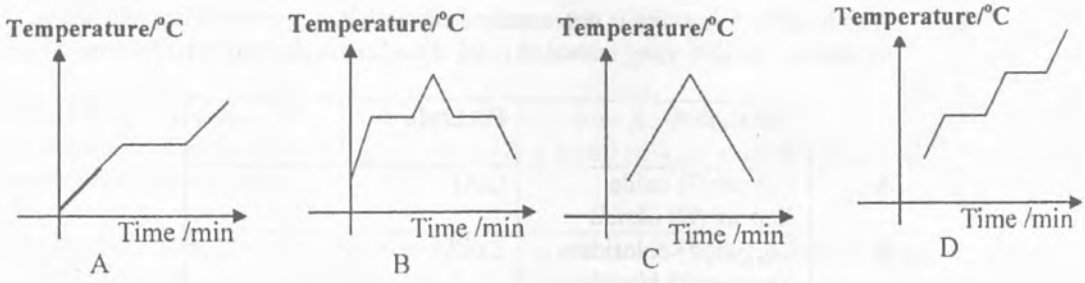
A 2.4

B 2.8.7

C 2.8.8.1

D 2.8

5 Which of the following graphs represents the heating of naphthalene until it turns liquid?
Yang manakah berikut mewakili graf pemanasan naftalena sehingga menjadi cecair ?



6 Diagram 2 shows the symbols for two elements. The letters used are not the actual symbol of the elements.

Rajah 2 menunj ukkan symbol bagi dua unsur. Huruf yang digunakan bukan symbol sebenar bagi unsur tersebut.

$^{24}_{12}X$ $^{16}_{8}Y$

Diagram 2
Rajah 2

When X reacts with Y, an ionic compound will be formed. What is its chemical formula?
Apabila X bertindakbalas dengan Y, sebatian ionik terbentuk. Apakah formula kimianya?

A X_2Y

B XY_2

C X_2Y_3

D XY

7 An atom of aluminium is represented by the symbol in Diagram 3 below
Atom aluminium diwakili oleh symbol dalam Rajah 3 di bawah

$^{27}_{13}Al$

Diagram 3
Rajah 3

How many protons, neutrons and electrons does an atom of aluminium contain?
Berapakah bilangan proton, neutron dan elektron yang terdapat dalam atom aluminium ?

	Number of protons *Bilangan proton*	Number of neutrons *Bilangan neutron*	Number of electrons *Bilangan elektron*
A	13	14	13
B	13	27	13
C	14	13	14
D	27	14	13

8 9.26 g of R metal reacted with 8.2 g of oxygen gas. Which of the following best represents the chemical equation for this reaction?
[Given relative atomic mass : R = 27 ; O = 16]
9.26 g logam R bertindak balas dengan 8.2 g gas oksigen. Yang manakah berikut mewakili persamaan kimia bagi tindak balas ini.

A $4R + O_2 \rightarrow 2R_2O$

B $3R + O_2 \rightarrow R_3O_2$

C $4R + 3O_2 \rightarrow 2R_2O_3$

D $2R + 3O_2 \rightarrow R_2O_3$

9 Which substance is a covalent compound?
Bahan manakah merupakan sebatian kovalen?

A Sodium oxide
Natrium oksida

B Sulphur dioxide
Sulfur dioksida

C Aluminium oxide
Aluminium oksida

D Magnesium oxide
Magnesium oksida

10 Which of the following reactions shows that copper is oxidized ?
Antara tindakbalas berikut, yang mana menunjukkan kuprum teroksida ?

A Reaction of zinc with copper(II) oxide
Tindakbalas di antara zink dan kuprum(II) oksida

B Reaction of copper with silver nitrate solution
Tindakbalas di antara kuprum dengan larutan argentum nitrat

C Electrolysis of copper(II) sulphate solution by using carbon electrodes
Elektrolisis larutan kuprum(II) sulfat menggunakan elektrod karbon

D Chemical cell with copper and zinc electrodes in dilute sulphuric acid
Sel kimia menggunakan elektrod kuprum dan zink di dalam larutan asid sulfurik

11 Diagram 4 shows the arrangement of electrons in atom G.
Rajah 4 menunjukkan susunan electron dalam atom G

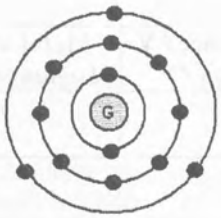


Diagram 4
Rajah 4

Which of the following statements are true about element G ?
Yang manakah pernyataan berikut adalah benar tentang unsur G ?

I It is placed in Period 3 in Periodic Table
Ianya terletak dalam Kala 3 Jadual Berkala

II It is place in Group 13
Ianya terletak dalam Kumpulan 13

III The ion of G is G^{3-}
Ion bagi G ialah G^{3-}

IV G formed an ionic compound with formula G_3O_2 when reacts with oxygen.
G membentuk sebatian ion dengan formula G_3O_2 apabila bertindak balas dengan oksigen

A I and II only

B II and IV only

C II and III only

D I ,II , and IV only

12 Which of the metals below can prevent iron from rusting?
Antara logam berikut, yang manakah boleh menggelakkan besi daripada berkarat?

A Zinc
Zink

B Copper
Kuprum

C Lead
Plumbum

D Silver
Argentum

13 Table 1 shows information about three simple cells.
Jadual 1 menunjukkan maklumat bagi tiga sel ringkas.

Pair of metals *Pasangan logam*	**Potential difference / V** *Beza keupayaan / V*	**Metal at negative terminal** *Logam pada terminal negatif*
X and copper	0.45	X
Y and copper	1.30	Y
Z and copper	0.56	Cu

Table 1
Jadual 1

What is the potential difference of the pair of metals Y and Z ?
Apakah nilai beza keupayaan bagi pasangan logam Y dan Z ?

A 0.85

B 1.01

C 1.86

D 2.31

14 When powder of metal P is heated with black metal Q oxide, the following observations are made:
Apabila serbuk logam P dipanaskan dengan oksida logam Q yang berwarna hitam, pemerhatian berikut diperolehi.

- **A glow is seen**
- ***Baraan terbentuk***
- **The residue produced is yellow when it is hot and turns white when cold**
- ***Baki yang terbentuk berwarna kuning bila panas, dan putih bila sejuk.***

Based on the information above, which statement is true ?
Berdasarkan maklumat yang diberi, pernyataan yang mana adalah benar?

A The powder of metal Q can displace P from its salt solution
Serbuk logam Q boleh menyesarkan P daripada larutan garamnya

B Metal Q oxide can react with a heated carbon powder
Oksida logam Q boleh bertindakbalas dengan serbuk karbon.

C Metal P oxide can react with a heated iron powder
Oksida logam P boleh bertindakbalas dengan serbuk besi yang panas.

D The powder of metal P can react with a heated magnesium oxide powder
Serbuk logam P boleh bertindakbalas dengan serbuk magnesium oksida yang panas

15 Which of the following are oxidising agents?
Antara yang berikut yang manakah merupakan agen pengoksidaan.

I Zinc
Zink

II Bromine water
Air bromine

III Potassium iodide solution
Larutan kalium iodide

IV Acidified potassium manganate(VII) solution
Larutan kalium mangganat (VII) berasid

A I and II only

B II and IV only

C I, II and III only

D I, II and IV only

16 You are going to coat an iron key with silver by electrolysis. The anode should be
Anda akan menyadur kunci besi dengan perak melalui elektrolisis. Anod adalah

A Silver plate
Plat perak

B Silver nitrate
Argentum nitrat

C Iron plate
Plat besi

D Iron key
Kunci besi

17 Diagram 6 shows test tubes X and Y, used in an experiment to investigate the effects of magnesium and copper on the rusting of iron.
Rajah 6 menunjukkan tabung uji X dan Y yang digunakan dalam eksperimen untuk menyiasat kesan magnesium dan kuprum ke atas pengaratan besi.

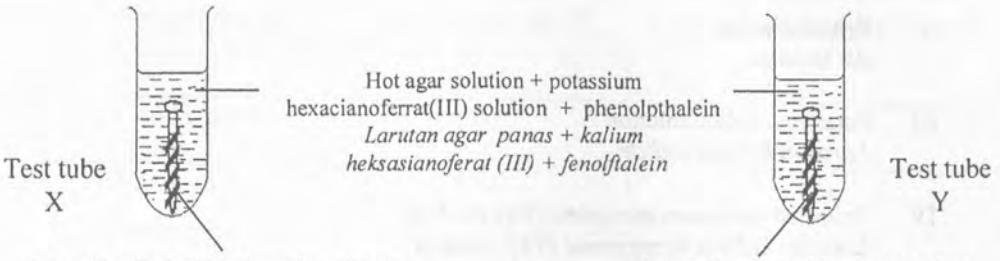


Diagram 6
Rajah 6

Which of the following are true about the experiment?
Antara pernyataan berikut, yang mana adalah benar tentang eksperimen di atas?

I Phenolphthalein indicator in both test tubes is used to detect the presence of hydroxide ions.
Penunjuk fenolftalein di dalam kedua-dua tabung uji berfungsi untuk mengesan ion hidroksida

II The hot agar solution in both test-tubes is to ensure the presence of oxygen in mixture.
Larutan agar yang panas di dalam kedua-dua tabung uji digunakan untuk mengesan kehadiran oksigen di dalam campuran

III Potassium hexacyanoferrate(III) solution in test tube X is to detect the corrosion of magnesium.
Larutan kalium heksasianoferat(III) di dalam tabung uji X digunakan untuk mengesan kakisan magnesium.

IV Potassium hexacyanoferrate(III) solution in test tube Y is to detect the presence of iron(II) ions.
Larutan kalium heksasianoferat(III) di dalam tabung uji Y digunakan untuk mengesan kehadiran ion-ion ferum(II).

A I and IV only

B I, III and IV only

C II and III only

D I, II, III and IV

18 Diagram 7 shows the set up of apparatus for an experiment involving a chemical cell.
Rajah7 menunjukkan susunan radas bagi satu eksperimen yang melibatkan sel kimia.

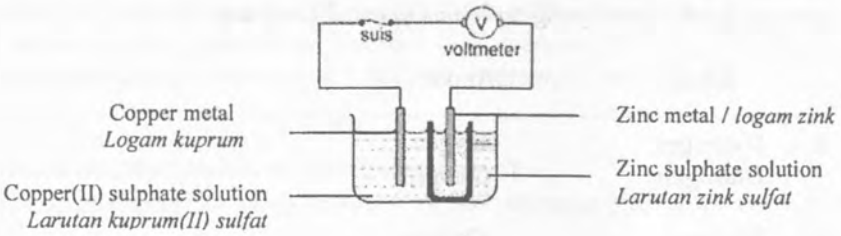


Diagram 7
Rajah 7

Which of the following statements are true about the above experiment ?
Antara berikut, yang manakah benar tentang eksperimen di atas ?

I Brown deposit formed at copper electrode
Enapan perang terbentuk di elektrod kuprum

II Zinc metal becomes thinner
Logam zink semakin menipis

III Electron flows from zinc electrode to copper electrode
Elektron mengalir daripada elektrod zink ke elektrod kuprum

IV Gas bubbles released at zinc electrode.
Gelembung gas terbebas di sekeliling elektrod zink

A I and III only

B II and IV only

C I, II and III only

D I, II, III and IV

19 1 mol dm^{-3} of copper(II) sulphate solution is electrolysed using carbon electrodes. What are the products formed at cathode and anode ?
Larutan kuprum(II) sulfat 1 mol dm^{-3} telah dielektrolisiskan menggunakan elektrod karbon. Apakah hasil yang terbentuk di anod dan katod ?

	Katod	Anode
A	Hydrogen *Hidrogen*	Oxygen *Oksigen*
B	Oxygen *Oksigen*	Copper *Kuprum*
C	Copper *Kuprum*	Oxygen *Oksigen*
D	Copper *Kuprum*	Sulphur dioxide *Sulfur dioksida*

20 Substance X ionises completely in water to produce high concentration of hydroxide ions. Substance X most probably is
Bahan X mengion dengan lengkap dalam air untuk menghasilkan kepekatan ion hidroksida yang tinggi. Bahan X mungkin

A Ammonia
Ammonia

B Sulphuric acid
Asid sulfurik

C Sodium hydroxide
Natrium hidroksida

D Ethanoic acid
Asid etanoik

21

A solution of potassium hydroxide, 0.1 mol dm^{-3} has a pH value of 13, while an ammonia solution, 0.1 mol dm^{-3} has a pH value of 10.
Larutan kalium hidroksida, 0.1 mol dm^{-3} mempunyai nilai pH 13, manakala larutan ammonia, 0.1 mol dm^{-3} mempunyai nilai pH 10

Which statement **best** explains the statements above?
Antara pernyataan berikut, yang mana paling baik menerangkan pernyataan di atas?

A Potassium hydroxide solution undergoes complete dissociation in water.
Larutan kalium hidroksida mencerai dengan lengkap dalam air.

B Both ammonia and potassium hydroxide solutions are strong alkali.
Kedua-dua larutan ammonia dan kalium hidroksida merupakan alkali kuat.

C Ammonia solution undergoes complete dissociation in water.
Larutan ammonia mencerai dengan lengkap dalam air.

D Ammonia and potassium hydroxide solutions undergo incomplete dissociation in water.
Larutan ammonia dan kalium hidroksida mencerai separa dalam air.

22 The following are the uses of acids in our daily life, **except**
*Berikut merupakan kegunaan asid dalam kehidupan seharian, **kecuali***

A To make various medicines.
Untuk membuat pelbagai ubat.

B To produce detergents and soaps.
Untuk menghasilkan detergen dan sabun.

