SIJIL PENDIDIKAN
MAKTAB RENDAH SAINS MARA
2014

CHEMISTRY

http://cikguadura.wordpress.com/

Paper 1

One hour and fifteen minutes

DO NOT OPEN THE QUESTION BOOKLET
UNTIL BEING TOLD TO DO SO

1 This question booklet is bilingual
Kertas soalan ini adalah dalam dwibahasa

2 Candidates are required to read the information at the last page of this question booklet
Calon dikehendaki membaca maklumat di halaman belakang kertas soalan

This question booklet contains 43 printed pages

[See next page]

1 Which diagram shows the arrangement of atoms inside a balloon containing helium?
Manakah rajah yang menunjukkan susunan atom di dalam belon yang mengandungi helium?
[o represents helium atom]
[o *mewakili atom helium*]

A

B

C

D

2 Which of the following is true about Relative Molecular Mass of a molecule?
Manakah antara pernyataan berikut adalah benar tentang Jisim Molekul Relatif sesuatu molekul?

A The average mass of one atom
1/12 x mass of an atom of C-12
Jisim purata satu atom
1/12 x *jisim satu atom* C-12

B The average mass of one molecule
1/12 x mass of an atom of C-12
Jisim purata satu molekul
1/12 x *jisim satu atom* C-12

C The average mass of one atom
1/12 x mass of an atom of H
Jisim purata satu atom
1/12 x *jisim satu atom* H

D The average mass of one molecule
1/12 x mass of an atom of H
Jisim purata satu molekul
1/12 x *jisim satu atom* H

3 Diagram 1 shows the structural formula of Vitamin C that is found in an orange.
What is the empirical formula of Vitamin C?
Rajah 1*menunjukkan formula struktur bagi Vitamin* C *yang terdapat di dalam sebiji buah limau.*
Apakah formula empirik bagi vitamin C?

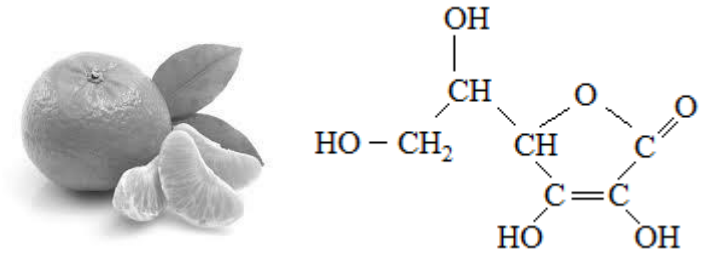


Diagram 1
Rajah 1

A $C_4H_4O_4$
B $C_3H_4O_3$
C $C_6H_8O_6$
D $C_8H_6O_8$

4 Food is cut into smaller pieces to shorten the cooking time.
Which factor is involved in the above situation?
Makanan dipotong kepada kepingan kecil untuk memendekkan masa memasak.
Apakah faktor yang terlibat dalam situasi di atas?

A Total surface area
Jumlah luas permukaan

B Presence of catalyst
Kehadiran mangkin

C Concentration
Kepekatan

D Pressure
Tekanan

5 Diagram 2 shows the apparatus set-up for an experiment to study the reaction between chlorine gas and substance X.
Rajah 2 *menunjukkan susunan radas bagi satu eksperimen untuk mengkaji tindak balas antara gas klorin dan bahan* X.

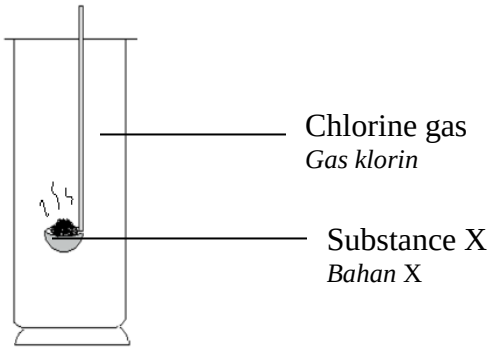


Diagram 2
Rajah 2

When the reaction is completed, a white solid is formed. Name the white solid.
Apabila tindak balas selesai,pepejal putih terbentuk. Namakan pepejal putih tersebut.

A Copper(II) chloride
Kuprum(II) *klorida*

B Iron(II) chloride
Ferum(II) *klorida*

C Lithium chloride
Litium klorida

D Lead(II) chloride
*Plumbum(*II) *klorida*

6 What is the meaning of *heat of reaction*?
Apakah yang dimaksudkan dengan haba tindak balas?

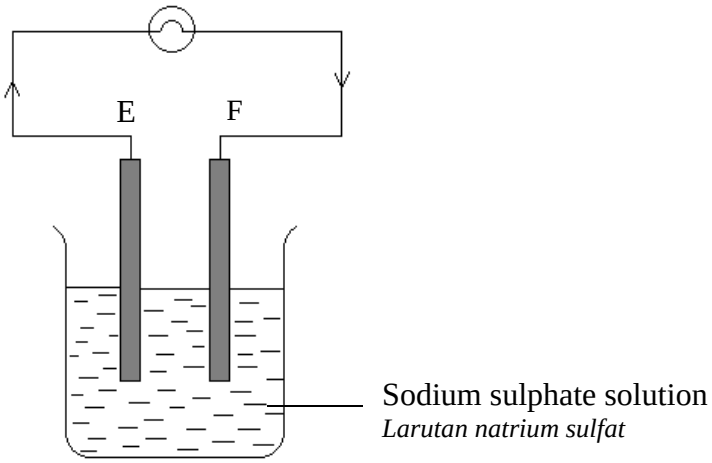
A The energy needed to break a chemical bond.
Tenaga diperlukan untuk memutuskan ikatan kimia.

B The energy needed to change the state of matter.
Tenaga diperlukan untuk menukar keadaan jirim.

C The energy released when a chemical bond is formed.
Tenaga dibebaskan apabila ikatan kimia dibentuk.

D The change of the energy content in the reactants and in the products.
Perubahan kandungan tenaga dalam bahan tindak balas dan hasil tindak balas.

7 Diagram 3 shows the electrons flow in a simple cell using metals E and F.
Which of the following metals are E and F?
Rajah 3 *menunjukkan aliran elektron dalam satu sel ringkas menggunakan logam* E *dan* F.
Manakah antara logam berikut adalah E *dan* F?

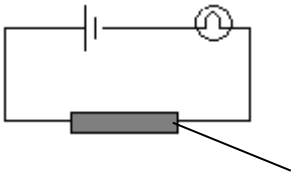


Diagam 3
Rajah 3

	E	**F**
A	Copper *Kuprum*	Lead *Plumbum*
B	Silver *Argentum*	Magnesium *Magnesium*
C	Tin *Stanum*	Aluminium *Aluminium*
D	Zinc *Zink*	Iron *Ferum*

8 Which bulb in the following circuits will light up?
Manakah mentol dalam litar berikut yang akan menyala?

A



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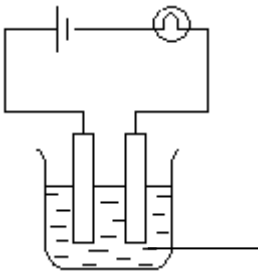

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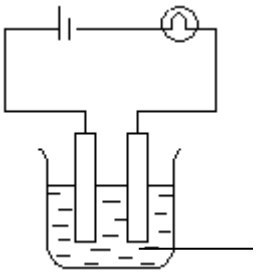

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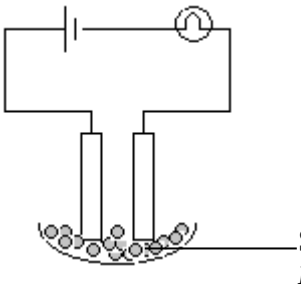


9 Diagram 4 shows the apparatus set-up to prepare a standard solution of 0.5 mol dm^{-3} sodium chloride.
Rajah 4 *menunjukkan susunan radas penyediaan larutan piawai* 0.5 mol dm^{-3} *natrium klorida.*

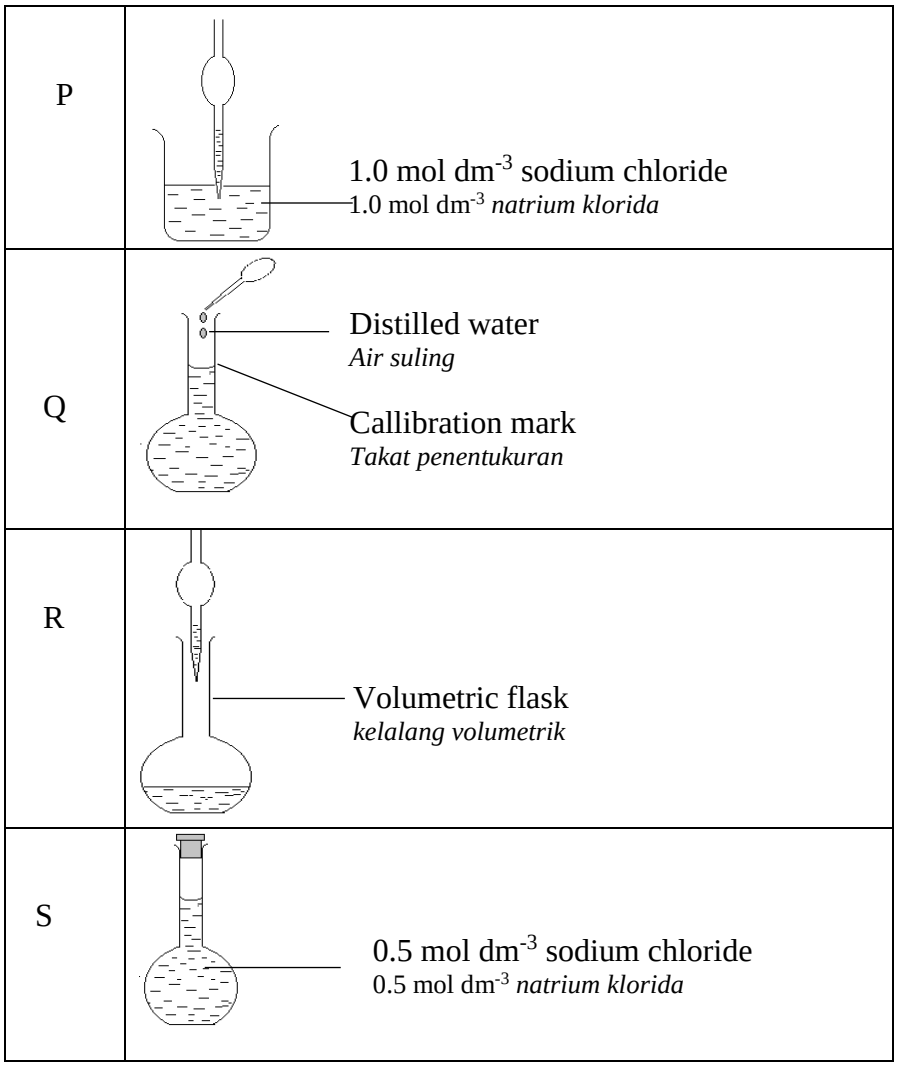


Diagram 4
Rajah 4

Which of the following is the correct sequence for the preparation?
Manakah antara berikut adalah turutan yang betul bagi penyediaan tersebut?