C To manufacture and preserve food.
Untuk pembuatan dan pengawetan makanan.

D To prevent coagulation of latex.
Untuk mencegah penggumpalan lateks.

23 Table 2 shows the set-up of apparatus and observations of three experiments.
Jadual 2 menunjukkan susunan radas dan pemerhatian bagi tiga eksperimen.

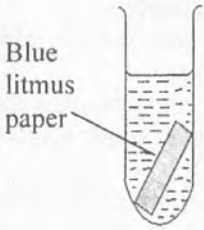
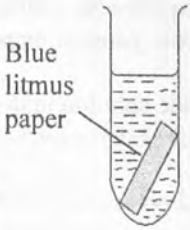
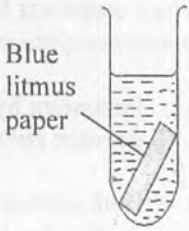
Experiment	I	II	III
Set-up apparatus for the experiments. *Susunan radas eksperimen.*	 Glacial ethanoic acid	 Glacial ethanoic acid + propanone	 Glacial ethanoic acid + water
Observation *Pemerhatian*	No changes in the colour of blue litmus paper. *Kertas litmus biru tidak berubah warna*	No changes in the colour of blue litmus paper. *Kertas litmus biru tidak berubah warna*	Blue litmus paper turns red. *Kertas litmus biru bertukar merah*

Table 2
Jadual 2

Based on the observations, choose the correct statement.
Berdasarkan pemerhatian, pilih pernyataan yang betul.

A Acids show their acidic properties only when dissolved in water.
Asid menunjukkan sifat keasidannya hanya apabila larut dalam air.

B Litmus paper does not react with glacial ethanoic acid.
Kertas litmus tidak bertindak balas dengan asid etanoik glasial.

C Propanone is an organic solvent.
Propanon merupakan pelarut organic

D Glacial ethanoic acid is a weak acid.
Asid etanoik glasial adalah asid lemah.

24 Diagram 8 shows the set-up of apparatus for the titration of sodium hydroxide solution with a diprotic acid, H_2X.
Rajah 8 menunjukkan susunan radas bagi proses pentitratan larutan natrium hidroksida dengan asid diprotik, H_2X.

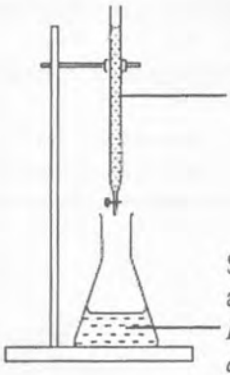


Diagram 8
Rajah 8

25.0 cm^3 of H_2X acid neutralises 20.0 cm^3 of sodium hydroxide solution. NaOH 1.0 mol dm^{-3}.
What is the molarity of the acid H_2X ?
25.0 cm^3 asid H_2X meneutralkan 20.0 cm^3 larutan natrium hidroksida, NaOH 1.0 mol dm^{-3} Berapakah kemolaran asid H_2X ?

A 0. 2 mol dm^{-3}

B 0. 4 mol dm^{-3}

C 0. 6 mol dm^{-3}

D 0. 8 mol dm^{-3}

25 What are the ions present in the copper(II) sulphate solution ?
Apakah ion-ion yang hadir dalam larutan kuprum(II) sulfat ?

A copper(II) ion and sulphate ion
ion kuprum(II) dan ion sulfat

B copper(II) ion and hydroxide ion
ion kuprum(II) dan ion hidroksida

C copper(II) ion , sulphate ion and hydroxide ion
ion kuprum(II), ion sulfat dan ion hidroksida

D copper(II) ion , sulphate ion , hydrogen ion and hydroxide ion
ion kuprum(II), ion sulfat, ion hidrogen dan ion hidroksida

26 Acid reacts with metal carbonate to produce a salt, besides
Asid bertindak balas dengan karbonat logam menghasilkan suatu garam, disamping

I Oxygen
Oksigen

II Water
Air

III Hydrogen
Hidrogen

IV Carbon dioxide
Karbon dioksida

A I and II only.
I dan II sahaja.

B II and III only.
II dan III sahaja.

C I and IV only.
I dan IV sahaja.

D II and IV only.
II dan IV sahaja

27 The equation shows the reaction between sodium chloride solution and silver nitrate solution to produce silver chloride precipitate.
Persamaan menunjukkan tindak balas antara larutan natrium klorida dan larutan argentum nitrat untuk menghasilkan mendakan argentum klorida.

$NaCl(aq) + AgNO_3(aq) \rightarrow AgCl(s) + NaNO_3(aq)$

200 cm^3 of 0.1 mol dm^{-3} sodium chloride solution reacts completely with excess silver nitrate solution.
200 cm^3 0.1 mol dm^{-3} larutan natrium klorida bertindak balas lengkap dengan larutan argentum nitrat berlebihan.

Calculate the mass of precipitate produced.
[Relative atomic mass Ag=108; Cl=35.5]
Hitungkan jisim mendakan yang terbentuk.
[Jisim atom relatif Ag=108; Cl=35.5]

A 3.78 g

B 3.87 g

C 2.78 g

D 2.86 g

28 The following information shows the properties of salt X.
Maklumat berikut menunjukkan sifat garam X.

- Releases brown gas and a gas which lights up glowing splinter when heated strongly.
  Membebaskan gas berwarna perang dan gas yang menyalakan kayu uji berbara apabila dipanaskan dengan kuat.
- Residue after heating is brown when it is hot and yellow when it is cold.
  Baki selepas pemanasan adalah berwarna perang semasa panas dan kuning apabila sejuk.

What is salt X ?
Apakah garam X ?

A Lead(II) carbonate
Plumbum(II) karbonat

B Lead(II) nitrate
Plumbum(II) nitrat

C Zinc nitrate
Zink nitrat

D Zinc carbonate
Zink karbonat

29 Which of the following are the physical characteristics of crystals?
Antara berikut, yang manakah merupakan sifat fizikal hablur?

I Have flat surfaces, straight edges and sharp angles.
Mempunyai permukaan yang rata, sisi lurus dan sudut yang tajam.

II Contain impurities.
Mengandungi bendasing.

III Insoluble in water.
Tidak larut dalam air.

IV Have fixed geometrical shapes such as a cuboid, rhombic or prism.
Mempunyai bentuk geometri tertentu seperti kuboid, rombus atau prisma.

A I and II only

B III and IV only

C I and IV only

D I, II and IV only

30 When powder of salt P is heated, the following observations are made:
Apabila serbuk garam P dipanaskan, pemerhatian berikut diperoleh:

- Green powder turns to black.
  Serbuk hijau menjadi hitam.
- Gas that turns lime water cloudy is evolved.
  Gas yang terbebas mengeruhkan air kapur.

What is salt P?
Apakah garam P?

A Copper(II) carbonate
Kuprum(II) karbonat

B Copper(II) oxide
Kuprum(II) oksida

C Zinc carbonate
Zink karbonat

D Sodium carbonate
Natrium karbonat

31 The information shows how a type of food additive functions
Maklumat di bawah menunjukkan bagaimana sejenis bahan tambah makanan berfungsi

Draws water out of the cells of microorganisms and retards the growth of microorganisms
Menyingkirkan air daripada sel mikroorganisma dan merencatkan pertumbuhan microorganisma

Which of the following food additives fits the description?
Bahan tambah makanan yang manakah yang menepati ciri-ciri ini?

A Sugar
Gula

B Vinegar
Cuka

C Ascorbic acid
Asid askorbik

D Sodium citrate
Natrium sitrat

32 What is the main function of soap as a cleansing agent ?
Apakah fungsi utama sabun sebagai agen pencuci ?

A soften the water
melembutkan air

B reduce the surface tension of water
mengurangkan ketegangan permukaan air

C precipitate the magnesium ion and calcium ions
Memendakkan ion magnesium dan ion kalsium

D reduce the attraction force between the dirt particles
mengurangkan daya tarikan antara zarah-zarah kotoran

33 The following substances are detergents except
Bahan-bahan berikut adalah sabun kecuali

A sodium oleate
Natrium oleat

B sodium lauryl sulphate
Natrium lauril sulfat

C sodium dodecyl sulphate
Natrium dodekil sulfat

D sodium 4-dodecylbenzene sulphonate
Natrium 4-dodekilbenzena sulfonat

34 Which of following shows the correct match between the polymer and its uses ?
Antara yang berikut , pasangan yang manakah yang betul bagi polimer dan kegunaannya?

	Polymer *Polimer*	Uses *Kegunaan*
A	Polyvinyl chloride *Polivinil klorida*	To make raincoats *Untuk membuat baju hujan*
B	Polyethene *Polietena*	To make heat insulator *Untuk membuat penebat haba*
C	Polystyrene *Polistirena*	To make bottles *Untuk membuat botol*
D	Perspex Perspek	To make footwear Untuk membuat kasut dan selipar

35 Diagram 9 shows the apparatus setup to determine the heat of combustion of ethanol.
Rajah 9 menunjukkan susunan radas bagi menentukan haba pembakaran etanol.

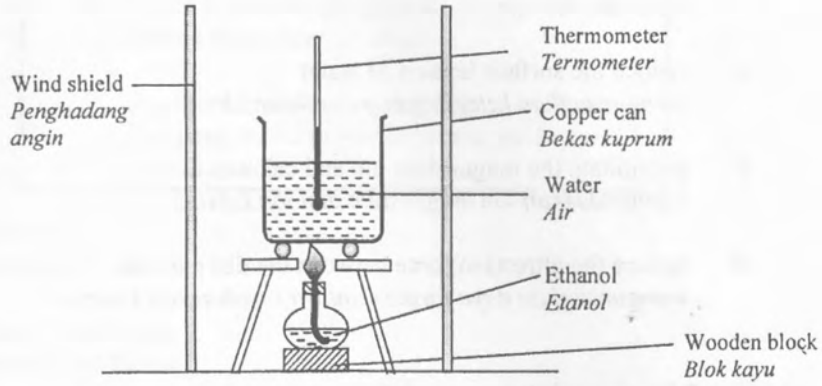


Diagram 9
Rajah 9

Among the data needed to determine the heat of combustion of ethanol are
Antara data yang diperlukan untuk menentukan haba pembakaran etanol adalah

I mass of ethanol
jisim etanol

II specific heat capacity of ethanol
Muatan haba tentu bagi etanol

III volume of water
Isipadu air

IV the temperature rise of water in the can
Kenaikan suhu air dalam bekas

A II and IV

B I ,II and IV

C I, III and IV

D I, II, III and IV

36 Which of the following medicines is a stimulant ?
Yang manakah antara ubat berikut adalah stimulant ?

A aspirin
aspirin

B clozapine
klozapin

C streptomycin
streptomisin

D methylphenidate
metilfenidat

37 A type of gas that has the following physical properties can be produced industrially .
Sejenis gas yang mempunyai sifat fizikal berikut boleh dihasilkan secara industri.

- **Very soluble in water**
  Sangat larut dalam air
- **Pungent smell**
  Berbau sengit
- **Colourless gas**
  Gas tidak berwarna
- **Alkaline gas**
  Gas beralkali

Name the gas.
Namakan gas itu.

A Chlorine
Klorin

B Ammonia
Ammonia

C Sulphur dioxide
Sulfur dioksida

D Hydrogen sulphide
Hidrogen sulfide

38 A patient has the following symptoms : **fever, headache, muscle and joint pains.** The medicine that can be taken to relieve the symptoms is
*Seorang pesakit mempunyai gejala-gejala seperti berikut : **demam, pening kepala, sakit otot dan sakit sendi**. Ubat yang boleh diambil untuk menangani gejala-gejala itu ialah*

A codeine
kodeina

B penicillin
penisilin

C paracetamol
parasetamol

D amphetamine
amfetamin

39 The following statements are true about exothermic reactions except
Pernyataan-pernyataan berikut adalah benar mengenai tindak balas eksotermik kecuali

A the reaction gives out heat to the surrounding
tindak balas membebaskan haba ke persekitaran

B the energy content of the products is lower than that of the reactants.
kandungan tenaga hasil tindak balas lebih rendah daripada kandungan tenaga bahan tindak balas

C the bond formation releases more energy than is required in the bond breaking
pembentukan ikatan membebaskan lebih banyak tenaga berbanding tenaga yang diperlukan untuk memecahkan ikatan

D the reaction of acid with alkali is an example of endothermic reaction.
Tindak balas asid dengan alkali adalah contoh bagi tindak balas endotermik

40 Which of the following statements is not true about rate of reaction?
Antara pernyataan berikut, yang manakah tidak benar mengenai kadar tindak balas?

A Rate of reaction depends on the concentration of reactant
Kadar tindak balas bergantung kepada kepekatan bahan tindak balas

B Rate of reaction depends on the volume of the reactant
Kadar tindak balas bergantung kepada isipadu bahan tindak balas

C Rate of reaction depends on the temperature
Kadar tindak balas bergantung kepada suhu

D Rate of reaction depends on the size of the reactant
Kadar tindak balas bergantung saiz bahan tindakbalas

41 Diagram 10 shows a graph of volume of carbon dioxide gas against time.
Rajah 10 menunjukkan graf isipadu gas carbon dioksida melawan masa.

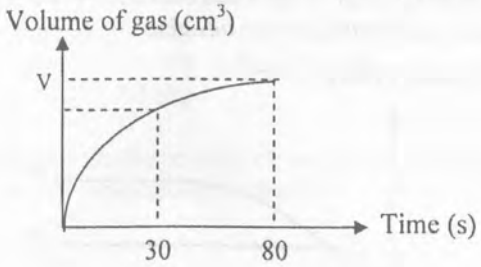


Diagram 10
Rajah 10

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

A The total volume of carbon dioxide, CO_2 given off is 2V cm^3.
Jumlah isipadu gas karbon dioksida yang dihasilkan adalah sebanyak 2V cm^3

B The reaction is complete at the 60^{th} second
Tindakbalas tamat pada saat ke 60.

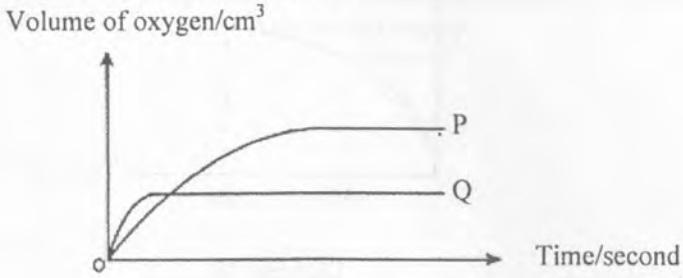
C The rate of reaction is the highest at the start of the reaction
Kadar tindak balas tertinggi pada ketika tindak balas bermula

D The rate of reaction at the 30^{th} second is higher than the rate of reaction at the 80^{th} second
Kadar tindak balas pada saat ke 30 adalah lebih tinggi berbandingkan kadar tindak balas pada saat ke 80.

42 Which of the following experiments has the highest initial rate of reaction?
Yang manakah antara berikut, mempunyai kadar awal yang paling tinggi.

	Experiment	Calcium carbonates, $CaCO_3$		Dilute hydrochloric acid, HCl	
		Mass (g)	Type	Volume (cm^3)	Concentration (mol dm^{-3})
A	I	5	powder	50	0.1
B	II	5	chips	50	0.2
C	III	10	powder	50	0.1
D	IV	10	powder	50	0.2

43 Curve P shows the decomposition of 25 cm^3 of 0.1 mol dm^{-3} hydrogen peroxide solutio to produce oxygen gas.
Lengkung P menunjukkan penguraian oleh 25 cm^3 0.1 mol dm^{-3} larutan hidrogen peroksida untuk menghasilkan gas oksigen.



If the experiment is repeated using another solution , which solution will produce curve Q.
Jika eksperimen tersebut diulang menggunakan larutan lain, larutan manakah yang aka menghasilkan lengkung Q

A 25 cm^3 of 0.15 mol dm^{-3} hydrogen peroxide

B 20 cm^3 of 0.15 mol dm^{-3} hydrogen peroxide

C 15 cm^3 of dm^{-3} 0.25 hydrogen peroxide

D 5 cm^3 of 0.25 mol dm^{-3} hydrogen peroxide

44 Which of the following explains the meaning of effective collision?
Yang mana satu antara pernyataan dibawah menerangkan pengertian tentang pelanggaran berkesan?

A The collision where its energy is less than the activation energy
Pelanggaran di mana tenaganya adalah kurang daripada tenaga pengaktifan

B The collision that causes a reaction
Pelanggaran yang menyebabkan tindak balas berlaku

C The collision which takes place before a reaction
Pelanggaran yang berlaku sebelum tindak balas

D The collision which takes place after a reaction
Pelanggaran yang berlaku selepas tindak balas

45 The equation below represents the reaction in the industrial preparation of ethanol
Persamaan dibawah mewakili tindak balas penyediaan etanol dalam industri.

$$CH_2 = CH_2 + H_2O \xrightarrow[300^\circ C/\ 60\ atm]{\text{Phosphoric acid}} CH_2\,CH_2\,OH$$

What is the name of the process for the preparation of ethanol in industry?
Apakah nama proses penyediaaan etanol dalam industri?

A Oxidation
Pengoksidaan

B Hydration
Penghidratan

C Dehydration
Pendehidratan

D Hydrogenation
Penghidrogenan

46 The IUPAC name of the compound formed by the reaction between propene and bromine is
Nama IUPAC bagi sebatian yang terbentuk antara tindak balas propena dan bromin ialah

A Bromopropane
Bromopropana

B 1,1-dibromopropane
1,1-dibromopropana

C 1,2-dibromopropane
1,2-dibromopropana

D 1,3-dibromopropane
1,3-dibromopropana

47 Diagram 11 shows the structural formula of carbon compound J
Rajah 11 di bawah menunjukkan formula struktur sebatian karbon J

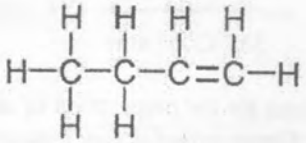


Diagram 11
Rajah 11

Which of the following statements are true?
Antara pernyataan berikut, yang manakah benar?
[Relative atomic mass of H = 1, C = 12]
[*Jisim atom relatif H = 1, C = 12*]

I Empirical formula of J is C_4H_8
Formula empirik J ialah C_4H_8

II Name of the compound J is but-1-ene
Nama sebatian J ialah but-1-ena

III Hydration of compoud J produce butan-1-ol
Penghidratan sebatian J menghasilkan butan-1-ol

IV Complete combustion of compound J produce carbon dioxide gas and water
Pembakaran lengkap sebatian J menghasilkan gas karbon dioksida dan air

A I and II only
I dan II sahaja

B III and IV only
III dan IV sahaja

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

D II, III and IV only
II, III dan IV sahaja

48 Which of the following chemicals is used to keep latex in its liquid state?
Antara bahan kimia berikut, yang manakah digunakan untuk mengekalkan lateks dalam keadaan cecair?

A Aqueous ammonia
Ammonia akueous

B Ethanoic acid
Asid ethanoik

C Methanol
Metanol

D Water
Air

49 In an experiment, excess magnesium powder is added to 50 cm^3 of 0.25 mol dm^{-3} zinc sulphate solution .The thermochemical equation is as shown :
Dalam satu eksperimen , serbuk magnesium ditambah secara berlebihan kepada 50 cm^3 0.25 mol dm^{-3} larutan zink sulfat . Persamaan termokimia untuk tindak balas itu adalah seperti berikut :

$$Mg_{(s)} + Zn^{2+} \rightarrow Zn + Mg^{2+} \qquad \Delta H = -80.64 \text{ kJ mol}^{-3}$$

Calculate the temperature rise in this experiment.
[Specific heat capacity of solution : 4.2 $Jg^{-1}{}^{o}C$, density of solution : 1gcm^{-3}]
Hitungkan kenaikan suhu dalam eksperimen ini.
[Muatan haba tentu larutan : 4.2$Jg^{-1}{}^{o}C$,ketumpatan larutan : 1gcm^{-3}]

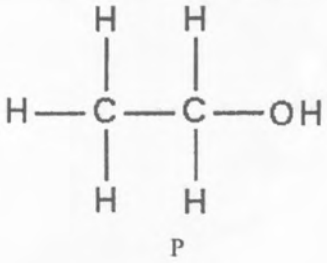
A $\frac{50 \times 0.25 \times 80640}{50 \times 4.2}$ °C

B $\frac{50 \times 4.2 \times 80640}{50 \times 0.25 \times 1000}$ °C

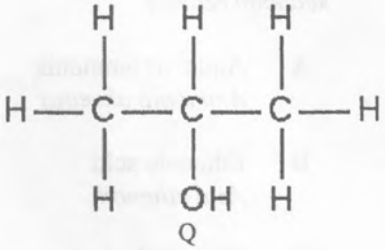
C $\frac{50 \times 0.25 \times 80.64}{50 \times 4.2}$ °C

D $\frac{50 \times 4.2 \times 80.64}{50 \times 0.25}$ °C

50 Diagram 12 shows the structural formulae of two molecules P and Q .
Rajah 12 menunjukkan formula struktur bagi molekul P dan Q.



P



Q

Diagram 12
Rajah 12

Which statement is true of both molecules P and Q?
Pernyataan yang manakah benar bagi kedua – dua molekul P dan Q?

A They have different functional groups
Kedua – duanya mempunyai kumpulan berfungsi yang berlainan

B All their physical properties are similar
Semua sifat fiziknya sama

C All their chemical properties are different
Semua sifat kimianya berbeza

D They can be represented by the same general formula
Kedua – duanya boleh diwakili oleh satu formula am yang sama

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

SULIT
4541/2
Chemistry
Kertas 2
September
2 ½ jam

Nama

Tingkatan

MAJLIS PENGETUA SEKOLAH MALAYSIA
CAWANGAN MELAKA

PEPERIKSAAN PERCUBAAN TINGKATAN LIMA
TAHUN 2011

CHEMISTRY

Kertas 2
Dua jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Kertas soalan ini mengandungi tiga bahagian:* ***Bahagian A, Bahagian B and Bahagian C.***
2. *Jawab* ***semua soalan dalam Bahagian A.*** *Tulis jawapan dalam* Bahagian **A** *dalam ruangan yang disediakan..*
3. *Jawab* ***satu*** *soalan dalam* ***Bahagian B*** *dan satu soalan dalan* ***Bahagian C.*** *Jawab soalan dalam* ***Bahagian B*** *dan* ***Bahagian C*** *dengan terperinci. Anda boleh menggunakan persamaan kimia, rajah, jadual, graf dan kaedah yang bersesuaian untuk menerangkan jawapan anda.*
4. *Tunjukkan jalan kerja. Ia dapat membantu anda mendapat markah.*
5. *Rajah dalam soalan tidak dilukis mengikut skala.*
6. *Markah yang diperuntukkan bagi setiap soalan ditunjukkan dalam kurungan.*
7. *Anda boleh menggunakan kalkulator saintifik yang tidak diprogramkan.*
8. *Serahkan kertas jawapan pada akhir waktu peperiksaan.*

Untuk kegunaan pemeriksa		
Bahagian	No.	Mark
A	1	
	2	
	3	
	4	
	5	
	6	
Jumlah		
B	7	
	8	
Jumlah		
C	9	
	10	
Jumlah		
Jumlah Markah		

Section A
Bahagian A
[60 marks]
[60 markah]

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

1 (a) Octane is a hydrocarbon compound and belongs to alkane homologues series. It is a component of petrol. Diagram 1.1 shows a molecule of octane.
Oktana ialah sebatian hidrokarbon dan berada dalam siri homolog alkana. Ia adalah sebatian yang terdapat dalam petrol. Rajah 1.1 menunjukkan satu molekul oktana

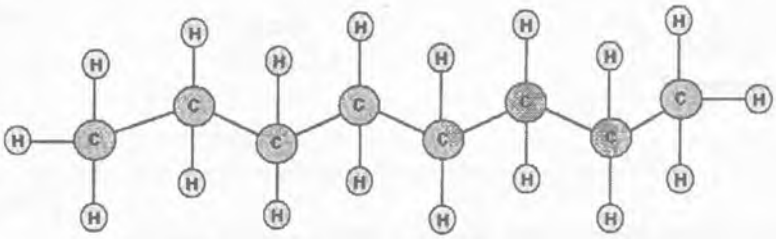


Diagram 1.1
Rajah 1.1

(i) What is meant by hydrocarbon compound ?
Apakah yang dimaksudkan dengan sebatian hidrokarbon ?

.....
[1 mark]

(ii) What is the molecular formula of octane ?
Apakah formula molekul oktana ?

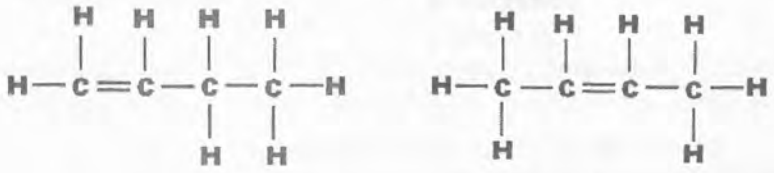
.....
[1 mark]

(iii) State the empirical formula of octane
Nyatakan formula empirik bagi oktana.

.....
[1 mark]

(iv) Octane burns completely in excess oxygen to form carbon dioxide and water. Write the chemical equation for the reaction that takes place.
Oktana terbakar lengkap dalam oksigen yang berlebihan untuk membentuk karbon dioksida dan air. Tuliskan persamaan kimia bagi tindak balas yang berlaku.

(b) Diagram 1.2 shows two isomers, P and Q of an alkene.
Rajah 1.2 menunjukkan dua isomer, P dan Q bagi suatu alkena.



Isomer P
Isomer P

Isomer Q
Isomer Q

Diagram 1.2
Rajah 1.2

(i) What is meant by isomer?
Apakah yang dimaksudkan dengan isomer ?

.....

[1 mark]

(ii) Name isomer P.
Namakan isomer P.

.....

[1 mark]

(iii) Draw the structural formula for one other isomer of P and Q.
Lukiskan formula struktur bagi satu lagi isomer P dan Q .

[1 mark]

(iv) Diagram 1.3 represents the chemical reaction between isomer Q and steam at 300°C with phosphoric acid as catalyst.
Rajah 1.3 mewakili tindak balas antara isomer Q dan stim pada 300°C dengan asid fosforik sebagai mangkin.

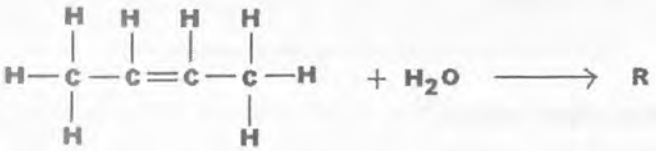


Diagram 1.3
Rajah 1.3

Complete the table below.
Lengkapkan jadual di bawah

Name of R *Nama bagi R*	
Homologous series of R *Siri homolog bagi R*	

[2 marks]

2 Diagram 2.1 shows the apparatus set up to show the transfer of electrons at a distance.
Rajah 2.1 menunjukkan susunan radas untuk menunjukkan pemindahan elektron pada suatu jarak.