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

10 Diagram 5 shows a flow chart for the manufacture of ammonium sulphate.
Rajah 5 *menunjukkan carta alir penghasilan ammonium sulfat.*

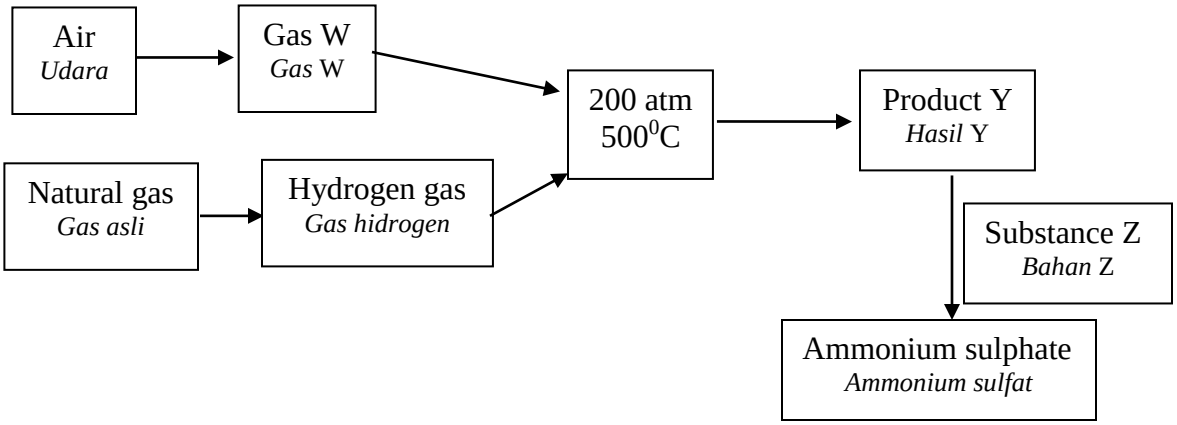


Diagram 5
Rajah 5

What are substances W, Y and Z?
Apakah bahan-bahan W, Y *dan* Z?

	W	**Y**	**Z**
A	N_2	NH_3	H_2SO_4
B	SO_2	SO_3	HCl
C	SO_2	SO_3	NO_2
D	H_2	NH_3	CO_2

11 Diagram 6 shows two examples of alloys, M and N, which contain copper as the main component.
Rajah 6 *menunjukkan dua contoh aloi* M *dan* N *yang mengandungi kuprum sebagai komponen utama.*

M

N

Diagram 6
Rajah 6

Which of the following are the added element in alloys **M** and **N**?
Manakah antara berikut,merupakan unsur tambahan dalam aloi M *dan* N?

	M	**N**
A	Tin	Zinc
B	Zinc	Magnesium
C	Tin	Antimony
D	Zinc	Aluminium

12 Which of the following atoms does not have neutron in its nucleus?
Manakah antara atom di bawah tidak mempunyai neutron di dalam nukleus?

A $^{1}_{1}H$

B $^{2}_{1}H$

C $^{16}_{8}O$

D $^{17}_{8}O$

13 Diagram 7 shows the apparatus set-up to investigate the reaction between calcium carbonate and hydrogen chloride gas dissolved in two different solvent.
Rajah 7 menunjukkan susunan radas untuk mengkaji tindak balas di antara kalsium karbonat dengan gas hidrogen klorida yang terlarut di dalam dua pelarut berbeza.

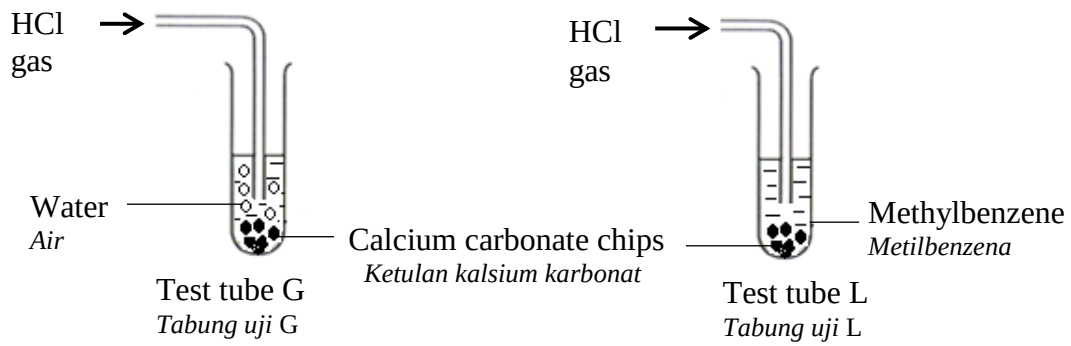


Diagram 7
Rajah 7

Which of the following statements is correct about the reaction in the test tubes?
Manakah antara pernyataan berikut adalah benar tentang tindak balas dalam tabung uji itu?

A Water remains as molecules in test tube G.
Air kekal sebagai molekul di dalam tabung uji G.

B Hydrogen chloride gas produces hydrogen ions in test tube G.
Gas hidrogen klorida menghasilkan ion hidrogen dalam tabung uji G.

C Calcium carbonate in test tube L dissolves.
Kalsium karbonat dalam tabung uji L *melarut.*

D Hydrogen chloride gas ionizes partially in test tube L
Gas hidrogen klorida mengion separa dalam test tube L.

14 Diagram 8 shows the apparatus set-up of an experiment to test gas J.
Rajah 8 *menunjukkan susunan radas bagi satu eksperimen untuk menguji gas* J.

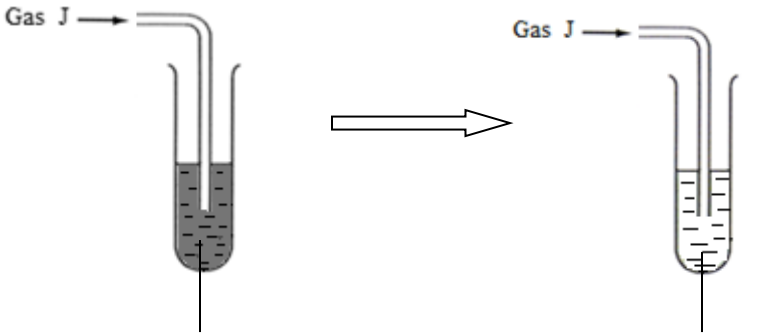
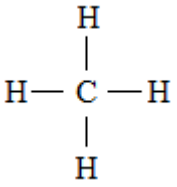


Diagram 8
Rajah 8

Which structural formula represents gas J?
Manakah formula struktur yang mewakili gas J?

A



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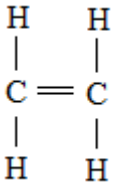

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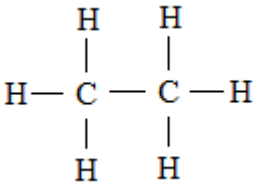
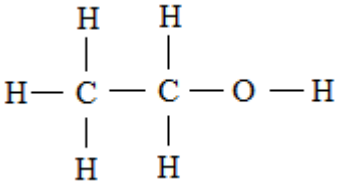
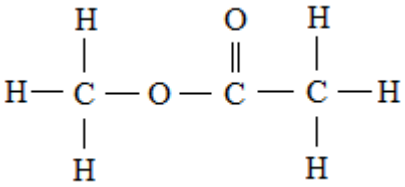


D



15 Which compound has a pH value less than 7?
Manakah sebatian yang mempunyai nilai pH kurang dari 7?

A



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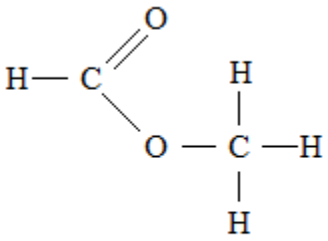

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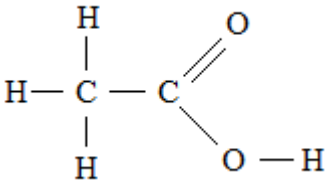
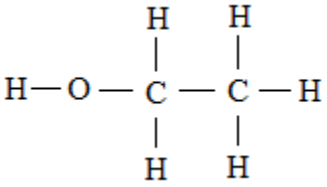


D



16 Which of the following is an oxidising agent?
Manakah antara berikut adalah agen pengoksidaan?

A Hydrogen sulphide
Hidrogen sulfida

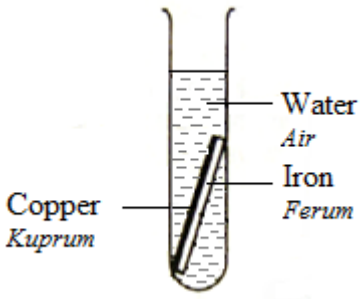
B Sulphur dioxide
Sulphur dioksida

C Sodium nitrite
Natrium nitrit

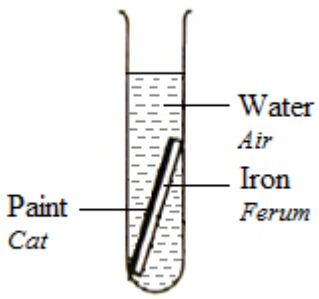
D Hydrogen peroxide
Hidrogen peroksida

17 The following diagrams show four test tubes containing a piece of iron which is protected on one side by a different coating.
In which test tube, the iron does not rust?
Rajah berikut menunjukkan empat tabung uji mengandungi kepingan besi yang dilindungi sebahagiannya oleh salutan yang berbeza.
Tabung uji manakah yang besinya tidak berkarat?

A



B



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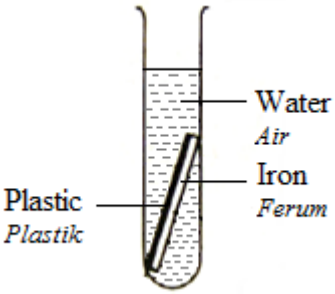

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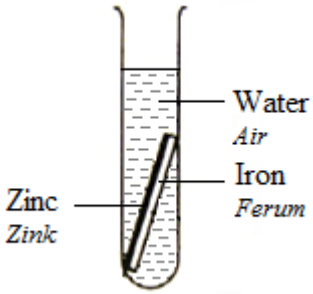


18 Table 1 shows the electrical conductivity of four substances, W, X, Y and Z.
Jadual 1 *menunjukkan kekonduksian elektrik bagi empat bahan,* W, X, Y *dan* Z

Substance ***Bahan***	**Electrical conductivity** ***Kekonduksian elektrik***
W	Does not conduct under any conditions *Tidak boleh mengkonduksikan elektrik dalam semua keadaan*
X	Conducts only in aqueous solution *Mengkonduksikan elektrik dalam larutan akueus.*
Y	Conducts when molten and when solid *Mengkonduksikan elektrik dalam keadaan leburan dan pepejal.*
Z	Conducts when molten and in aqueous solution *Mengkonduksikan elektrik dalam keadaan leburan dan larutan akueus.*

Table 1
Jadual 1

Which of the following represents W, X, Y and Z?
Manakah antara berikut adalah W, X, Y *dan* Z?

	W	**X**	**Y**	**Z**
A	Pb	HCl	NaCl	S
B	Pb	HCl	S	NaCl
C	S	HCl	Pb	NaCl
D	S	NaCl	HCl	Pb

19 Diagram 9 shows a bottle of mangoes soaked in vinegar.
Rajah 9 *menunjukkan sebalang mangga yang direndam dalam cuka.*

Diagram 9
Rajah 9

Which type of food additive does vinegar belongs to?
Apakah jenis bahan tambah makanan bagi cuka?

A Dyes
Pewarna

B Thickener
Pemekat

C Antioxidant
Antioksida

D Preservative
Pengawet

20 Diagram 10 shows examples of modern medicine.
Rajah 10 *menunjukkan contoh ubat moden.*

Streptomycin
Streptomisin

Penicillin
Penisilin

Diagram 10
Rajah 10

What is the function of these medicines?
Apakah fungsi ubat-ubat ini?

A To kill bacteria.
Untuk membunuh bakteria.

B To reduce pain.
Untuk mengurangkan kesakitan.

C To stabilise body system.
Untuk menstabilkan sistem badan.

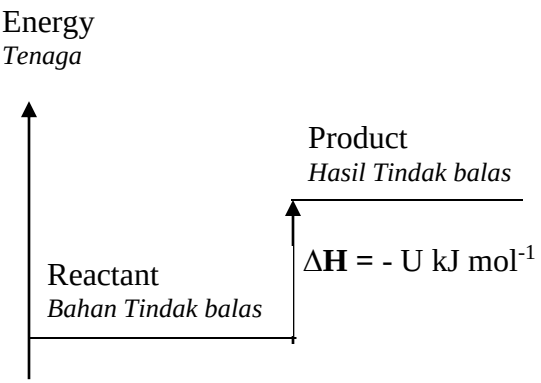
D To reduce tension and anxiety.
Untuk mengurangkan tekanan dan kerisauan.

21 Diagram 11 shows the cold pack used to reduce pain.
Rajah 11 *menunjukkan pek sejuk yang digunakan untuk mengurangkan kesakitan.*

Diagram 11
Rajah 11

Which of the following shows the correct energy level diagram when cold pack is used?
Manakah antara berikut menunjukkan gambar rajah aras tenaga yang betul apabila pek sejuk digunakan?

A



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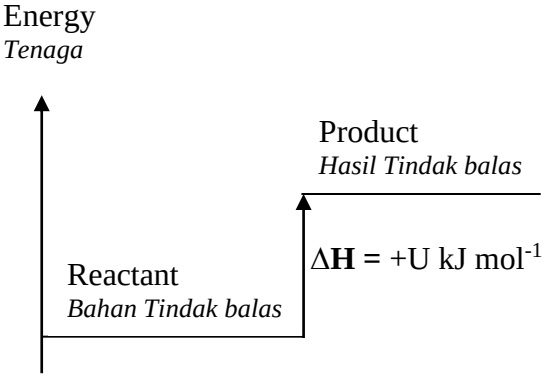

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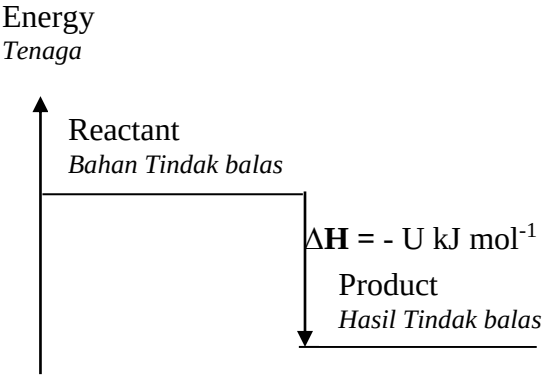
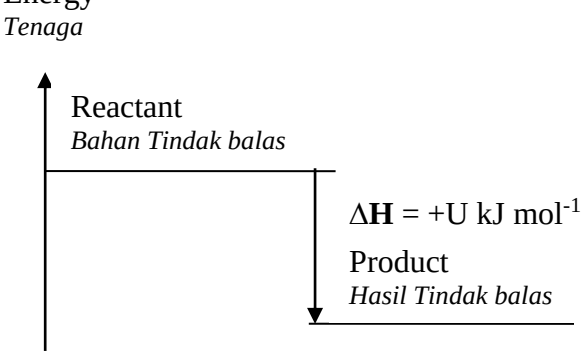


D



22 Diagram 12 shows the electron arrangement in a particle.
Rajah 12 *menunjukkan susunan elektron bagi suatu zarah.*

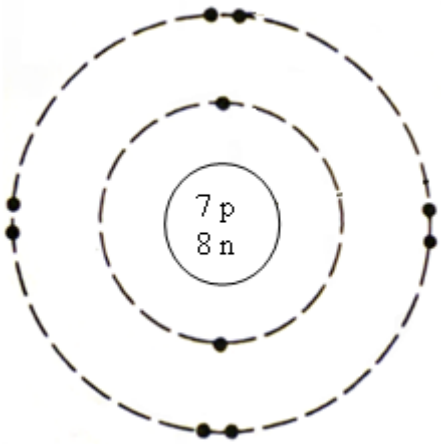


Diagram12
Rajah 12

Which of the following formula represents the particle?
Manakah antara formula berikut mewakili zarah tersebut?

A N^{3-}

B O^{2-}

C Al^{3+}

D Ne

23 Diagram 13 shows the apparatus set-up for the reaction between sodium and water.
Rajah 13 *menunjukkan susunan radas bagi tindak balas antara natrium dan air*.

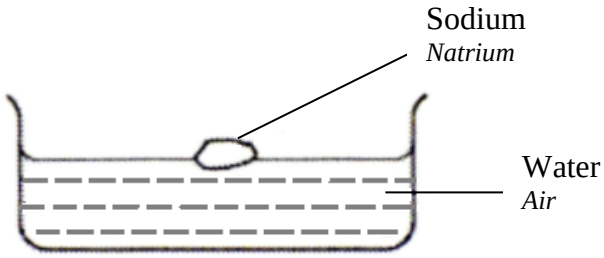


Diagram 13
Rajah 13

The solution produced is tested with phenolphthalein and the gas is tested with a wooden splinter.
Which of the following observations are correct?
Larutan yang dihasilkan diuji dengan fenolftalein dan gas yang terbebas diuji dengan kayu uji.
Manakah antara pemerhatian berikut adalah betul?

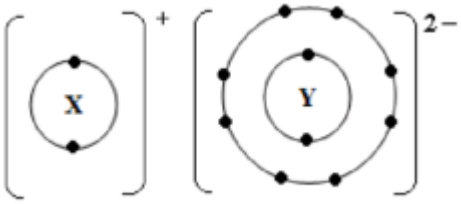
	Phenolphthalein indicator *Penunjuk fenolftalein*	**Wooden splinter** *Kayu uji*
A	Pink *Merah jambu*	Glowing splinter relights *Kayu uji berbara menyala*
B	Colourless *Tidak berwarna*	Lighted splinter produce ‘pop' sound *Kayu uji menyala menghasilkan bunyi ‘pop’*
C	Colourless *Tidak berwarna*	Glowing splinter relights *Kayu uji berbara menyala*
D	Pink *Merah jambu*	Lighted splinter produce 'pop'sound *Kayu uji menyala menghasilkan bunyi ‘pop’*

24 Diagram 14 shows the symbol of atoms X and Y.
Rajah 14 *menunjukkan simbol bagi atom* X *dan* Y.

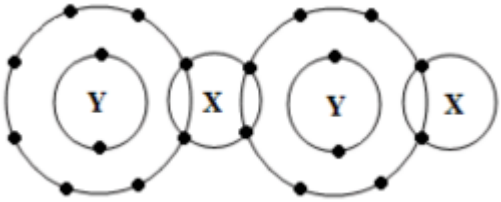
Diagram 14
Rajah 14

Which of the following diagrams represent the compound formed when X reacts with Y?
Manakah antara rajah berikut mewakili sebatian yang terbentuk apabila X *bertindak balas dengan* Y?

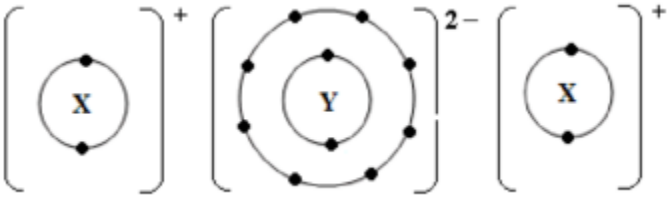
A



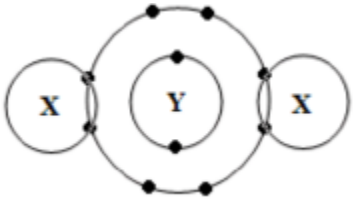
B



C



D



25 Diagram 15 shows the apparatus set-up for the electrolysis of 1.0 mol dm^{-3} sodium chloride solution using carbon electrodes.

Rajah 15 *menunjukkan susunan radas bagi elektrolisis larutan natrium klorida* 1.0 mol dm^{-3} *dengan menggunakan elektrod karbon.*

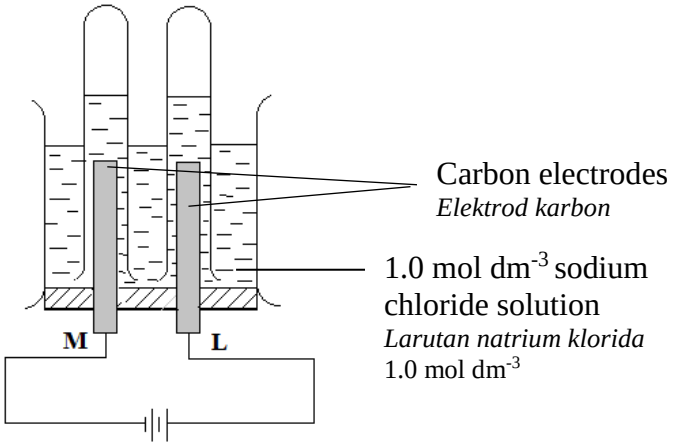


Diagram 15
Rajah 15

Which of the following are observations for the electrolysis process?
Manakah antara yang berikut adalah pemerhatian bagi proses elektrolisis tersebut?

I Grey solid deposited at electrode M.
Pepejal kelabu terenap di elektrod M.

II Colourless gas is released at electrode M.
Gas tidak berwarna dibebaskan di elektrod M.

III Electrode L becomes thinner.
Elektrod L *menipis.*

IV Greenish yellow gas is released at electrode L.
Gas kuning kehijauan dibebaskan di elektrod L.

A I and III
I *dan* III

B II and III
II *dan* III

C I and IV
I *dan* IV

D II and IV
II *dan* IV

26 Diagram 16 shows the pH scale for three aqueous solutions Q, R and T of the same concentration.
Rajah 16 *menunjukkan skala* pH *bagi tiga larutan akueus,* Q, R *dan* T *dengan kepekatan yang sama.*

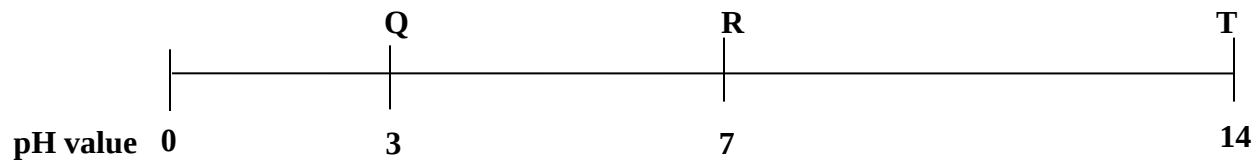


Diagram 16
Rajah 16

What could the aqueous solutions be?
Apakah kemungkinan larutan-larutan tersebut?

	Q	**R**	**T**
A	Nitric acid *Asid nitrik*	Water *Air*	Ammonia *Ammonia*
B	Sulphuric acid *Asid sulfurik*	Ethanol *Etanol*	Potassium hydroxide *Kalium hidroksida*
C	Hydrochloric acid *Asid hidroklorik*	Glucose solution *Larutan glukosa*	Lithium hydroxide *Litium hidroksida*
D	Ethanoic acid *Asid etanoik*	Sodium chloride *Natrium klorida*	Sodium hydroxide *Natrium hidroksida*

27 Which of the following statements explains why ceramics is suitable to make an engine block?
Manakah antara pernyataan berikut menjelaskan mengapa seramik lebih sesuai digunakan untuk membuat blok enjin?

A Ceramic is chemically inert.
Seramik lengai terhadap bahan kimia.

B Ceramic is an electrict conductor.
Seramik merupakan konduktor elektrik.

C Ceramic has high heat resistance.
Seramik mempunyai rintangan haba yang tinggi.

D Ceramic has low specific heat capacity.
Seramik mempunyai kapasiti haba tentu yang rendah

28 Diagram 17 shows the observation of a chemical test on solution T.
Rajah 17 *menunjukkan pemerhatian bagi suatu ujian kimia ke atas larutan* T.

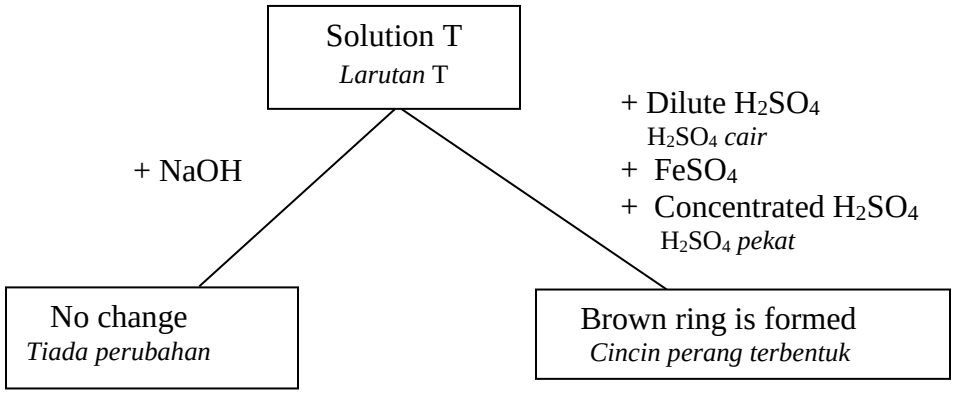


Diagram 17
Rajah 17

What are the ions present in solution T?
Apakah ion-ion yang hadir di dalam larutan T?