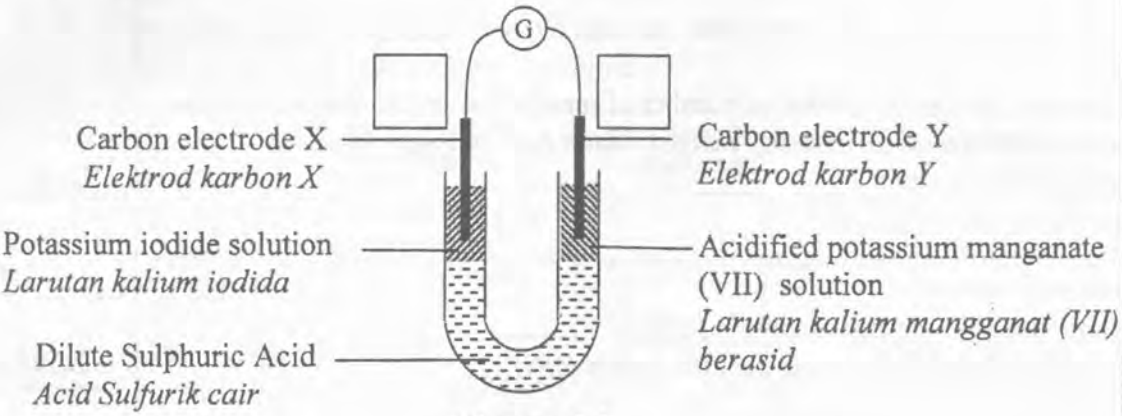


Diagram 2.1
Rajah 2.1

(a) State the function of dilute sulphuric acid.
Nyatakan fungsi larutan asid sulfurik cair.

.....

[1 mark]

(b) After a few minutes, potassium iodide solution changes from colourless to brown.
Selepas beberapa minit, larutan kalium iodida berubah warna daripada tanpa warna ke warna perang.

(i) Write the half equation for the reaction that occurs.
Tuliskan setengah persamaan untuk tindakbalas yang berlaku.

.....

[1 mark]

(ii) Name the product formed in (b)(i).
Namakan hasil yang terbentuk di (b)(i).

.....

[1 mark]

(iii) Describe the confirmation test for the product formed in (b)(ii).
Huraikan ujian pengesahan untuk hasil yang terbentuk di (b)(ii).

.....

.....

.....

[3 marks]

(c) Equation below shows the reaction that occurs to acidified potassium mangganate(VII) solution in the above experiment.
Persamaan di bawah menunjukkan tindakbalas yang berlaku kepada larutan kalium mangganat(VII) berasid dalam eksperimen di atas..

$$MnO_4^- + 8H^+ + 5e \rightarrow Mn^{2+} + 4H_2O$$

(i) State the changes of oxidation number of manganese in the above equatio
Nyatakan perubahan nombor pengoksidaan bagi mangan dalam persamaan di atas.

.....

[1 ma

(ii) Name the reaction that occurs in (c)(i).
Namakan tindakbalas yang berlaku dalam (c)(i)

.....

[1 ma

(d) In the above diagram,
Dalam rajah di atas,

(i) Mark √ in the box at the electrode which acts as the anode
Tandakan √ dalam kotak bagi elektrod yang bertindak sebagai anod.

[1 ma

(ii) Show the direction of the flow of electrons.
Tunjukkan arah pengaliran elektron.

[1 ma

3 The flow chart in Diagram 3.1 shows the stages how palm oil is extracted from fruits.
Carta alir dalam Rajah 3.1 menunjukkan peringkat-peringkat bagaimana minyak kelapa sawit diekstrak daripada buahnya.

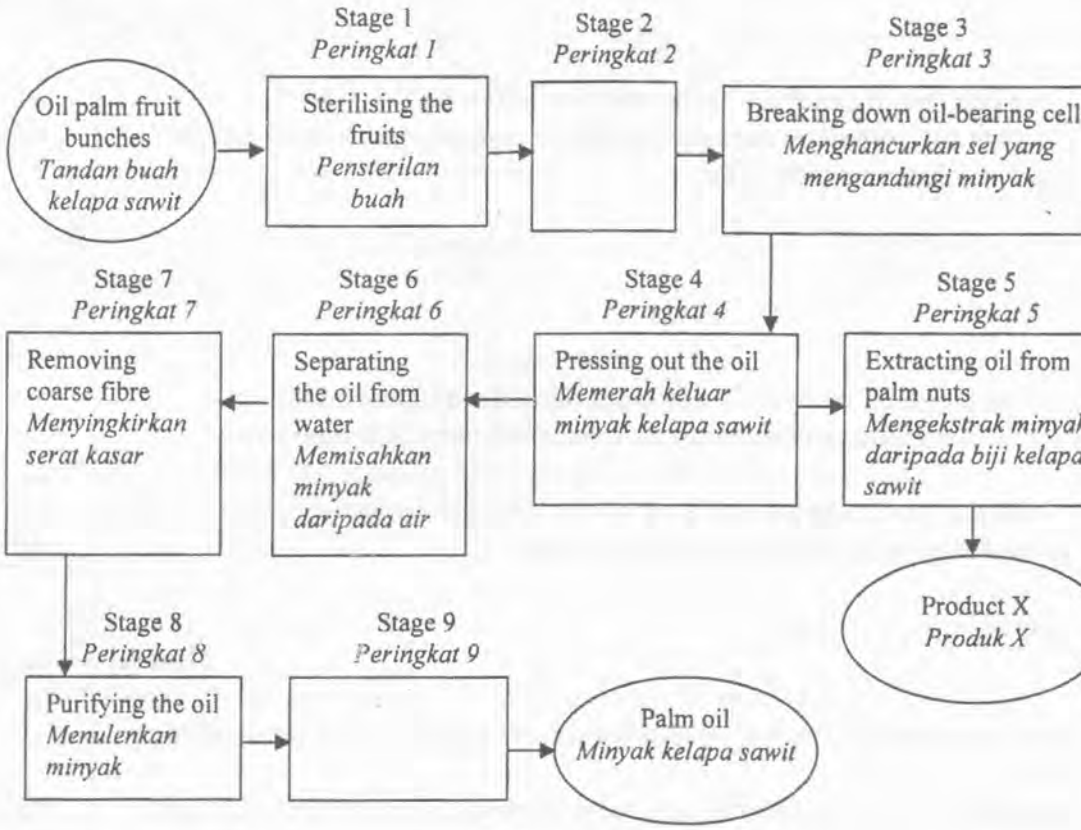


Diagram 3.1
Rajah 3.1

Based on the Diagram 3.1
Berdasarkan Rajah 3.1

(a) (i) State the processes that are carried out at stage 2 and stage 9
Nyatakan proses-proses yang dijalankan dalam peringkat 2 dan peringkat 9

Stage 2 :
Peringkat 2 : .....

Stage 9 :
Peringkat 9 : .....

[2 mark

(ii) Name product X formed in the extraction process.
Namakan produk X yang terbentuk dalam proses pengekstrakan ini.

(iii) The extraction of oil from the fruits has to be carried out within 24 hours after harvesting. Give your reason.
Pengekstrakan minyak kelapa sawit perlu dilakukan dalam tempoh masa 24 jam setelah dipetik. Berikan sebab anda.

.....

[1 mark]

(iv) Give one health benefit of using palm oil in our diet.
Berikan satu kebaikan dari segi kesihatan penggunaan minyak kelapa sawit dalam pemakanan kita.

.....

[1 mark]

(b) Soaps can be prepared by hydrolysing palm oil under alkaline condition.
Sabun boleh disediakan melalui hidrolisis beralkali minyak kelapa sawit .

(i) Name the process to prepare soap.
Namakan proses untuk menyediakan sabun.

.....

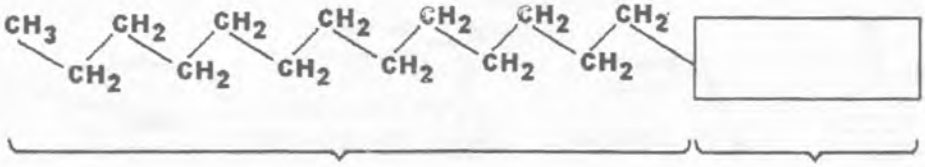
[1mark]

(ii) State one chemical substance that can be used to react with palm oil in (b)(i)
Nyatakan satu bahan kimia yang boleh digunakan untuk bertindak balas dengan minyak kelapa sawit dalam (b)(i).

.....

[1 mark]

(c) A soap ion consists of the hydrophobic part and the hydrophilic part as shown in the Diagram 3.2 below.
Ion sabun terdiri daripada bahagian hidrofobik dan bahagian hidrofilik seperti yang ditunjukkan dalam rajah 3.2 di bawah.



Hydrophobic part
Bahagian hidrofobik

Hydrophilic part
Bahagian hidrofilik

Diagram 3.2
Rajah 3.2

(i) Name the ion that made up the hydrophilic part of the soap ion.
Namakan ion yang membina bahagian hidrofilik ion sabun

.....

[1 mark]

(ii) Complete the structure of the soap ion in the diagram 3.2
Lengkapkan struktur ion sabun dalam rajah 3.2

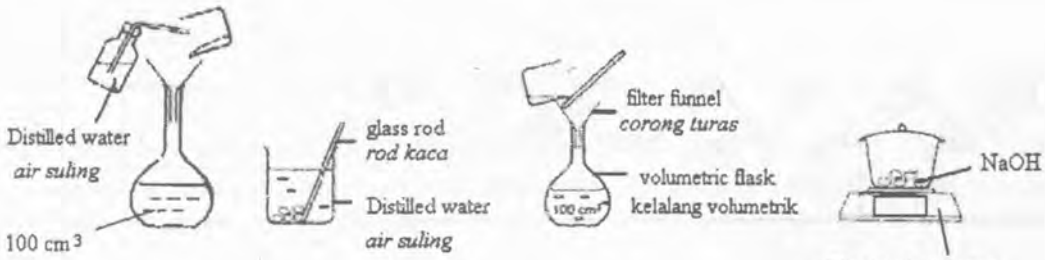
[1 mark]

(iii) State one disadvantage of using soap as cleansing agent.
Nyatakan satu kekurangan menggunakan sabun sebagai agen pencuci.

.....

[1 mark]

4 Diagram 4 .1 shows the steps involved in the preparation of a standard solution.
Rajah 4.1 menunjukkan langkah-langkah yang terlibat untuk menyediakan laruta piawai.



Step P *Langkah P* | Step Q *Langkah Q* | Step R *Langkah R* | Step S *Langkah S*

Diagram 4.1
Rajah 4.1

(a) What is meant by a standard solution?
Apakah yang dimaksudkan dengan larutan piawai?

.....

.....

[1 mark]

(b) Arrange the steps in the correct order of preparing a standard solution.
Susunkan langkah-langkah mengikut urutan yang betul bagi menyediakan larutan piawai.

.....

[1 mark]

(c) (i) Calculate the mass of solid sodium hydroxide needed to prepare 100 cm^3 of 2.0 mol dm^{-3} sodium hydroxide solution.
Hitungkan jisim pepejal natrium hidroksida yang diperlukan untuk menyediakan 100 cm^3 larutan natrium hidroksida 2.0 mol dm^{-3}.

(ii) State two precautionary steps that must be taken to prepare a standard solution.
Nyatakan dua langkah berjaga-jaga yang perlu diambil untuk menyediakan larutan piawai.

.....

.....

.....

.....

[2 marks]

(d) (i) 100 cm^3 of 0.20 mol dm^{-3} sodium hydroxide solution is prepared from the standard solution. Name this method to prepare the specified concentration solution.
100 cm^3 larutan natrium hidroksida, 0.20 mol dm^{-3} disediakan daripada larutan piawai itu. Namakan kaedah ini bagi penyediaan larutan yang berkepekatan spesifik tersebut.

.....

[1 mark]

(ii) State two apparatus that are needed to prepare the solution in (d) (i)
Nyatakan dua radas yang diperlukan untuk menyediakan larutan di (d) (i)

.....

[2 marks]

5 An experiment was carried out to determine the rate of reaction betw granulated marble chips and dilute hydrochloric acid. In this experiment, exc granulated marble chips, $CaCO_3$ were reacted with 20 cm^3 of hydrochloric a The volume of carbon dioxide gas, CO_2 produced was recorded every seconds as shown in Table 5.1.
Satu eksperimen dijalankan untuk menentukan kadar tindak balas ant ketulan marmar dengan asid hidroklorik cair. Dalam eksperimen ini, ketu marmar, $CaCO_3$ yang berlebihan ditindak balaskan dengan 20 cm^3 a hidroklorik. Isipadu gas karbon dioksida, CO_2 yang terhasil direkodkan se 30 saat seperti di dalam Jadual 5.1

Time (s) *Masa (s)*	0	30	60	90	120	150	180	210	24
Volume of carbon dioxide (cm^3) *Isipadu gas karbon dioksida (cm^3)*	0	8	16	24	31	37	40	40	4(

Table 5.1
Jadual 5.1

(a) Based on Table 5.1, plot a graph of volume of carbon dioxide gas produ against time.
Berdasarkan kepada Jadual 5.1, plotkan graf isipadu gas karbon dioksida y dibebaskan melawan masa.

[4 mar

(b) Based on the graph drawn in (a), calculate :
Berdasarkan kepada graf yang dilukis di (a), hitungkan :

(i) Average rate of reaction in the first minute.
Kadar tindak balas purata pada minit yang pertama.