A Ca^{2+} and Cl^-
Ca^{2+} *dan* Cl^-

B Mg^{2+} and SO_4^{2-}
Mg^{2+} *dan* SO_4^{2-}

C Zn^{2+} and Cl^-
Zn^{2+} *dan* Cl^-

D NH_4^+ and NO_3^-
NH_4^+ *dan* NO_3^-

29 Why do tropical fireflies flash faster on warm night?
Mengapakah kunang-kunang tropika berkelip dengan cepat di waktu malam yang panas?

A Rate of chemical reaction of these fireflies is very high at night.
Kadar tindak balas kimia kunang-kunang ini sangat tinggi di waktu malam.

B Rate of chemical reaction of these fireflies is very high at higher temperature.
Kadar tindak balas kimia kunang-kunang ini sangat tinggi pada suhu tinggi.

C Rate of chemical reaction of these fireflies is very high in higher humidity.
Kadar tindak balas kimia kunang-kunang ini sangat tinggi dalam kelembapan tinggi.

D Rate of chemical reaction of these fireflies is very high at tropical area.
Kadar tindak balas kimia kunang-kunang ini sangat tinggi di kawasan tropika.

[See next page

30 A student carried out two experiments to investigate the rate of decomposition of 0.05 mol dm^{-3} hydrogen peroxide solution.
Table 2 shows the result of the experiments.
Seorang pelajar menjalankan dua eksperimen untuk mengkaji kadar penguraian larutan hidrogen peroksida 0.05 mol dm^{-3}.
Jadual 2 *menunjukkan keputusan eksperimen.*

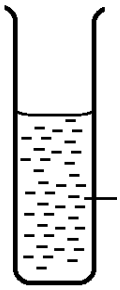
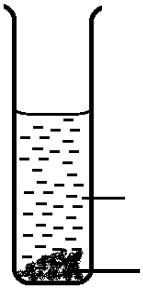
Experiment	**I**	**II**
Apparatus set-up *Susunan radas*	 0.05 mol dm^{-3} Hydrogen peroxide *Hidrogen peroksida* 0.05 mol dm^{-3}	 0.05 mol dm^{-3} Hydrogen peroxide *Hidrogen peroksida* 0.05 mol dm^{-3} Manganese(IV) oxide powder *Serbuk mangan*(IV) *oksida*
Time taken for complete decomposition /s *Masa yang diambil untuk penguraian lengkap /*s	300	60

Table 2
Jadual 2

Which of the following is the function of manganese(IV) oxide in Experiment II?
Manakah antara berikut merupakan fungsi mangan(IV) *oksida dalam Eksperimen* II?

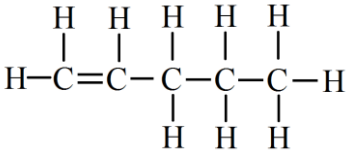
A To increase the kinetic energy of the reaction.
Untuk meningkatkan tenaga kinetik bagi tindak balas.

B To provide larger total surface area exposed for the reaction.
Memyediakan jumlah luas permukaan terdedah yang lebih besar bagi tindak balas.

C To increase the number of particles per unit volume of the reactant.
Untuk meningkatkan bilangan zarah per unit isipadu bahan tindakbalas.

D To provide an alternative pathway with a lower activation energy.
Menyediakan laluan alternatif dengan tenaga pengaktifan yang lebih rendah.

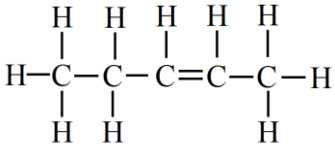
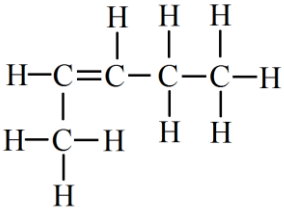
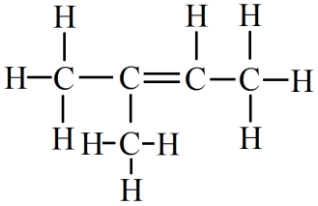
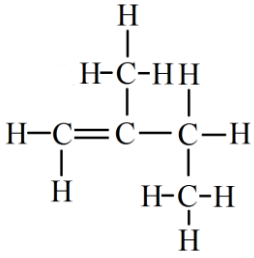
31 Diagram 18 shows the structural formula of pent-1-ene.
*Rajah*18 *di bawah menunjukkan formula struktur pent*-1-*ena.*



Pent-1-ene
Pent-1-*ena*

Diagram 18
Rajah 18

Which of the following is an isomer of pent-1-ene?
Manakah antara berikut merupakan isomer bagi pent-1-*ena*?

	Structural formula ***Formula struktur***	**Name** ***Nama***
A		Pent-3-ene *Pent*-3-*ena*
B		1-methylbut-1-ene 1-*metilbut*-1-*ena*
C		2-methylbut-2-ene 2-*metilbut*-2-*ena*
D		2,3-dimethylprop-1-ene 2,3-*dimetilprop*-1-*ena*

32 Diagram 19 shows the apparatus set up for the reaction between propan-1-ol and acidified potassium dichromate(VI) solution.
Rajah 19 *menunjukkan susunan radas bagi tindak balas antara propan*-1-*ol dan larutan kalium dikromat*(VI) *berasid.*

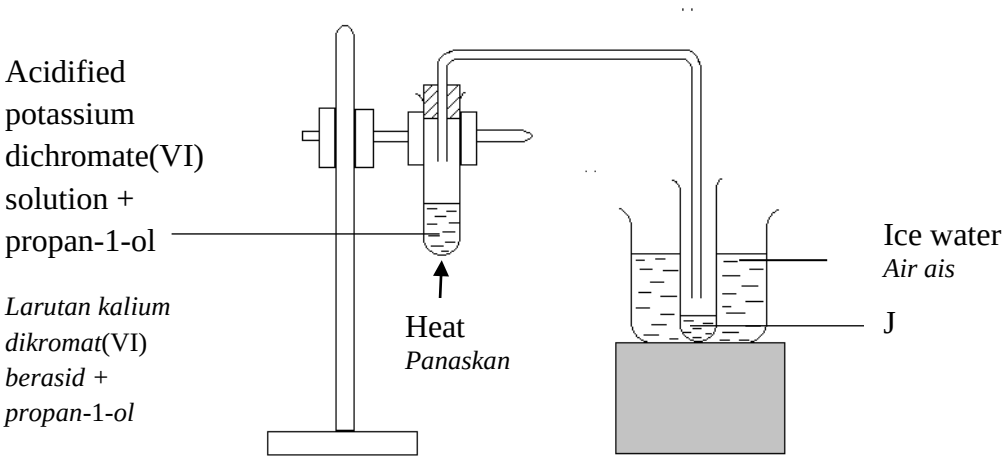


Diagram 19
Rajah 19

Which of the following statements shows the chemical properties of J?
Manakah antara pernyataan berikut menunjukkan sifat kimia bagi J?

I Decolourises brown bromine water.
Menyahwarnakan warna perang air bromin.

II Releases colourless gas when reacts with magnesium ribbon.
Menghasilkan gas tidak berwarna apabila bertindak balas dengan pita magnesium.

III A sweet smelling substance is produced when J is heated with ethanol.
Bahan berbau manis terhasil apabila J *dipanaskan dengan etanol.*

IV Burnt in excess oxygen to produce carbon dioxide and water.
Terbakar dalam oksigen berlebihan menghasilkan karbon dioksida dan air.

A I and III
I *dan* III

B II and IV
II *dan* IV

C I and IV
I *dan* IV

D II and III
II *dan* III

33 Diagram 20 shows the cross section of oil rig.
Rajah 20 *menunjukkan keratan rentas pelantar minyak.*

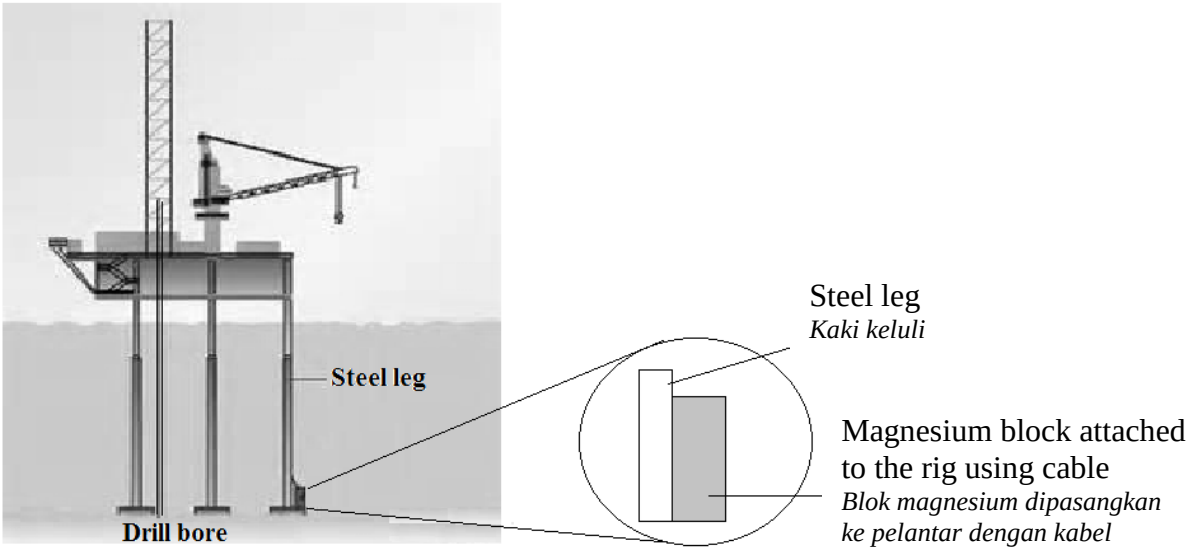


Diagram 20
Rajah 20

Which of the following statement is correct about the function of magnesium?
Manakah antara pernyataan berikut benar mengenai fungsi magnesium?

A Magnesium increases the stability of oil rig.
Magnesium meningkatkan kestabilan pelantar minyak

B Magnesium maintains the position of oil rig.
Magnesium mengekalkan kedudukan pelantar minyak

C Magnesium increases the strength of the steel leg.
Magnesium meningkatkan kekuatan kaki keluli.

D Magnesium prevents the corrosion of steel leg.
Magnesium mencegah kakisan kaki keluli.

34 Diagram 21 shows substance V is added to potassium bromide solution until no further change. 1, 1, 1-trichloroethane is then added to the test tube and the mixture is shaken well.

Rajah 21 *menunjukkan bahan* V *ditambah kepada larutan kalium bromida sehingga tiada perubahan lagi.* 1,1,1-*trikloroetana kemudiannya ditambah ke dalam tabung uji dan campuran di goncang.*

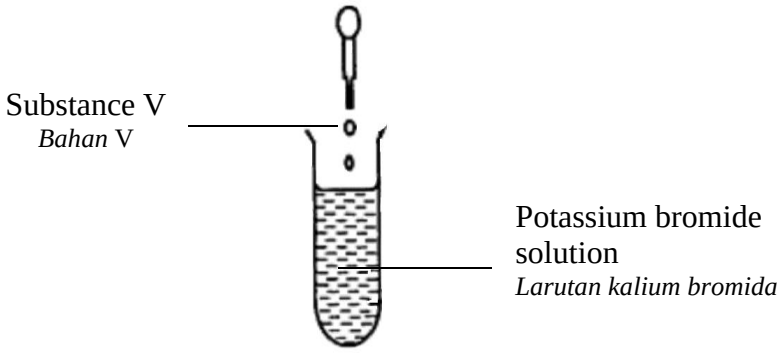


Diagram 21

Rajah 21

The colour of 1, 1, 1-trichloroethane layer turns brown.
Which of the following could be substance V?
Warna lapisan 1, 1, 1-*trikloroetana bertukar menjadi perang.*
Manakah antara berikut adalah bahan V?

A Iodine
Iodin

B Astatine
Astatin

C Bromine
Bromin

D Chlorine
Klorin

35 Diagram 22 shows the steps by which carbon dioxide can be converted into organic products and finally returned to the atmosphere.
Rajah 22 menunjukkan langkah-langkah yang mana karbon dioksida boleh ditukar kepada produk organik dan akhirnya kembali ke atmosfera.

Which step is endothermic?
Langkah yang manakah adalah endotermik?

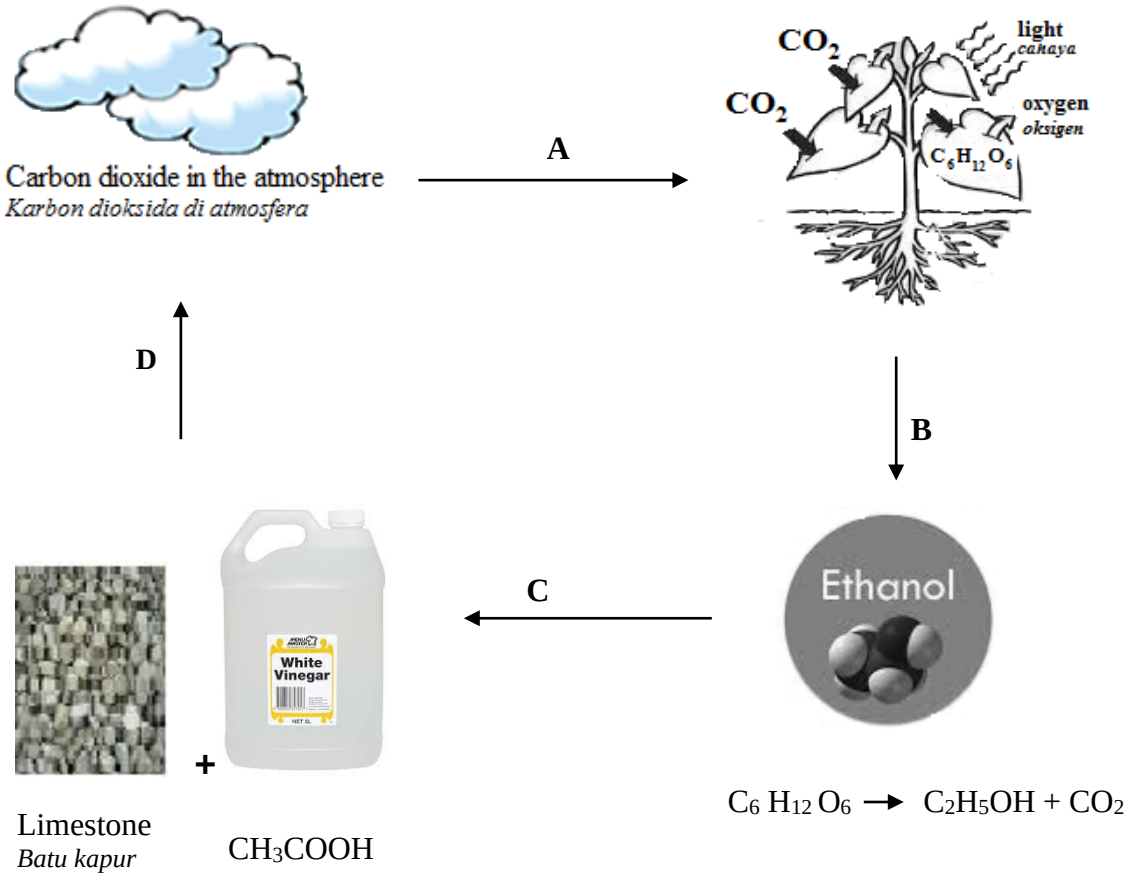


Diagram 22
Rajah 22

36 Diagram 23 shows the arrangement of particles in substance P at 1 atm pressure and two different temperatures.
Rajah 23 menunjukkan susunan zarah bahan P *pada tekanan* 1 *atm dan dua suhu berbeza.*

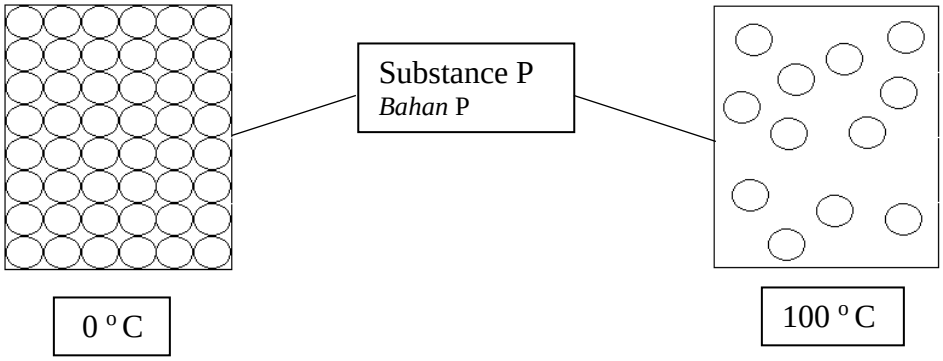


Diagram 23
Rajah 23

Which of the following statements is/are true?
Manakah antara pernyataan berikut adalah benar?

I Substance P vibrate and rotate at fixed position at 0 °C.
Sebatian P *bergetar dan berputar di kedudukan tetap pada* 0 °C

II The kinetic energy of substance P is low at 100 °C
Tenaga kinetik sebatian P *adalah rendah pada* 100 °C

III The forces of attraction between the particles is strong at 0 °C
Daya tarikan antara zarah adalah kuat pada 0 °C

IV The melting point of substance P is 100 °C
Takat lebur sebatian P *ialah* 100 °C

A III only
III *sahaja*

B I and III
I *dan* III

C I , III and IV
I , III *dan* IV

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

37 Diagram 24 shows two containers of equal size filled with nitrogen gas and hydrogen gas respectively.
[Molar volume of gas at STP = 22.4 dm^3 mol^{-1}]
Rajah 24 *menunjukkan dua bekas yang bersaiz sama diisi dengan gas nitrogen dan gas hidrogen.*
[*Isi padu molar gas pada STP* = 22.4 dm^3 mol^{-1}]

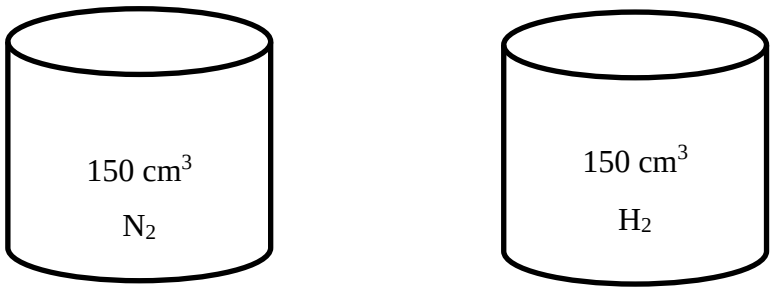


Diagram 24
Rajah 24

Which of the following statements explain about the two gases?
Manakah antara pernyataan berikut menerangkan tentang dua gas berkenaan?

A The number of moles of nitrogen gas and hydrogen gas are equal.
Bilangan mol gas nitrogen dan gas hidrogen adalah sama

B The number of moles of hydrogen gas is greater than nitrogen gas.
Bilangan mol gas hidrogen lebih besar daripada gas nitrogen.

C The number of nitrogen gas particles is more than hydrogen gas. .
Bilangan zarah gas nitrogen lebih banyak daripada gas hidrogen.

D The number of nitrogen gas particles is less than hydrogen gas.
Bilangan zarah gas nitrogen kurang daripada gas hidrogen.

38 Diagram 25 shows the position of elements H, Na, K, Fe, N, O and Cl in the Periodic Table of Elements.
Rajah 25 *menunjukkan kedudukan unsur* H, Na, K, Fe, N, O *dan* Cl *dalam Jadual Berkala Unsur*.

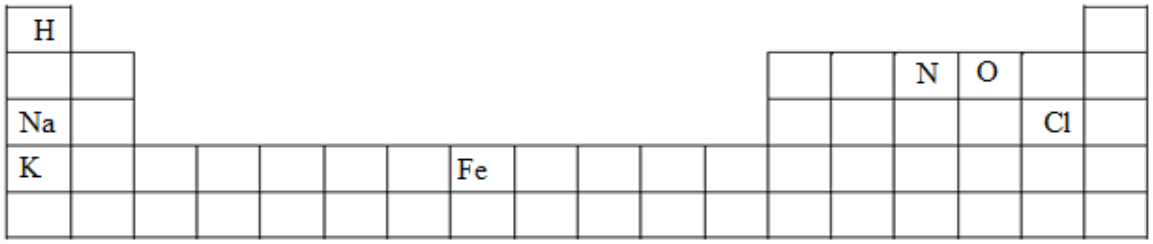


Diagram 25
Rajah 25

Which of the following information is correct about the compound formed?
Manakah antara maklumat berikut benar mengenai sebatian yang terbentuk?

	Chemical formulae ***Formula kimia***	**Physical properties** ***Ciri – ciri fizikal***
A	NaCl	Conduct electricity in any states *Mengalirkan arus elektrik dalam semua keadaan*
B	NH_3	Exists as gas at room temperature *Wujud sebagai gas pada suhu bilik*
C	$FeCl_3$	Dissolves in tetrachloromethane *Larut dalam tetraklorometana*
D	K_2O	Have low melting and boiling point *Mempunyai takat lebur dan takat didih tinggi*

39 Table 3 shows the electrical conductivity and solubility of substances S, T, and U.
Jadual 3 *menunjukkan kekonduksian elektrik dan keterlarutan bahan* S, T *dan* U.

Substance ***Bahan***	**Electrical conductivity** ***Kekonduksian elektrik***			**Solubility** ***Keterlarutan***	
	Solid ***Pepejal***	**Molten** ***Lebur***	**Aqueous** ***Akueus***	**Water** ***Air***	**Benzene** ***Benzena***
S	Yes *Ya*	Yes *Ya*	No *Tidak*	No *Tidak*	No *Tidak*
T	No *Tidak*	No *Tidak*	No *Tidak*	No *Tidak*	Yes *Ya*
U	No *Tidak*	Yes *Ya*	Yes *Ya*	Yes *Ya*	No *Tidak*

Table 3
Jadual 3

Which of the following are substances S, T and U?
Manakah antara berikut adalah bahan S, T *dan* U?

	S	**T**	**U**
A	Acetamide *Asetamida*	Lithium chloride *Litium klorida*	Aluminium *Aluminium*
B	Aluminium *Aluminium*	Acetamide *Asetamida*	Lithium chloride *Litium klorida*
C	Aluminium *Aluminium*	Lithium chloride *Litium klorida*	Acetamide *Asetamida*
D	Lithium chloride *Litium klorida*	Acetamide *Asetamida*	Aluminium *Aluminium*

40 Table 4 shows the information of four simple voltaic cells.
Jadual 4 *menunjukkan maklumat bagi empat sel volta ringkas.*

Pair of metals ***Pasangan logam***	**Potential difference / V** ***Beza keupayaan /* V**	**Positive terminal** ***Terminal positif***
P and zinc *P dan zink*	1.60	P
Q and zinc *Q dan zink*	0.08	Q
R and zinc *R dan zink*	0.50	Zinc *Zink*
S and zinc *S dan zink*	1.90	Zinc *Zink*

Table 4
Jadual 4

Based on Table 4, arrange the metals in ascending order of Electrochemical Series.
Berdasarkan Jadual 4*, susun logam tersebut mengikut susunan menaik Siri Elektrokimia.*

A P, Q, zinc, R, S

B R, S, zinc, P, Q

C Zinc, S, R, Q, P

D S, R, Zinc, Q, P

41 Diagram 26 shows the apparatus set-up for the titration of potassium hydroxide solution with dilute sulphuric acid.
Rajah 26 *menunjukkan susunan radas bagi pentitratan larutan kalium hidroksida dengan asid sulfurik cair.*

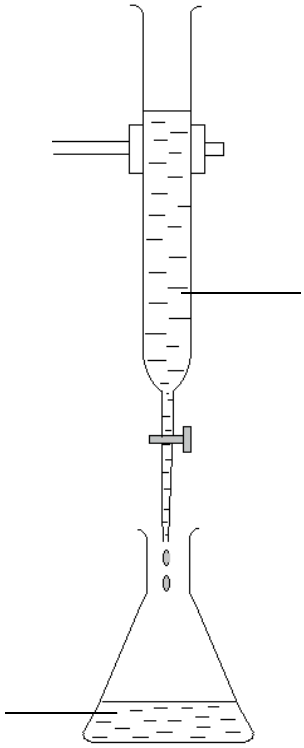


Diagram 26
Rajah 26

What is the total volume of the mixture in the conical flask at the end point?
Apakah jumlah isipadu campuran di dalam kelalang kon pada takat akhir?