[1 ma

(ii) Overall average rate of reaction
Kadar tindak balas purata keseluruhan

(c) Sketch on the graph in (a), the curve that would be obtained if
Lakarkan pada graf di (a), lengkung yang dijangka diperolehi jika

(i) This experiment is repeated by replacing granulated marble chips wi powdered marble (other conditions remaining the same)
Eksperimen ini diulang dengan menggantikan ketulan marmar deng serbuk marmar (keadaan lain dikekalkan)

[2 mark

(ii) Granulated marble chips are replaced with powdered marble with t same mass but the volume of hydrochloric acid used is reduced to half its initial volume(with the same concentration).
Ketulan marmar ditukar dengan serbuk marmar dengan jisim yang sa tetapi isipadu asid hidroklorik yang digunakan dikurangkan kepa separuh daripada isipadu awal(kepekatan asid adalah sama)

[2 mark

6 Diagram 6.1 shows the apparatus set up for electrolysis of 1.0 mol dm^{-3} hydrochloric acid solution using carbon electrodes.
Rajah 6.1 menunjukkan susunan radas bagi elektrolisis larutan asid hidroklorik 1.0 mol dm^{-3} yang menggunakan elektrod karbon.

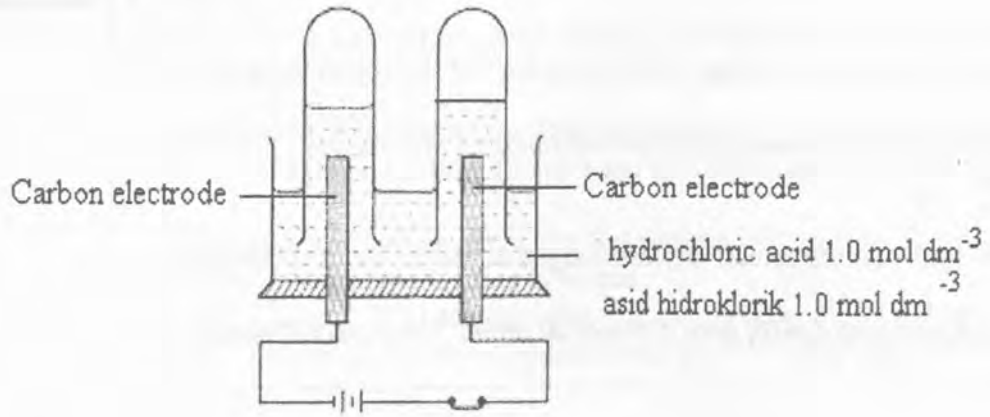


Diagram 6.1
Rajah 6.1

(a) Write the formula of the ions that are attracted to the anode.
Tuliskan formula bagi ion-ion yang tertarik ke anod.

.....

[1 mark]

(b) (i) State the observation at the anode.
Nyatakan pemerhatian yang diperolehi di anod.

.....

[1 mark]

(ii) Name the product formed in (b)(i).
Namakan hasil yang terbentuk di (b)(i)

.....

[1 mark]

(iii) Write the half equation for the formation of product in (b)(ii).
Tuliskan persamaan setengah bagi pembentukan hasil di (b)(ii).

.....

(c) Describe a chemical test to verify the product formed at the cathode.
Huraikan satu ujian kimia untuk mengesahkan hasil yang terbentuk di katod

.....

.....

[2 m

(d) The experiment is repeated by using 0.0001 mol dm^{-3} of hydrochloric acid solution.
Eksperimen diulang dengan menggunakan larutan asid hidroklorik 0.0001 mol dm^{-3}.

(i) State the ions that are selectively discharged at the anode. Explain yo answer.
Nyatakan ion yang dipilih untu didiscas di anod. Terangkan jawapan anda.

.....

.....

[2 m

(ii) State one factor that affects the discharge of ions at an electrode.
Nyatakan satu faktor yang mempengaruhi discas ion di elektrod.

.....

[1 m

(e) State the change of energy in the above cell.
Nyatakan perubahan tenaga dalam sel di atas.

.....

[1 m

Section B
[20 *marks*]

Answer any **one** *question.*
The time suggested to answer this section is 30 minutes.

7 (a) Diagram 7.1 shows part of the report on Fukushima nuclear accidents caused by earthquake.

The radiation effects from the Fukushima nuclear accidents

The radiation effects from the Fukushima nuclear accidents are the results the released of radioactive **isotopes**.
On 12 March 2011 the day after the earthquake, increased levels of **Iodine-1** and **Caesium-137** were reported near Unit 1 on the plant site.

Diagram 7.1

Rajah 7.1 menunjukkan sebahagian laporan kemalangan nuklear Fukushima gempa bumi.

Kesan radiasi daripada kemalangan nuklear Fukushima

Kesan radiasi daripada kemalangan nuklear Fukushima disebabkan o terbebasnya ***isotop*** *radioaktif.*
Pada 12 Mac 2011, sehari selepas gempa bumi, peningkatan paras ***Iodin-1*** *dan* ***Ceasium-137*** *dilaporkan berdekatan Unit 1 bagi loji tersebut.*

Rajah 7.1

(i) State the meaning of isotope.
Nyatakan maksud isotop.

(ii) If the proton number of Iodine-131 and Caesium-137 is 53 and 55, deter number of neutrons in isotopes Iodine-131 and Caesium-137.
Jika nombor proton bagi Iodin-131 dan Ceasium-137 ialah 53 dan 55, bilangan neutron bagi isotop Iodin-131 dan Ceasium-137.

(b) Diagram 7.2 shows the electron arrangement of ion M^{2+}.
Rajah 7.2 menunjukkan susunan elektron bagi ion M^{2+}.

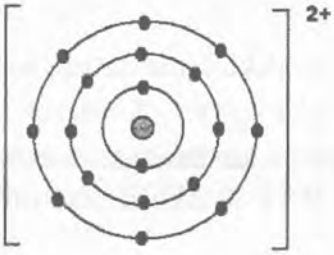


Diagram 7.2
Rajah 7.2

State the position for atom M in the Periodic Table of Elements.
Explain your answer.
Nyatakan kedudukan bagi atom M dalam Jadual Berkala Unsur
Terangkan jawapan anda.

(c) Table 7.3 shows the proton number and nucleon number of atom of eleme
Jadual 7.3 menunjukkan nombor proton dan nombor nukleon bagi atom
R.

Atom	proton number *nombor proton*	nucleon number *nombor nukleon*
Q	9	19
R	6	12

Table 7.3
Jadual 7.3

The reaction between Q and R forms a compound.
Describe the formation of the compound.
Tindak balas di antara Q dan R menghasilkan satu sebatian.
Huraikan pembentukan sebatian itu.

(d) The table below shows three types of food additive and their functions.
Jadual di bawah menunjukkan 3 jenis bahan tambah makanan dan fung masing.

Type of food additive *Jenis bahan tambah makanan*	Function *Fungsi*
X	To slow down or prevent the growth of microorganisms so that food can be kept for a longer period. *Untuk memperlahan atau menghalang pertumbuhan mikroorganisma supaya makanan tahan lebih lama.*
Y	To prevent oxidation that causes rancid of fats and fruits from turning brown *Untuk menghalang pengoksidaan yang menyebabkan lemak menjadi tengik dan buah-buahan menjadi coklat*
Z	To improve and restore the taste of food *Untuk meningkatkan dan memulihkan rasa makanan*

State the type of food additive X, Y and Z . State **one** example for each
Nyatakan jenis bahan tambah makanan X, Y dan Z. Nyatakan satu contoh ba jenis.

8 (a) Diagram 8.1 shows part of the Periodic Table of elements.
Rajah 8.1 menunjukkan sebahagian daripada Jadual Berkala Unsur.

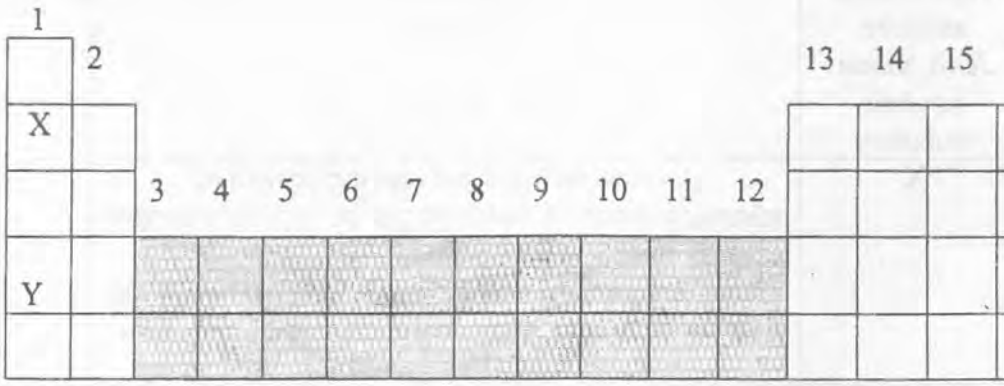


Diagram 8.1
Rajah 8.1

(a) (i) Write the electron arrangement for atom X and atom Y.
Tuliskan susunan elektron bagi atom X dan atom Y.

(ii) Write the observation for the reactions of these elements with wate
Compare and explain the reactivity of the reactions.
Tuliskan pemerhatian bagi tindak balas unsur-unsur ini dengan a
dan terangkan kereaktifan tindak balas tersebut.

(iii) State the name given to the elements found in the shaded part of th
Table shown above and state the three special characteristics exhib
elements.
Nyatakan nama yang diberikan kepada unsur-unsur dalam bahagi
dilorekkan dalam Jadual Berkala di atas dan nyatakan tiga sifat is
dipamerkan oleh unsur-unsur ini.

(b) Table 8.2 shows three patients with the symptoms displayed or disease cont the medicines prescribed as written in a doctor's file.
Jadual 8.2 menunjukkan tiga orang pesakit dengan gejala –gejala yang di atau penyakit yang dihidapi dan ubat yang dibekalkan seperti yang ditulis d seorang doctor.

Patient *Pesakit*	Symptom / Disease *Gejala/ Penyakit*	Medicine Prescribed *Ubat yang dibekalkan*	Type of Medici *Jenis Ubat*
Aminah	Arthritic Pain *Sakit sendi tulang*	Aspirin *Aspirin*	X
Susan	Pneumonia *Radang paru-paru*	Penicillin *Penisilin*	Antibiotic *Antibiotik*
Maniam	Depression , lack of interest in his surrounding *Kemurungan , kurang peka terhadap persekitarannya*	Tranquilizers *Trankuilizer*	Y

Table 8.2
Jadual 8.2

(i) State the type of medicine X and medicine Y.
Nyatakan jenis ubat X dan ubat Y .

(ii) For each of the medicine given in the above table, describe the correct the possible side effects.
Untuk setiap ubat yang diberikan di dalam jadual di atas, hura penggunaan yang betul dan kemungkinan kesan sampingan penggunaannya

Section C
[20 *marks*]

Answer any ***one*** *question.*
The time suggested to answer this section is 30 minutes.

9 (a) The following pictures show examples of objects that are made up materials.
Gambar-gambar berikut menunjukkan beberapa objek yang diperbuat d komposit.

Fibreglass
Gentian kaca

Fibre Optic
Gentian Optik

Photochro
Kaca fo

(i) What is meant by composite materials?
Apakah yang dimaksudkan dengan bahan komposit?

(ii) Give the name of components that made up the following compo fibreglass , fibre optics and photochromic glass.
Berikan nama komponen yang membina bahan komposit : g gentian optik dan kaca fotokromik.

(iii) Compare the properties of fibreglass with its components .
Bandingkan sifat-sifat gentian kaca dengan komponennya.

(b) Describe a laboratory experiment to investigate the hardness property of and its alloy.
Your descriptions should include materials, apparatus set-up, procedures and their inference.
Huraikan satu eksperimen makmal untuk menyiasat sifat kekerasan loga yang dinamakan.

10 Neutralization reaction between acid and alkali can be used to produce soluble salt.
Tindakbalas peneutralan di antara asid dan alkali boleh digunakan untuk menyedia garam yang larut dalam air.

Acid + alkali → salt + water

(a) By using suitable acid and alkali, describe how you can prepare a pure samp soluble salt by using neutralization reaction.
Dengan menggunakan asid dan alkali yang sesuai, huraikan bagaimana a menyediakan sampel garam terlarutkan yang tulen menggunakan ti peneutralan.

[

(b) You are given a sample of solid copper(ll) nitrate salt.
Describe a chemical test that can be used to verify the the presence of copp and nitrate ions in copper(II) nitrate salt.
Anda telah diberikan satu contoh pepejal garam kuprum(II) nitrat. Huraikan kimia yang boleh anda gunakan untuk mengesahkan kehadiran ion kuprum(I nitrat dalam sampel tersebut.

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

4541/3
Chemistry
Kertas 3
September
2011
1 ½ jam

Nama

Kelas

MAJLIS PENGETUA SEKOLAH MALAYSIA
CAWANGAN MELAKA

PEPERIKSAAN PERCUBAAN TINGKATAN LIMA

TAHUN 2011

CHEMISTRY

Kertas 3

Satu jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Tuliskan nama dan tingkatan pada ruang yang disediakan.*
2. *Kertas soalan ini adalah dalam dwi bahasa.*
3. *Calon hendaklah membaca arahan pada halaman 2 .*

Untuk kegunaan pemeriksa sahaja		
Soalan	Markah Penuh	Markah diperolehi
1	33	
2	17	
Jumlah	50	

Kertas soalan ini mengandungi 11 halaman bercetak

Answer **all** question
*Jawab **semua** soalan*

1 Diagram 1.1 shows the set-up of apparatus to determine the heat of combustion for alcohols.
Rajah 1.1 menunjukkan susunan radas untuk menentukan haba pembakaran alkohol.

For Examiner's Use

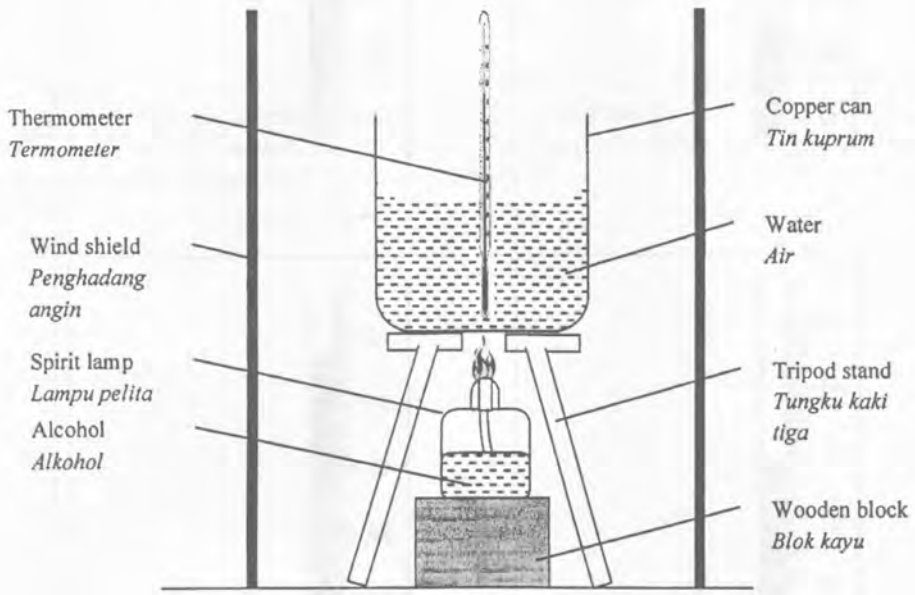


Diagram 1.1
Rajah 1.1

Three sets of experiments are carried out to determine the heat of combustion of different types of alcohols.
Tiga set eksperimen telah dijalankan untuk menentukan haba pembakaran bagi alkohol yang berlainan jenis.

Diagram 1.2 shows the initial and highest readings of the thermometer in the three sets of experiment.
Rajah 1.2 menunjukkan bacaan awal dan tertinggi termometer bagi ketiga-tiga set eksperimen.

For Examiner's Use

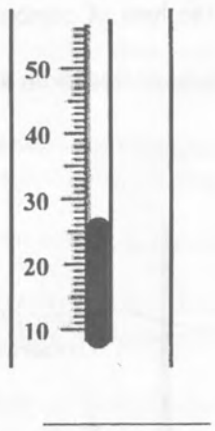
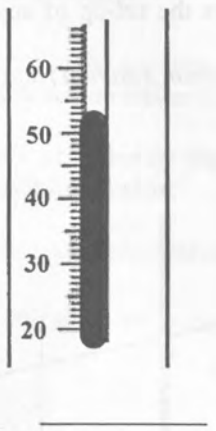
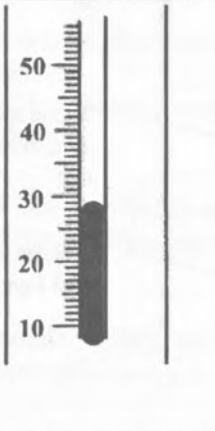
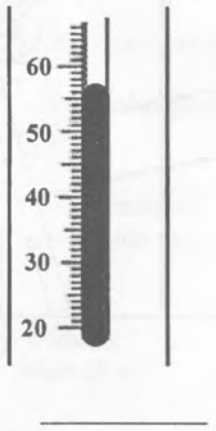
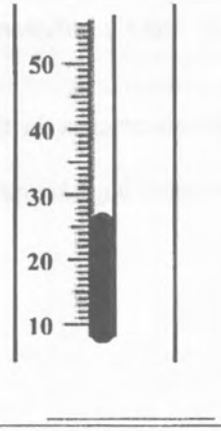
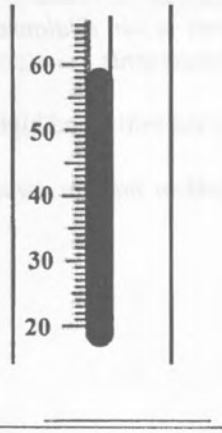
Set	Initial thermometer reading *Bacaan awal termometer*	Highest thermometer reading *Bacaan tertinggi termometer*
I		
II		
III		

Diagram 1.2
Rajah 1.2

(a) Record the initial thermometer readings and highest thermometer readings in Set I, Set II and Set III at space provided in Diagram 1.2.
Rekodkan bacaan awal termometer dan bacaan tertinggi thermometer dalam Set I, Set II dan Set III pada ruang yang disediakan di Rajah 1.2.

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

For Examiner's Use

1*(a)*

3

(b) Construct a table to record the initial temperature of water, highest temperature of water and increase in temperature in Set I, Set II and Set III.
Bina satu jadual untuk merekodkan suhu awal air, suhu tertinggi air dan kenaikan suhu dalam Set I, Set II dan Set III.

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

1*(b)*

3

For Examiner's Use

Table 1 shows the heats of combustion of four alcohols.
Jadual 1 menunjukkan haba pembakaran bagi empat jenis alkohol.

Alcohol *Alkohol*	**Molecular formula** *Formula molekul*	**Heat of combustion (kJ mol^{-1})** *Haba pembakaran (kJ mol^{-1})*
Methanol *Metanol*	CH_3OH	-728
Ethanol *Etanol*	C_2H_5OH	-1376
Propanol *Propanol*	C_3H_7OH	-2016
Butanol *Butanol*	C_4H_9OH	

Table 1
Jadual 1

(c) State one hypothesis based on Table 1.
Nyatakan satu hipotesis berdasarkan Jadual 1.

.....

.....

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

1*(c)*

3

(d) Predict the heat of combustion for butanol.
Ramalkan haba pembakaran bagi butanol.

.....

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

1*(d)*

3

(e) Sketch a graph to show heat of combustion of alcohols in Table 1 against number of carbon atoms per molecule.
Lakar graf untuk menunjukkan haba pembakaran bagi alkohol dalam Jadual 1 melawan bilangan atom karbon per molekul.

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

1*(e)*

3

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

(i) The manipulated variable
Pembolehubah dimanipulasikan

.....

(ii) The responding variable
Pembolehubah bergerak balas

.....

(iii) The constant variable
Pembolehubah dimalarkan

.....

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

For Examiner's Use

1(f)

3

Diagram 1.3 shows the energy level for combustion of ethanol.
Rajah 1.3 menunjukkan aras tenaga untuk pembakaran etanol.

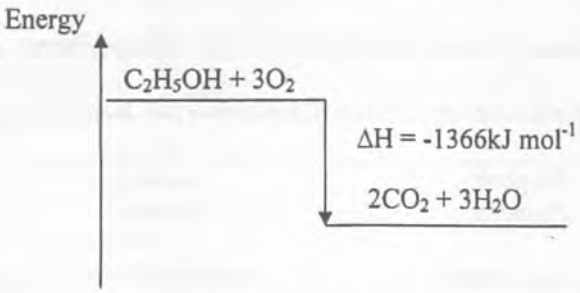


Diagram 1.3
Rajah 1.3

(g) State three information from Diagram 1.3.
Nyatakan tiga maklumat berdasarkan Rajah 1.3.

1. .....

2. .....

3. .....

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

1(g)

3

(h) Thermochemical equations below represent the combustion of propane and ethanol in excess oxygen.

Persamaan termokimia di bawah mewakili pembakaran propana dan etanol dalam oksigen berlebihan.

$$C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O \qquad \Delta H = -2202 \text{ kJ mol}^{-1}$$

$$C_2H_5OH + 3O_2 \rightarrow 2CO_2 + 3H_2O \qquad \Delta H = -1376 \text{ kJ mol}^{-1}$$

Based on the thermochemical equations above, state the operational definition for heat of combustion.

Berdasarkan persamaan termokimia di atas, nyatakan definisi secara operasi bagi haba pembakaran.

.....

.....

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

For Examiner's Use

1(h)

3

(i) Alcohol is one example of carbon compounds.
Alkohol adalah satu contoh sebatian karbon.

Classify the following carbon compounds into hydrocarbons and non-hydrocarbons.
Kelaskan sebatian karbon berikut kepada hidrokarbon dan bukan hidrokarbon.

Propene *Propena*	Butanol *Butanol*
Ethanoic acid *Asid etanoik*	Methyl ethanoate *Metil etanoat*

1(i)

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

3

Diagram 1.4 shows set-up of apparatus for two sets of experiment.
Rajah 1.4 menunjukkan susunan radas bagi dua set eksperimen.

For Examiner's Use

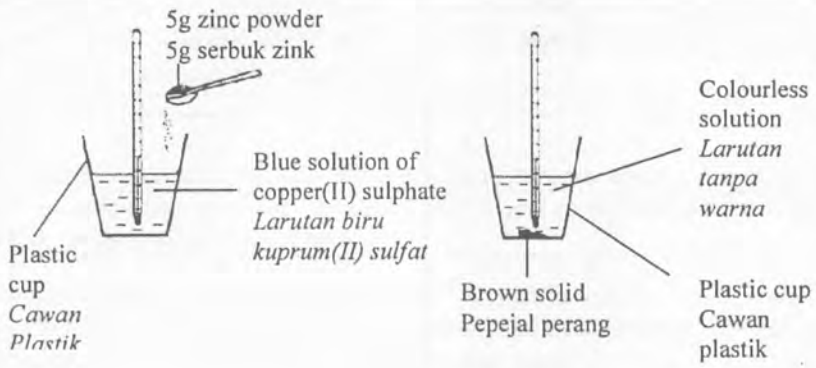
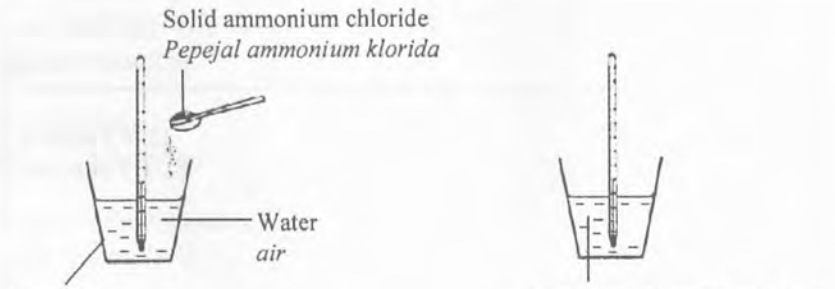
Set	Set-up of apparatus *Susunan radas*
I	 Initial temperature = 28^0C Highest temperature = 36^0C
II	 Initial temperature = 29^0C Lowest temperature = 25^0C

Diagram 1.4
Rajah 1.4

(j) Based on the information in Diagram 1.4, complete the following table.
Berdasarkan maklumat pada Rajah 1.4, lengkapkan jadual berikut.

For Examiner's Use

Set	Observation	Inference
I	1. .... 2.	1. .... 2. ....
II	1.	1. ....

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

1(j)
6

For Examiner's Use

There are many items around us such as tyres, mattress and gloves are made from rubber. Natural rubber is obtained from the latex secreted by rubber tree. Latex needs to be turned into a solid for it to be used in daily purposes.

Terdapat banyak barangan di sekeliling kita yang diperbuat daripada getah seperti tayar, tilam dan sarung tangan. Getah asli didapati daripada lateks pada pokok getah. Cecair lateks perlu dijadikan pepejal untuk digunakan dalam pembuatan pelbagai barangan harian.

An acid is used to coagulate the latex while an alkali can prevent the coagulation of latex. Based on this idea, plan one laboratory experiment to investigate the effect of acid and alkali on the coagulation of latex.

Asid digunakan untuk menggumpalkan lateks manakala alkali boleh mencegah penggumpalan lateks. Berdasarkan idea ini, rancang satu eksperimen makmal untuk menyiasat kesan asid dan alkali ke atas penggumpalan lateks.