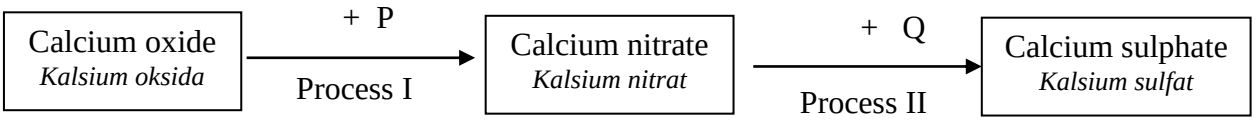
A 20 cm^3

B 30 cm^3

C 40 cm^3

D 50 cm^3

42 Diagram 27 shows two processes to prepare calcium sulphate salt which is known as "Plaster of Paris" that can be used to support a broken bone.
P and Q are two substances needed in these processes.
Rajah 27 *menunjukkan dua proses penyediaan garam kalsium sulfat yang dikenali sebagai "Plaster of Paris"dan boleh digunakan untuk menyokong tulang yang patah.*
P *dan* Q *adalah dua bahan yang diperlukan dalam proses tersebut.*



Steps in Process II ***Langkah-langkah dalam Proses* II**	**Description** ***Keterangan***
S1	Filter the mixture *Turaskan campuran*
S2	Mix the materials *Campurkan kedua-dua bahan*
S3	Rinse the residue with distilled water *Bilas baki turasan dengan air suling*
S4	Dry the salt *Keringkan garam tersebut*

Diagram 27
Rajah 27

What are substances P and Q and the correct arrangement for the steps involved in Process II?
Apakah bahan-bahan P *dan* Q *serta susunan yang betul bagi langkah-langkah yang terlibat dalam Proses* II?

	P	**Q**	**Steps** ***Langkah - langkah***
A	Sodium sulphate *Natrium sulfat*	Nitric acid *Asid nitrik*	S1, S2, S3 and S4
B	Nitric acid *Asid nitrik*	Sodium sulphate *Natrium sulfat*	S2, S1, S3 and S4
C	Sodium nitrate *Natrium nitrat*	Sulphuric acid *Asid sulfurik*	S2, S1, S3 and S4
D	Sulphuric acid *Asid sulfurik*	Barium sulphate *Barium sulfat*	S1, S3, S4 and S2

[See next page

43 Nichrome is an alloy of two transition elements, nickel and chromium.
The alloy is used as the heating coil in electric stove and electric toasters.
Which properties of nichrome are important for these uses?
Nikrom adalah sejenis aloi yang mengandungi dua unsur peralihan iaitu nikel dan kromium.
Aloi ini digunakan sebagai gelung pemanas dalam dapur elektrik dan pembakar roti elektrik.
Manakah ciri-ciri nikrom berikut penting bagi kegunaan di atas?

	Melting point ***Takat lebur***	**Resistant to oxidation** ***Ketahanan terhadap pengoksidaan***
A	High *Tinggi*	Good *Baik*
B	High *Tinggi*	Weak *Lemah*
C	Low *Rendah*	Good *Baik*
D	Low *Rendah*	Weak *Lemah*

44 Limescale accumulated in the kettles or boilers can be removed by using hydrochloric acid as represented in the following equation:
Kerak kapur yang terkumpul di dalam cerek atau dandang boleh disingkirkan dengan menggunakan asid hidroklorik yang diwakili oleh persamaan berikut:

$$2\,HCl + CaCO_3 \rightarrow CaCl_2 + CO_2 + H_2O$$

Which of these statements is true about the reaction?
Manakah antara pernyataan berikut adalah benar mengenai tindak balas itu?

[Relative Atomic Mass: H: 1, C: 12, O: 16, Cl: 35.5, Ca: 40]
[*Jisim atom relatif:* H: 1, C: 12, O: 16, Cl: 35.5, Ca: 40]

A The products are hydrochloric acid and calcium carbonate
Produk adalah asid hidroklorik dan kalsium karbonat

B One mole of hydrochloric acid produces 0.5 mole of calcium chloride
Satu mol asid hidroklorik menghasilkan 0.5 mol *kalsium klorida*.

C One mole of calcium carbonate produces one molecule of carbon dioxide
Satu mol kalsium karbonat menghasilkan satu molekul karbon dioksida

D 73g of hydrochloric acid is needed to produce 0.5 mole of carbon dioxide
73g *asid hidroklorik diperlukan untuk menghasilkan* 0.5 mol *karbon dioksida*

45 The following statement explains the properties and uses of butyl acetate.
Pernyataan berikut menerangkan sifat dan kegunaan butil asetat.

> Butyl acetate is a clear colourless liquid with a fruity odour. It is used as synthetic fruit flavouring in foods such as candies, ice cream, cheeses and baked goods. It is also used in photographic film, nail polish removals, lacquers, perfumes, oils and resins.
>
> *Butil asetat adalah cecair tanpa warna yang berbau seperti buah-buahan. Ia digunakan sebagai perisa buah-buahan sintetik dalam makanan seperti gula-gula, ais krim, keju dan produk bakeri. Ia juga digunakan di dalam filem fotografi, pencuci pengilat kuku, lakra, minyak wangi, minyak dan resins.*
>
> Source / *Sumber*: en.wikipidea.org

Which combination of compounds can produce butyl acetate?
Manakah antara gabungan sebatian berikut boleh menghasilkan butil asetat?

A Butane and butanol
Butana dan butanol

B Propanol and butanol
Propanol dan butanol

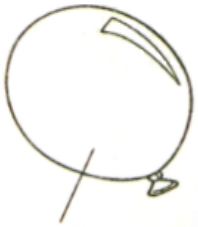
C Ethanoic acid and butanol
Asid etanoik dan butanol

D Etanoic acid and butyl propanoate
Asid etanoik dan butil propanoat

46 An inflated balloon becomes smaller because gas molecules can diffuse through the wall of the balloon.
Four balloons are filled with different gases at the same temperature and pressure.
Which balloon would deflate most quickly?
Belon yang berisi gas akan mengecil kerana molekul gas boleh meresap melalui dinding belon.
Empat belon dipenuhi dengan gas-gas berbeza pada suhu dan tekanan yang sama.
Belon manakah yang akan kempis paling cepat?

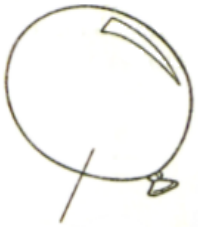
[Relative atomic mass: H =1; C =12; N = 14; O =16]
[*Jisim atom relatif:* H =1; C =12; N = 14; O =16]

A



Carbon dioxide, CO_2
Karbon dioksida, CO_2

B



Methane, CH_4
Metana, CH_4

C

Nitrogen, N_2
Nitrogen, N_2

D

Oxygen, O_2
Oksigen, O_2

47 Table 5 shows the energy released from complete combustion of some fuels.
Jadual 5 *dibawah menunjukkan haba yang dibebaskan dari pembakaran lengkap beberapa bahan api*.

Fuel ***Bahan api***	**Molecular formula** ***Formula molekul***	**Relative molecular mass** ***Jisim molekul relatif***	**ΔH / kJ mol^{-1}**
Methane *Metana*	CH_4	16	–880
Ethanol *Etanol*	C_2H_5OH	46	–1380
Propane *Propana*	C_3H_8	44	–2200
Heptane *Heptana*	C_7H_{16}	100	–4800

Table 5
Jadual 5

Based on Table 5, which fuel produces the most energy when 1 g of the fuel is completely burnt?
Berdasarkan Jadual 5, *manakah antara bahan api berikut menghasilkan paling banyak tenaga apabila* 1 g *bahan api terbakar dengan lengkap*?

A Ethanol
Etanol

B Heptane
Heptana

C Methane
Metana

D Propane
Propana

48 Table 6 shows the extraction of metals from their ores using three different methods.
Jadual 6 *menunjukkan pengekstrakan logam daripada bijih logam menggunakan tiga kaedah yang berbeza.*

Metal ***Logam***	**Method** ***Kaedah***
E	Reduction using carbon *Penurunan menggunakan karbon*
F	Electrolysis *Elektrolisis*
G	Reduction by hydrogen *Penurunan oleh hidrogen*

Table 6
Jadual 6

Which of the following is the correct arrangement of the reactivity of metals in descending order?
Manakah antara susunan berikut adalah betul bagi kereaktifan logam dalam susunan menurun?

A G, E, F

B E, F, G

C F, E, G

D G, F, E

49 The following equation represents the complete combustion of propene gas.
Persamaan berikut mewakili pembakaran lengkap gas propena.

$$C_3H_{6\,(g)} + 9/2\ O_{2\,(g)} \rightarrow 3CO_{2\,(g)} + 3H_2O_{\,(g)}$$

Which of the following statements are true when 1 mol of propene gas burnt completely*?*
Manakah antara pernyataan berikut adalah benar apabila 1 mol *propena terbakar dengan lengkap*?

[Relative Molecular Mass: $C_3H_6 = 42$, $O_2 = 32$, $CO_2 = 44$, $H_2O = 18$,
Molar volume of gas is 22.4 $dm^3\ mol^{-1}$ at STP]
[*Jisim molekul relatif:* $C_3H_6 = 42$, $O_2 = 32$, $CO_2 = 44$, $H_2O = 18$,
Isi padu molar gas ialah 22.4 $dm^3\ mol^{-1}$ *pada STP*]

I Combustion of 0.1 mol of propene produces 5.4 g of water
Pembakaran 0.1 mol *propena menghasilkan* 5.4 g *air*

II Combustion of 1 mol of propene produces 2 mol of water
Pembakaran 1 mol *propena menghasilkan* 2 mol *air*

III Combustion of 4.2 g of propene requires14.4 g of oxygen
Pembakaran 4.2 g *propena memerlukan* 14.4 g *oksigen*
.

IV Combustion of 0.1 mol of propene produces 6.72 dm^3 carbon dioxide gas at STP
Pembakaran 0.1 mol *propena menghasilkan* 6.72 dm^3 *gas karbon dioksida pada STP*

A I and II

B I and III

C II and IV

D I, III and IV

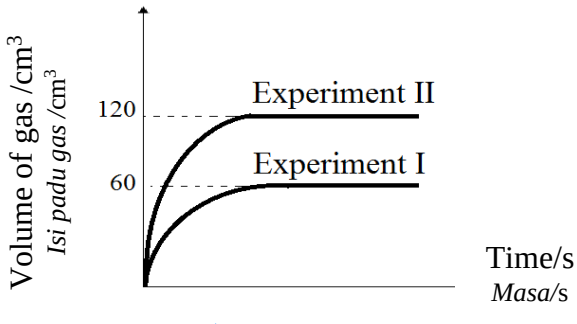
50 Table 7 shows the experiments carried out to study the rate of reaction between zinc and nitric acid at room temperature and pressure.
Jadual 7 menunjukkan eksperimen yang dijalankan untuk mengkaji kadar tindak balas antara zink dan asid nitrik pada suhu dan tekanan bilik.

Experiment *Eksperimen*	**Zinc** *Zink*		**Nitric acid** *Asid nitrik*	
	Mass (g) *Jisim* **(g)**	**Size** *Saiz*	**Volume /cm^3** *Isi padu* **/cm^3**	**Concentration / mol dm^{-3}** *Kepekatan*/**mol dm^{-3}**
I	3.5	Granule *Butiran*	50	0.1
II	6.5	Powder *Serbuk*	50	0.2

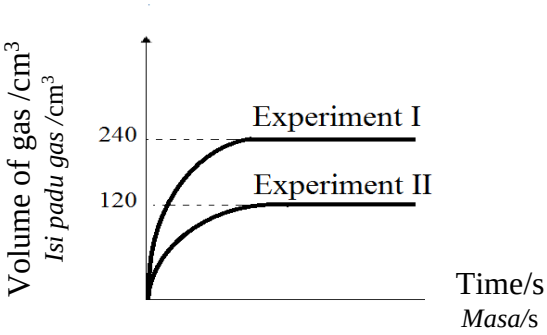
Table 7
Jadual 7

Which of the following graphs represents the two experiments?
[Molar volume of gas is 24 dm^3 mol $^{-1}$ at room temperature and pressure;
Molar mass of Zn = 65 g mol^{-1}]
Manakah antara graf berikut mewakili dua eksperimen di atas?
[*Isi padu molar gas ialah* 24 dm^{3}mol^{-1} *pada suhu dan tekanan bilik; Jisim molar* Zn=65 g mol^{-1}]

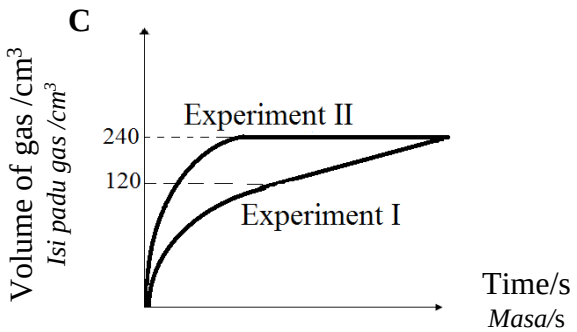
A



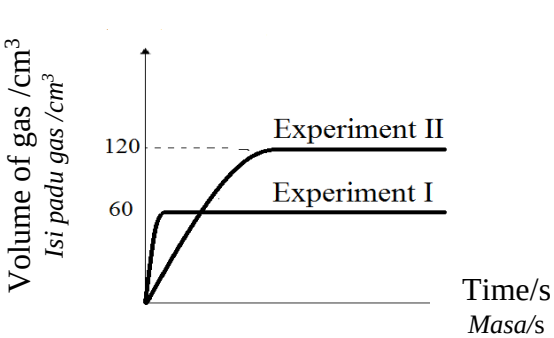
B



C



D



END OF QUESTION PAPER
http://cikguadura.wordpress.com/

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 setiap soalan dengan menghitamkan ruangan yang betul pada kertas jawapan.

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

5. If you wish to change your answer, erase the blackened mark that you have made. Then blacken the new answer.
Sekiranya anda hendak menukar 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 scientific calculator.
Anda dibenarkan menggunakan kalkulator saintifik.

4541/2
Chemistry
Paper 2
Sept 2014
2 ½ hour

Name : …….

Index Number: ….....…….

Class : …….

SIJIL PENDIDIKAN
MAKTAB RENDAH SAINS MARA
2014

CHEMISTRY

http://cikguadura.wordpress.com/

Paper 2

Two hours and thirty minutes

DO NOT OPEN THE QUESTION BOOKLET UNTIL BEING TOLD TO DO SO

1. Write your name and index number in the spaces provided.
   Tuliskan ***nama*** *dan* ***angka giliran*** *anda pada ruang yang disediakan.*

2. This question booklet is bilingual.
   Kertas soalan ini adalah dalam dwibahasa.

3. Candidate is required to read the information at the back page.
   Calon dikehendaki membaca maklumat di halaman belakang.

For Examiner's Use			
Section	Question	Full mark	Marks
A	**1**	9	
	2	9	
	3	10	
	4	10	
	5	11	
	6	11	
B	**7**	20	
	8	20	
C	**9**	20	
	10	20	
TOTAL			

Section A
Bahagian A

[60 *marks*]
[60 *markah*]

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

1 (*a*) Diagram 1.1 shows structural formula for the anion part of cleansing agents, M and N.
Rajah 1.1 *menunjukkan formula struktur bahagian anion agen pencuci,* M *dan* N.

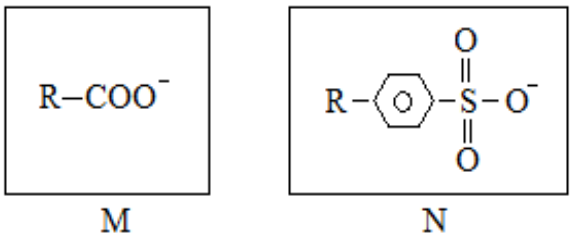


Diagram 1.1
Rajah 1.1

(i) State the type of cleansing agents M and N.
Nyatakan jenis agen pencuci M *dan* N.

1(*a*)(i)

M :.....

N :.....

[2 *marks*]
[2 *markah*]

(ii) A student carried out an experiment to investigate the cleansing effect of M and N on oily stained cloth in hard water.
State the observation obtained in Table 1.1.
Seorang pelajar menjalankan eksperimen untuk mengkaji kesan pencucian M *dan* N *ke atas kain kotor berminyak di dalam air liat.*
Nyatakan pemerhatian yang diperolehi dalam Jadual 1.1.

Cleansing agent ***Agen pencuci***	**Observation** ***Pemerhatian***
M	
N	

Table 1.1
Jadual 1.1

1(*a*)(ii)

[2 *marks*]
[2 *markah*]

For Examiner's Use

(iii) State which cleansing agent is more effective to remove the oily stain.
Nyatakan agen pencuci manakah lebih berkesan untuk menghilangkan kotoran berminyak.

1(*a*)(iii)

....

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

(*b*) Table 1.2 shows the example of three types of commonly used medicines.
Jadual 1.2 *menunjukkan contoh tiga jenis ubat yang biasa digunakan.*

Type Of Medicine ***Jenis Ubat***	**Example** ***Contoh***
Analgesic *Analgesik*	**P :**
Psychotherapeutic medicine *Ubat psikoterapeutik*	Barbiturate *Barbiturat*
Q :	Penicillin *Penisilin*

Table 1.2
Jadual 1.2

(i) Complete Table 1.2.
Lengkapkan Jadual 1.2.

1(*b*)(i)

[2 *marks*]
[2 *markah*]

(ii) State the function of analgesic.
Nyatakan fungsi analgesik.

1(*b*)(ii)

.....

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

(iii) Explain why the prescription and dosage of penicillin given by the doctor must be followed strictly.
Jelaskan mengapa pengambilan penisilin perlu mengikut preskripsi dan dos yang ditetapkan oleh doktor.

1(*b*)(iii)

.....

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

2 Table 2 shows proton numbers for certain elements in Period 3 of the Periodic Table of Elements.
Jadual 2 *menunjukkan nombor proton bagi unsur-unsur tertentu yang terdapat dalam Kala* 3 *Jadual Berkala Unsur.*

Element ***Unsur***	Sodium *Natrium*	Magnesium *Magnesium*	Aluminium *Aluminium*	Silicon *Silikon*	Chlorine *Klorin*	Argon *Argon*
Proton number ***Nombor proton***	11	12	13	14	17	18

Table 2
Jadual 2

Based on Table 2, answer the following questions.
Berdasarkan Jadual 2, j*awab soalan-soalan berikut.*

2(*a*)

(*a*) Write the chemical formula for an element that is a metal.
Tuliskan formula kimia bagi satu unsur logam.

……..

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

2(*b*)

(*b*) Write the electron arrangement for aluminium ion.
Tulis susunan elektron bagi ion aluminium.

……..

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

(*c*) (i) Atomic size of chlorine is smaller than sodium.
Explain why.
Saiz atom klorin adalah lebih kecil berbanding natrium.
Terangkan mengapa.

2(*c*)(i)

……....

.....

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

For Examiner's Use

(ii) Sodium reacts with chlorine to produce compound X.
Draw the electron arrangement of compound X.
Natrium bertindak balas dengan klorin untuk menghasilkan sebatian X.
Lukis susunan elektron bagi sebatian X *yang terbentuk.*

2(*c*)(ii)

[2 *marks*]
[2 *markah*]

(iii) State the type of compound formed in (*c*) (ii).
Nyatakan jenis sebatian yang terbentuk di (*c*)(ii).

2(*c*)(iii)

……...
[1 *mark*]
[1 *markah*]

(*d*) State one use of silicon or its compounds in our daily life.
Nyatakan satu kegunaan silikon atau sebatiannya dalam kehidupan harian.

2(*d*)

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

(*e*) Diagram 2 shows a light bulb filled with argon gas.
Rajah 2 *menunjukkan satu mentol yang diisi dengan gas argon.*

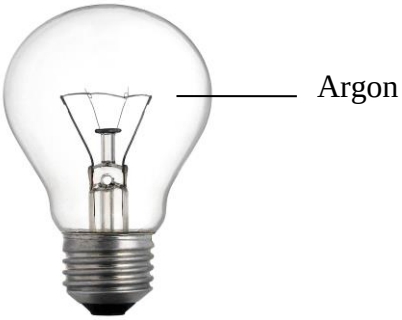


Diagram 2
Rajah 2

(i) Why argon gas is suitable to be used in the light bulb?
Mengapa gas argon sesuai digunakan dalam mentol?

2(*e*)(i)

.....

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

(ii) 0.002 mol of argon gas is needed to fill the light bulb.
Calculate the volume of argon gas that is needed.
[Molar volume of gas at room condition : 24 dm^3 mol^{-1}]
0.002 mol *gas argon diperlukan untuk mengisi mentol tersebut.*
Hitungkan isi padu gas argon yang diperlukan.
[*Isi padu molar gas pada keadaan bilik :* 24 dm^3 mol^{-1}]

2(*e*)(ii)

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

For Examiner's Use

3 Diagram 3 shows the apparatus set-up to investigate the electrolysis of 1.0 mol dm^{-3} potassium iodide solution using carbon electrodes.
Rajah 3 *menunjukkan susunan radas untuk mengkaji elektrolisis larutan kalium iodida* 1.0 mol dm^{-3} *menggunakan elektrod karbon.*

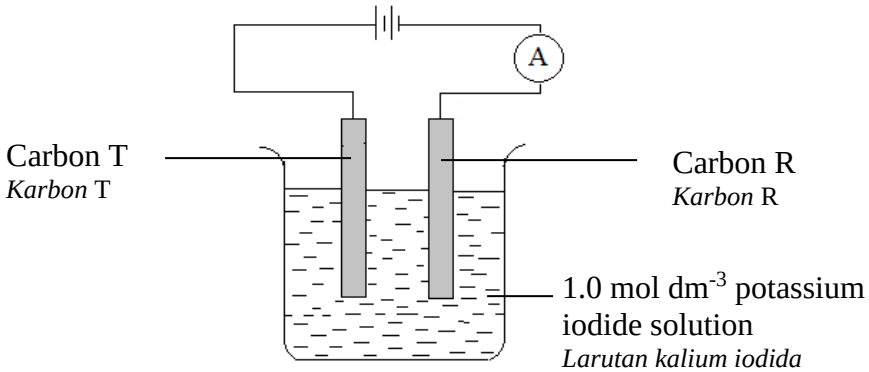


Diagram 3
Rajah 3

(*a*) What is meant by electrolyte?
Apakah yang dimaksudkan dengan elektrolit?

……

……
[1 *mark*]
[1 *markah*]

3(*a*)

(*b*) Write the ionic formulae for all ions present in potassium iodide solution.
Tulis formula semua ion yang hadir dalam larutan kalium iodida.

……
[1 *mark*]
[1 *markah*]

3(*b*)

(*c*) (i) Name the ions attracted to the anode.
Namakan ion-ion yang tertarik ke anod.

……
[1 *mark*]
[1 *markah*]

3(*c*)(i)

(ii) Write the half equation for the ion discharged at the anode.
Tulis persamaan setengah bagi ion yang didiscas di anod.

……
[1 *mark*]
[1 *markah*]

3(*c*)(ii)

3(*d*)(i)

(*d*) (i) State the observation at electrode R.
Nyatakan pemerhatian di elektrod R.

.....

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

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

3(*d*)(ii)

……

……

[2 *marks*]
[2 *markah*]

(*e*) In another experiment, 1.0 mol dm^{-3} potassium iodide solution is replaced with 0.001 mol dm^{-3} potassium iodide solution.
Dalam eksperimen yang lain, larutan kalium iodida 1.0 mol dm^{-3} *digantikan dengan larutan kalium iodida* 0.001 mol dm^{-3}.