Your planning should include the following aspects:

Perancangan anda hendaklah mengandungi aspek-aspek berikut:

(a) Problem statement
Pernyataan masalah

(b) All the variables
Semua pembolehubah

(c) Statement of the hypothesis
Pernyataan hipotesis

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

(e) Procedure for the experiment
Prosedur eksperimen

(f) Tabulation of data
Penjadualan data

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

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

MAJLIS PENGETUA SEKOLAH MALAYSIA
CAWANGAN MELAKA

PEPERIKSAAN PERCUBAAN TINGKATAN LIMA
TAHUN 2011

CHEMISTRY

Marking Scheme

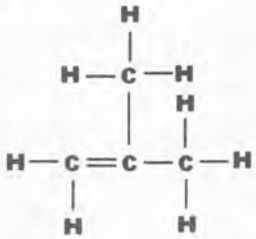
Paper 1 and Paper 2

SET 1

ANSWERS FOR CHEMISTRY PAPER 1
(SET 1)

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

SECTION A

1	(a)	(i)	Compound contain carbon and hydrogen only		1
		(ii)	C_8H_{18}		1
		(iii)	C_4H_9		1
		(iv)	1. Correct formula of reactant and product	1	
			2. Balance the equation	1	2
			Answer:		
			$C_8H_{18} + 25/2O_2 \rightarrow 8CO_2 + 9H_2O$ //		
			$2C_8H_{18} + 25O_2 \rightarrow 16CO_2 + 18H_2O$		
	(b)	(i)	Two or more compound with the same molecular formula but different structural formula		1
		(ii)	But-1-ene		1
		(iii)			1
		(iv)	1. Butan- 2 -ol	1	
			2. Alcohol	1	2
			Total		**10**

2	(a)	To allow the flow of ion through it.		1
	(b)(i)	$2I^- \rightarrow I_2 + 2e$		1
	(ii)	Iodine		1
	(iii)	1) Method		1
		2) reagent used		1
		3) observation		1
		Sample answer: ▪ Add a few drops ▪ of starch solution ▪ dark blue colouration is formed		
	(c)(i)	$+7 \rightarrow +2$		1
	(ii)	Reduction		1
	(d)(i)	Mark X at the electrode immersed in potassium iodide solution		1
	(ii)	Correct flow of electron; arrow shows the movement of electron from carbon electrode X to carbon electrode Y through external circuit		1
			Total	**10**

3	(a)	(i)	Process 2 - Stripping the fruits from bunches		1
			Process 9 – Drying the oil		1
		(ii)	palm kernel oil		1
		(iii)	to avoid the fruits from become spoilt		1
		(iv)	contain high amount of natural antioxidants // does not contain cholesterol // contain omega-6 fatty acid//easily absorbed/digested		1
	(b)	(i)	saponification		1
		(ii)	sodium hydroxide/potassium hydroxide // NaOH/KOH		1
	(c)	(i)	carboxylate ion		1
		(ii)	COO^- // $-\overset{\overset{O}{\|\|}}{C}-O^-$		1
		(iii)	forms scum in hard water		1
			Total		**10**
4	(a)		A solution in which its concentration is accurately known // A solution with a known concentration		1
	(b)		S, Q, R and P		1
	(c)	(i)	1. No. of mole = (2.0 x 100)/1000 = 0.2 mol	1	
			2. Molar Mass of NaOH = 23+16+1 // 40 g mol^{-1}	1	
			3. Mass of NaOH = 0.2 x 40 g // 8 g	1	3
		(ii)	1. Sodium hydroxide is weighed in a weighing bottle not on a piece of filter paper	1	2
			2. Rinse beaker and weighing bottle with distilled water and the washing are poured into volumetric flask	1	
	(d)	(i)	Dilution		1
		(ii)	1. Pipette	1	
			2. volumetric flask	1	2
			Total		**10**

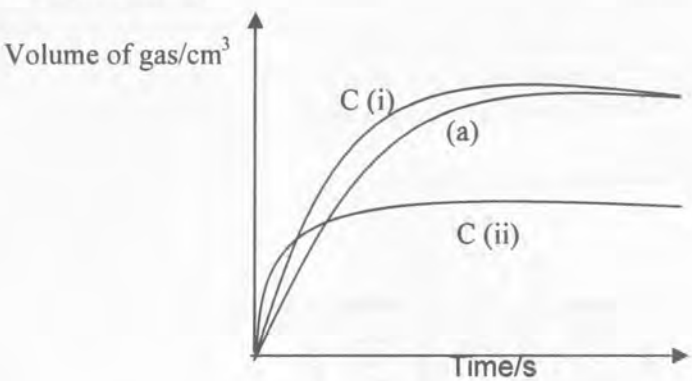
5	(a)	Labelling of both axis and units are correct	1
		Scale of the graph (size of graph)	1
		Transferring of points is correct	1
		Graph is smooth and starts from zero	1
	(b)	(i) 16-0 / 60-0 // 0.27 cm^3s^{-1} //16 cm^3min^{-1}	1
		(ii) 40/180 // 0.22 cm^3s^{-1} // 13.33 cm^3min^{-1}	1

(c)

(i) The curve of graph C (i) is more steep than the curve of graph in(a).
The volume of gas produced in experiment II is same with graph in (a)

(ii) The curve of graph C (ii) is more steep than the curve of graph in(a).
The volume of gas produced in experiment II is half produced in graph(a)

Sample Answer



1
1
1
1

Total 10

6	(a)	Cl^- and OH^-	1
(b)	(i)	Greenish-yellow gas	1
	(ii)	Chlorine gas	1
	(iii)	$2Cl^- \rightarrow Cl_2 + 2e$	1
	(c)	Put a lighted wooden splinter to the mouth of the test tube (containing the gas)	1
		Pop sound is heard.	1
(d)	(i)	Hydroxide ion / OH^-	1
		OH^- is discharged because the position of OH^- is lower than Cl^- in the electrochemical series.	1
	(ii)	Concentration of ions in the electrolyte/ Position of ions in the electrochemical series/ Type of electrodes (any one)	1
	(e)	Electrical energy → chemical energy	1
		Total	10

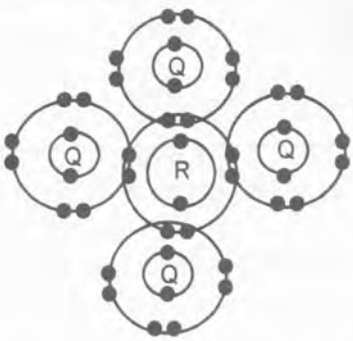
SECTION B

7 (a) (i) Atom of element with the same proton number but different nucleon number/number of neutron // Atom of the same element with different numbers of neutrons — 1

(ii) 1. Iodine-131 : 131-53 = 78 — 1
2. Caesium-137 : 137 – 55 = 82 — 1 — 2

(b) (i) 1. Group 2 , Period 4 — 1
2. Atom M has electron arrangement 2.8.8.2 — 1
3. Valens electron is 2, Group 2 — 1
4. Atom M has 4 shells occupied with electrons, hence period 4 — 1 — 4

(c) 1.Q and R form covalent bond. — 1
2.Atom Q has an electron arrangement of 2.7//2,7 — 1
3.Atom R has an electron arrangement of 2.4//2,4 — 1
4.To achieve the stable electron arrangement, [atom] R shares electrons with [atom] Q. — 1
5.One [atom] R contributes 4 electrons. — 1
6. Each [atom] R contributes one electron. — 1
7. [Atom] R shares four of its valence electrons each with 4 atoms of Q — 1
8. molecule with the formula RQ_4. — 1



Notes : points 4, 7 and 8 can be obtained from the diagram

Max – 7 markah — 7

(d) Able to state the type of food additives and state the correct example

Sample answer — 6

Type	Food additives	Examples
X	Preservatives	Sodium benzoate// sodium nitrite
Y	Antioxidants	Ascorbic acid//Sodium citrate
Z	Flavourings	Sugar //salt//vinegar

Total **20**

8 (a) (i) atom X - 2.1 , 1
atom Y - 2.8.8.1 1 2

(ii)
1. X- moves slowly on the water surface// produce 'hiss' sound 1
2. Y- moves rapidly on the water surface , burns with lilac flame// produce 'hiss' sound 1
3. Y is more reactive than X in its reaction with water 1
4. atom Y is bigger than atom X // its valence electron is further away from the nucleus than atom X 1
5. Weaker force of attraction between the nucleus and the valence electron 1
6. The single valence electron can be released more easily (during chemical reaction) 1 6

(iii)
1. Transition elements 1
2. Form coloured ions or compounds //
3. Exhibit different oxidation numbers in compounds //
4. Form complex ions//
5. Act as a catalyst

[any three from point 2 – 5] 3 4

(b) (i)
1. X- Analgesic 1
2. Y- Psychotherapeutic medicine 1

(ii)

Medicine	**Correct usage of medicine**	**Side effect**	
Aspirin	To be taken after meal//swallowed with lots of water	Internal bleeding/ ulceration/stomach irritation	1+1
Penicillin	To be injected// should be taken full course	Headache//allergic reaction // diarrhoea	1+1
Tranquilizer	To be taken only with doctor's prescription	Drug addiction	1+1 8

Total **20**

SECTION C

a) (i) 1. A structural material that is formed by combining two or more different materials 1

2. with properties superior to those of the original components 1 2

(ii)

Composite Material	Components
Fibreglass	Glass, plastic
Fibre Optic	Glass, plastic
Photochromic glass	Silver chloride/silver bromide crystals, glass/plastic

1
1
1 3

(iii)

Composite Material/ Components Material	Properties
Fibreglass	High tensile strength, easily moulded and shaped, low density
Glass	Hard, strong , high density, brittle
Plastic	Elastic, flexible, low density

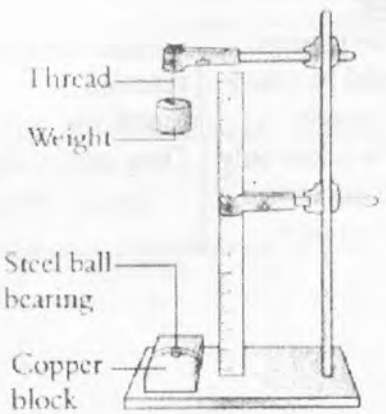
1
1
1 3

b) 1. Materials : copper, bronze/brass // other named metal and its alloy 1

2. Functional diagram ; 1

[1. Steel ball bearing is tied onto the copper block.
2. The weight is hung at retord clamp
3. The ruler is placed vertically]

Sample answer



3. Labels – thread, weight, steel ball bearing, metal block/alloy Block 1

4. A steel ball bearing is taped onto a copper block/metal block using cellophane tape 1
5. 1 kg weight is hung at a height of [50-100cm] above the copper block/metal block 1

6. The weight is allowed to drop onto the ball bearing 1
7. The diameter of the dent made by the ball bearing on the copper block/metal block is measured. 1
8. Steps 1-4 is repeated twice to obtain an average value for the dent. 1
9. Steps 1-5 is repeated using a bronze/brass block/ alloy block to replace the copper block. 1
10. The readings are recorded in a table. 1

Metal block	Diameter of the dent (mm)			
	1	2	3	Average
Copper	(2.9)	(2.9)	(2.9)	(2.9)
Brass/Bronze	(2.3)	(2.3)	(2.3)	(2.3)

11. Results : Bronze//brass block produces smaller dent than copper block // [diameter readings of alloy are smaller than alloy] 1
12. Inference
The smaller the diameter of the dent, the harder the material 1 12

Total 20

10	(a)	[25-100 cm^3] of [0.5-2.0 mol dm^{-3}] [suitable alkali] solution is measured	1	
		And pour into a conical flask	1	
		Add 2-3 drops of phenolphthalein into the conical flask	1	
		Filled a burette with acid [suitable acid] and record the initial burette reading	1	
		Add the acid slowly into the conical flask	1	
		Until pink colour solution turns colourless and record the final record reading.	1	
		Repeat the experiment by adding the same volume of alkali and acid.	1	
		Without using phenolphthalein.	1	
		The mixture is then heated in a evaporating dish until saturated	1	
		The saturated solution is cooled	1	
		Crystals are filtered and rinsed with a little distilled water	1	
		And dried by using filter papers	1	12
		Test for Cu^{2+}	1	
		1.Solid of copper(II) nitrate is dissolved in water		
		2.Add a few drops of sodium hydroxide solution until excess into a test tube	1	
		3.Blue precipitate is formed	1	
		4.insoluble in excess sodium hydroxide.	1	4
		Test for NO_3^-		
		1.Add a little / $2cm^3$ of dilute sulphuric acid into a test tube containing $2cm^3$ of copper(II) nitrate solution	1	
		2.Add a little / $2cm^3$ of iron(II) sulphate solution to the mixture	1	
		3.Slowly add concentrated sulphuric acid through the wall of the test tube	1	
		4.Brown ring is formed	1	4
				Total 20

SKEMA PEMARKAHAN TAMAT

4541/3
Chemistry 3
September
2011
Mark Scheme

MAJLIS PENGETUA SEKOLAH MALAYSIA
CAWANGAN MELAKA

PEPERIKSAAN PERCUBAAN TINGKATAN LIMA
TAHUN 2011

CHEMISTRY 3

PERATURAN PEMARKAHAN

Skema Pemarkahan ini mengandungi 15 halaman bercetak

<table>
<tr><th colspan="2">Question</th><th>Details</th><th>Score</th></tr>
<tr><td>1.</td><td>(a)</td><td>Able to record all readings accurately to one decimal point with unit.

<u>Answer:</u>

<table>
<tr><th>Set</th><th>Initial thermometer reading</th><th>Highest thermometer reading</th></tr>
<tr><td>I</td><td>27.0 ^{0}C</td><td>53.0 ^{0}C</td></tr>
<tr><td>II</td><td>29.0 ^{0}C</td><td>57.0^{0}C</td></tr>
<tr><td>III</td><td>27.0 ^{0}C</td><td>59.0 ^{0}C</td></tr>
</table></td><td>3</td></tr>
<tr><td></td><td></td><td>Able to record all readings correctly.
readings to one decimal point without unit
readings without decimal point with / without unit

<u>Sample answers:</u>

<table>
<tr><th>Set</th><th>Initial thermometer reading</th><th>Highest thermometer reading</th></tr>
<tr><td>I</td><td>27.0</td><td>53.0</td></tr>
<tr><td>II</td><td>29.0</td><td>57.0</td></tr>
<tr><td>III</td><td>27.0</td><td>59.0</td></tr>
</table>
OR
<table>
<tr><th>Set</th><th>Initial thermometer reading</th><th>Highest thermometer reading</th></tr>
<tr><td>I</td><td>27</td><td>53^{0}C</td></tr>
<tr><td>II</td><td>29</td><td>57^{0}C</td></tr>
<tr><td>III</td><td>27</td><td>59^{0}C</td></tr>
</table></td><td>2</td></tr>
<tr><td></td><td></td><td>Able to record three to five readings correctly.</td><td>1</td></tr>
<tr><td></td><td></td><td>No response or wrong response</td><td>0</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
</table>

<table>
<tr><th colspan="2">Question</th><th>Details</th><th>Score</th></tr>
<tr><td></td><td>(b)</td><td>Able to construct a table to record the initial temperature of water, highest temperature of water and increase in temperature for Set I, Set II and Set III that contain:

1. Correct titles
2. Readings and units

<u>Sample answer:</u>

<table>
<tr><td>Set</td><td>I</td><td>II</td><td>III</td></tr>
<tr><td>Initial temperature / ^{0}C</td><td>27.0</td><td>29.0</td><td>27.0</td></tr>
<tr><td>Highest temperature / ^{0}C</td><td>53.0</td><td>57.0</td><td>59.0</td></tr>
<tr><td>Increase in temperature / ^{0}C</td><td>26.0</td><td>28.0</td><td>32.0</td></tr>
</table>
</td><td>3</td></tr>
<tr><td></td><td></td><td>Able to construct a less accurate table that contains the following:

1. Titles
2. Readings

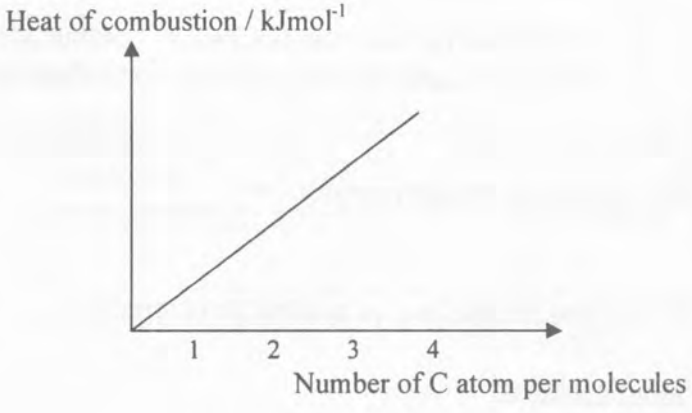
<u>Sample answer:</u>

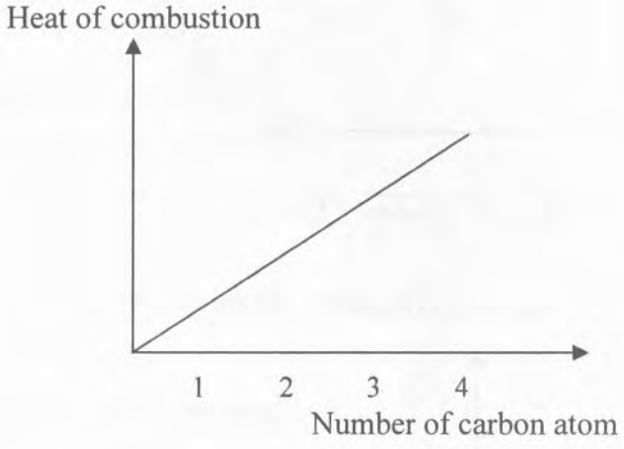
<table>
<tr><td></td><td>I</td><td>II</td><td>III</td></tr>
<tr><td>Initial temperature</td><td>27 ^{0}C</td><td>29</td><td>27 ^{0}C</td></tr>
<tr><td>Highest temperature</td><td>53 ^{0}C</td><td>57</td><td>59</td></tr>
<tr><td>Increase in temperature</td><td>26 ^{0}C</td><td>28</td><td>32 ^{0}C</td></tr>
</table>
</td><td>2</td></tr>
<tr><td></td><td></td><td>Able to construct a table with at least one title / reading

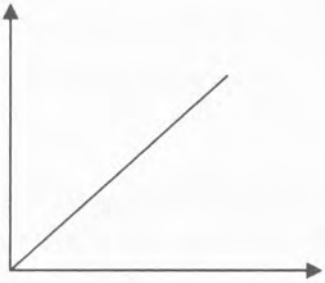
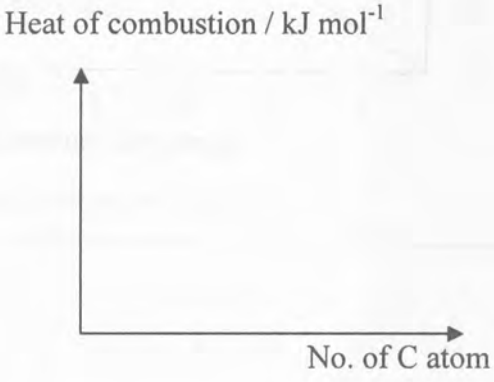
<u>Sample answer:</u>

<table>
<tr><td></td><td>I</td><td>II</td><td>III</td></tr>
<tr><td>Increase in temperature</td><td></td><td></td><td></td></tr>
</table>
</td><td>1</td></tr>
<tr><td></td><td></td><td>No response or wrong response</td><td>0</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
</table>

Question		Details	Score
	(c)	Able to state the hypothesis accurately Sample answer: The higher the number of carbon atoms in the alcohols molecules, the higher is the heat of combustion.	3
		Able to state the hypothesis correctly. Sample answer: 1. The higher the heat of combustion, the higher the number of carbon atoms in the alcohol molecules. 2. The number of carbon atoms in the alcohol molecules affect the heat of combustion.	2
		Able to state the idea of hypothesis. Sample answer: 1. Number of carbon changes, heat of combustion changes. 2. Different alcohols, different heat of combustion.	1
		No response or wrong response	0
	(d)	Able to predict the heat of combustion correctly. Sample answer: 2656 kJ mol^{-1} # accept value in the range of 2656 kJ mol^{-1} to 26664 kJ mol^{-1}	3
		Able to predict the heat of combustion less accurately. Sample answer: 2657 // higher than 2016 kJ mol^{-1}	2

Question		Details	Score
		Able to give an idea of predicting the heat of combustion. *Sample answer:* Heat more than heat of propanol.	1
		No response or wrong response	0
	(e)	Able to sketch the graph of heat of combustion of alcohols against number of carbon atoms per molecule. The graph must have the following information: 1. The axes are labeled correctly 2. Correct unit 3. Correct curve <u>Sample answer:</u>  	3

Question		Details	Score
		Able to sketch the graph of the heat of combustion against number of carbon atom: 1. without the units on Y-axis 2. correct curve Sample answer  	2

Question		Details	Score
		Able to sketch the graph with only one correct information Sample answers  OR  	1
		No response or wrong response	0

Question		Details	Score
	(f)	Able to state the three variables correctly Sample answer **Manipulated variable** Type of alcohols // number of carbon atom per molecule **Responding variable** Heat of combustion **Constant variable** Volume of water // copper can	3
		Able to state any two variables correctly	2
		Able to state any one variable correctly	1
		No response or wrong response	0
	(g)	Able to state **three** correct information from the diagram. Sample answer: 1. The reaction is an exothermic reaction // heat energy is released to the surrounding. 2. 1366kJ of heat is released when one mole of ethanol is burnt. 3. Total energy of reactants is higher than the products.	3
		Able to state **any two** correct information.	2
		Able to state **any one** correct information	1
		No response or wrong response	0

<table>
<tr><th colspan="2">Question</th><th>Details</th><th>Score</th></tr>
<tr><td></td><td>(h)</td><td>Able to give the operational definition accurately.

<u>Sample answer:</u>

Heat released when one mole of propane or one mole of ethanol is burnt completely in excess oxygen. //

Heat released when one mole of substance is burnt completely in excess oxygen.</td><td>3</td></tr>
<tr><td></td><td></td><td>Able to give the operational definition correctly.

<u>Sample answer:</u>

Heat released when a substance / propane / ethanol is burnt in oxygen.</td><td>2</td></tr>
<tr><td></td><td></td><td>Able to give an idea of the operational definition.

<u>Sample answer:</u>

Heat is released. // Exothermic reaction. // Propane / Ethanol is burnt.</td><td>1</td></tr>
<tr><td></td><td></td><td>No response or wrong response</td><td>0</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>(i)</td><td>Able to classify all carbon compounds correctly.

<u>Sample answer:</u>

<table><tr><th>Hydrocarbon</th><th>Non-hydrocarbon</th></tr><tr><td>Propene</td><td>Butanol
Ethanoic acid
Methyl ethanoate</td></tr></table></td><td>3</td></tr>
<tr><td></td><td></td><td>Able to classify at least three carbon compounds correctly.</td><td>2</td></tr>
<tr><td></td><td></td><td>Able to classify any one carbon compound correctly.</td><td>1</td></tr>
</table>

<table>
<tr><th colspan="2">Question</th><th>Details</th><th>Score</th></tr>
<tr><td></td><td></td><td>No response or wrong response</td><td>0</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>(j)</td><td>Able to state any three observations and any three inferences correctly.

<u>Sample answer :</u>

<table>
<tr><th>Set</th><th>Observation</th><th>Inference</th></tr>
<tr><td>I</td><td>1. Temperature increases. //

2. Blue solution turns colourless //

3. Brown solid formed</td><td>1. Exothermic reaction // Heat is released.

2. Concentration of copper ion decreases.

3. Copper formed // Copper ion becomes Cu // Cu^{2+} / (copper ion) discharge</td></tr>
<tr><td>II</td><td>1. Temperature decreases //

2. Solid ammonium chloride dissolved in water.</td><td>1. Endothermic reaction // Heat is absorbed.

2. Ammonium chloride is a soluble salt.</td></tr>
</table>
</td><td>3 + 3</td></tr>
<tr><td></td><td></td><td>Able to state any two observations and any two inferences correctly.</td><td>2 + 2</td></tr>
<tr><td></td><td></td><td>Able to state any one observation and any one inference correctly.</td><td>1 + 1</td></tr>
<tr><td></td><td></td><td>No response or wrong response</td><td>0</td></tr>
</table>

Question		Details	Score
2	(a)	Able to give the problem statement correctly. Sample answer: How does an acid / ethanoic acid and alkali / ammonia solution affect the coagulation of latex?	3
		Able to give the problem statement less accurately Sample answer: To investigate the effect of acid and alkali on the coagulation of latex. // Does acid coagulate the latex. // Does alkali prevent the coagulation of latex.	2
		Able to give an idea of problem statement. Sample answer: Acid / alkali affect / influence coagulation of latex.	1
		No response or wrong response	0
	(b)	Able to state **the three** variables correctly. Sample answer: Manipulated variable: Acid / Ethanoic acid and Alkali / Ammonia solution Responding variable: Coagulate / Does not coagulate Constant variable: Volume of latex / acid / (ammonia solution) / alkali // latex // temperature	3
		Able to state **any two** variables correctly	2
		Able to state **any one** variables correctly	1

Question		Details	Score
		No response or wrong response	0
	(c)	Able to state the relationship between the manipulated variable and the responding variable correctly with direction. Sample answer: Acid / Ethanoic acid coagulate the latex while alkali / ammonia solution does not coagulate the latex.	3
		Able to state the relationship between the manipulated variable and the responding variable. Sample answer: Latex coagulate when acid / ethanoic acid is added but does not coagulate when alkali / ammonia solution is added.	2
		Able to state the idea of hypothesis. Sample answer: Acid / Ethanoic acid can coagulate latex // Alkali / ammonia solution does not coagulate latex.	1
		No response or wrong response	0

Question		Details	Score
	(d)	Able to give complete list of substances and apparatus. Sample answer: **Apparatus** 1. [100 – 250] cm^3 beaker 2. Measuring cylinder 3. Glass rod 4. Dropper **Substances** 1. Latex 2. [0.1 – 2.0] mol dm^{-3} ethanoic acid 3. Ammonia solution	3
		Able to list basic substances and apparatus. Sample answer: **Apparatus** 1. Beaker 2. Measuring cylinder 3. Glass rod **Substances** 1. Latex 2. Ethanoic acid / any acid 3. Ammonia / any alkali	2
		Able to give an idea of substances and apparatus. Sample answer: **Apparatus** Any container **Substances** Latex and acid / alkali	1
		No response or wrong response	0

<table>
<tr><th colspan="2">Question</th><th>Details</th><th>Score</th></tr>
<tr><td></td><td>(e)</td><td>Able to state the steps correctly:

Sample answer:

1 [10-50] cm^3 of latex is added into a beaker.
2 Ethanoic acid is added into the beaker using a dropper and the mixture is stirred with a glass rod.
3 The beaker is left aside.
4 Steps 1 to 3 / experiment are repeated using ammonia solution to replace ethanoic acid.
5 The observations are recorded.</td><td>3</td></tr>
<tr><td></td><td></td><td>Steps 1, 2, 4 and 5
Ignore the value in step 1</td><td>2</td></tr>
<tr><td></td><td></td><td>Add acid / alkali into the latex.</td><td>1</td></tr>
<tr><td></td><td></td><td>No response or wrong response</td><td>0</td></tr>
<tr><td></td><td>(f)</td><td>Able to tabulate the data with the following information :
1. Correct titles
2. Complete list of mixture
3. Correct observation

Sample answer :

<table><tr><th>Mixture / Substances</th><th>Observation</th></tr><tr><td>Latex + acid / ethanoic acid</td><td>Coagulation of latex occurs rapidly</td></tr><tr><td>Latex + alkali / ammonia solution</td><td>Latex does not coagulate//no changes</td></tr></table></td><td>3</td></tr>
</table>

<table>
<tr><th colspan="2">Question</th><th>Details</th><th>Score</th></tr>
<tr><td></td><td></td><td>Sample answer :

<table><tr><th>Mixture / Substances</th><th>Observation</th></tr><tr><td>Latex + acid / ethanoic acid</td><td></td></tr><tr><td>Latex + alkali / ammonia solution</td><td></td></tr></table></td><td>2</td></tr>
<tr><td></td><td></td><td>Able to construct a table with:
1. At least one title
2. Incomplete list of mixture.

Sample answer :
<table><tr><th></th><th>Observation</th></tr><tr><td>Latex + acid / alkali</td><td></td></tr></table></td><td>1</td></tr>
<tr><td></td><td></td><td>No response or wrong response</td><td>0</td></tr>
</table>

END OF MARK SCHEME