3(*e*)(i)

(i) Name the gas released at the anode.
Namakan gas yang terbebas di anod.

……

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

(ii) The volume of gas collected at anode is 24.0 cm^3 at room condition.
Calculate the number of molecules of gas collected.
[Avogadro's constant: 6.02 X 10^{23} mol^{-1} ; 1 mol of gas occupies 24 dm^3 at room condition]
Isi padu gas yang terkumpul di anod ialah 24.0 cm^3 *pada keadaan bilik.*
Hitung bilangan molekul gas yang terkumpul.
[*Pemalar Avogadro:* 6.02 X 10^{23} mol^{-1} *;* 1 *mol gas menempati* 24 dm^3 *pada keadaan bilik*]

3(*e*)(ii)

[2 *marks*]
[2 *markah*]

For Examiner's Use

4 (*a*) Diagram 4 shows a series of reactions that involved solid W.
Rajah 4 *menunjukkan satu siri tindak balas yang melibatkan pepejal* W.

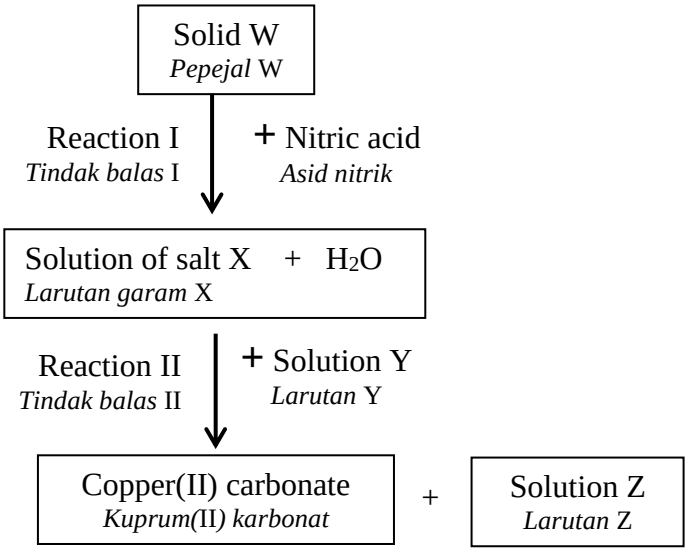


Diagram 4
Rajah 4

Based on Diagram 4, answer the following questions:
Berdasarkan Rajah 4, *jawab soalan-soalan berikut:*

(i) Solid W is a black powder. Name solid W.
Pepejal W *adalah serbuk berwarna hitam. Namakan pepejal* W.

4(*a*)(i)

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

(ii) State the colour of copper(II) carbonate salt.
Nyatakan warna garam kuprum(II) *karbonat.*

4(*a*)(ii)

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

(iii) Suggest solution Y that is required to be added to solution of salt X to produce copper(II) carbonate.
Cadangkan larutan Y *yang perlu ditambah kepada larutan garam* X *untuk menghasilkan kuprum*(II) *karbonat.*

4(*a*)(iii)

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

(iv) Write the chemical equation for Reaction II.
Tuliskan persamaan kimia bagi Tindak balas II.

4(*a*)(iv)

.....
[2 *mark*s]
[2 *markah*]

(*b*) State the observation when excess ammonia solution is added into solution of salt X.
Nyatakan pemerhatian apabila larutan ammonia berlebihan ditambah ke dalam larutan garam X.

4(*b*)

……

.....

[2 *marks*]
[2 *markah*]

(*c*) Describe a chemical test to identify the anion present in solution Z.
Huraikan ujian kimia untuk mengenalpasti anion yang hadir dalam larutan Z.

.....

.....

.....

4(*c*)

.....

.....

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

For Examiner's Use

5 Table 5 shows three sets of experiment to study the factors affecting the rate of reaction between calcium carbonate, $CaCO_3$ and nitric acid, HNO_3.
Jadual 5 *menunjukkan tiga set eksperimen untuk mengkaji faktor – faktor yang mempengaruhi kadar tindak balas di antara kalsium karbonat,* $CaCO_3$ *dan asid nitrik,* HNO_3.

Experiment ***Eksperimen***	**Reactants** ***Bahan tindak balas***	**Temperature/ ^{0}C** ***Suhu/ ^{0}C***
I	25 cm^3 of 0.1 mol dm^{-3} nitric acid and excess calcium carbonate chips 25 cm^3 *asid nitrik* 0.1 mol dm^{-3} *dan ketulan kalsium karbonat berlebihan*	30
II	25 cm^3 of 0.1 mol dm^{-3} nitric acid and excess calcium carbonate chips 25 cm^3 *asid nitrik* 0.1 mol dm^{-3} *dan ketulan kalsium karbonat berlebihan*	40
III	25 cm^3 of 0.1 mol dm^{-3} nitric acid and excess calcium carbonate powder 25 cm^3 *asid nitrik* 0.1 mol dm^{-3} *dan serbuk kalsium karbonat berlebihan*	40

Table 5
Jadual 5

(*a*) State the observable changes which can be used to measure the rate of reaction in this experiment.
Nyatakan perubahan yang boleh diukur untuk menentukan kadar tindak balas bagi eksperimen ini.

5(*a*)

.....

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

(*b*) The following chemical equation represents the reaction in the experiment.
Persamaan kimia berikut mewakili tindak balas dalam eksperimen ini.

$$CaCO_3 + 2HNO_3 \rightarrow Ca(NO_3)_2 + CO_2 + H_2O$$

(i) Calculate the number of mole of nitric acid used in Experiment III.
Hitung bilangan mol asid nitrik yang digunakan dalam Eksperimen III.

5(*b*)(i)

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

(ii) Calculate the volume of carbon dioxide gas released in Experiment III at room condition.
[1 mol of gas occupies 24 dm^3 at room condition]
Hitung isi padu gas karbon dioksida yang terbebas dalam Eksperimen III *pada keadaan bilik.*
[1 mol *gas menempati* 24 dm^3 *pada keadaan bilik*]

5(*b*)(ii)

[2 *marks*]
[2 *markah*]

(iii) Sketch the graph of the volume of carbon dioxide gas collected against time for Experiment I, II and III on the same axis.
Lakar graf isi padu gas karbon dioksida yang terkumpul melawan masa bagi Eksperimen I, II *dan* III *pada paksi yang sama .*

5(*b*)(iii)

[2 *marks*]
[2 *markah*]

(iv) Compare the rate of reaction in Experiment I and Experiment II.
Bandingkan kadar tindak balas bagi Eksperimen I *dan Eksperimen* II.

5(*b*)(iv)

……**.....**
[1 *mark*]
[1 *markah*]

For Examiner's Use

(v) Explain your answer in (*b*)(iv) based on the collision theory.
Jelaskan jawapan anda di (*b*)(iv) *berdasarkan teori perlanggaran.*

……

.....

.....

.....

[4 *marks*]
[4 *markah*]

5(*b*)(v)

6 Diagram 6 shows the apparatus set- up to investigate the reaction between iron(II) sulphate solution and bromine water through the transfer of electrons at a distance.
Rajah 6 *menunjukkan susunan radas untuk mengkaji tindak balas antara larutan ferum*(II) *sulfat dan air bromin melalui pemindahan elektron pada suatu jarak.*

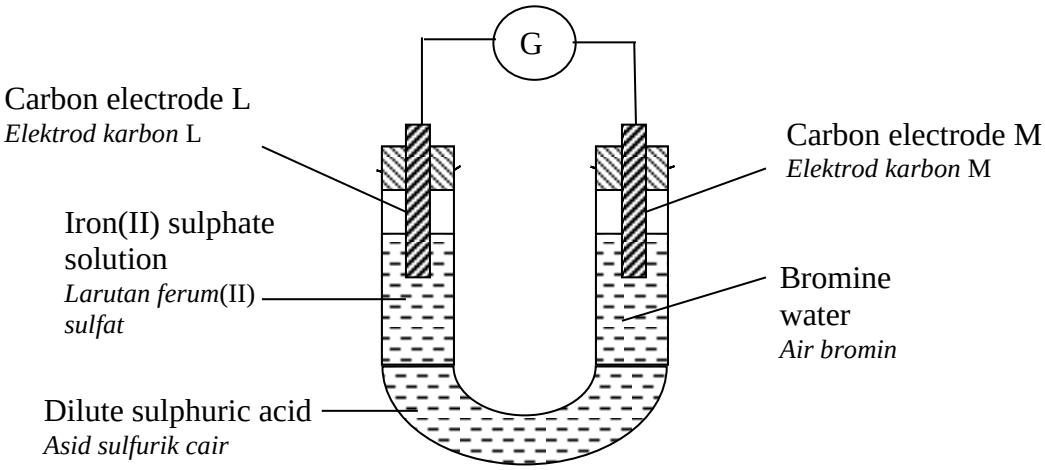


Diagram 6
Rajah 6

(*a*) What is the function of dilute sulphuric acid?
Apakah fungsi asid sulfurik cair?

6(*a*)

……

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

(*b*) Show the direction of electron flow in Diagram 6.
Tunjukkan arah pengaliran elektron dalam Rajah 6.

6(*b*)

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

(*c*) Referring to the reaction that takes place at electrode L:
Merujuk pada tindak balas yang berlaku di elektrod L:

(i) Name the product formed.
Namakan hasil tindak balas yang terbentuk.

6(*c*)(i)

……

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

(ii) Describe a chemical test to determine the product formed in (*c*)(i).
Huraikan ujian kimia untuk mengesahkan produk yang terhasil dalam (*c*)(i).

6(*c*)(ii)

……

……

[2 *marks*]
[2 *markah*]

For Examiner's Use

(*d*) Write the half equation for the reaction that takes place at electrode M.
Tuliskan setengah persamaan bagi tindak balas yang berlaku di elektrod M.

6(*d*)

……

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

(*e*) The experiment is repeated by replacing bromine water with acidified potassium dichromate(VI) solution.
Predict the observation at electrode M and explain your answer.
Eksperimen diulangi dengan menggantikan air bromin dengan larutan kalium dikromat(VI) *berasid.*
Ramalkan pemerhatian pada elektrod M *dan terangkan jawapan anda.*

6(*e*)

……**.....**

……

[2 *marks*]
[2 *markah*]

(*f*) **Without using U Tube**, draw another apparatus set up to investigate the transfer of electron at a distance, using the same materials as in Diagram 6.
Mark in the diagram the positive and negative terminal of the cell.
Tanpa menggunakan Tiub U *, lukiskan susunan radas lain untuk mengkaji pemindahan elektron pada satu jarak menggunakan bahan yang sama dalam Rajah* 6.
Tandakan terminal positif dan negatif bagi sel pada rajah itu.

6(*f*)

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

Section B
[*Bahagian B*]

[20 *marks*]
[20 *markah*]

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

7 (*a*) (i) Diagram 7.1 shows the structural formula of an organic compound, benzene.
Rajah 7.1 *menunjukkan formula struktur bagi satu sebatian organik, benzena.*

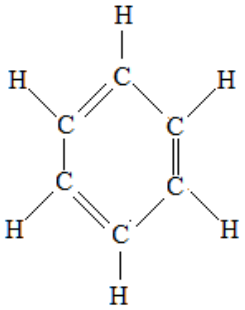


Diagram 7.1
Rajah 7.1

Based on Diagram 7.1, define empirical formula and molecular formula.
Berdasarkan Rajah 7.1, *berikan definisi formula empirik dan formula molekul.*

[2 *marks*]
[2 *markah*]

(ii) Some compounds have the same empirical formula and molecular formula . One of the example is carbon dioxide, CO_2 .
Name and write the formula of another compound that shows the same phenomenon.
Sesetengah sebatian mempunyai formula empirik yang sama dengan formula molekul. Salah satu sebatian ialah karbon dioksida, CO_2.
Namakan dan tuliskan formula bagi satu sebatian lain yang menunjukkan fenomena yang sama.

[2 *marks*]
[2 *markah*]

(*b*) (i) Hydrocarbon G consists of 80.0% carbon and 20.0% hydrogen. Given the relative molecular mass of hydrocarbon G is 30, determine the empirical formula and molecular formula of G.
[Relative atomic mass: H =1; C =12]
Hidrokarbon G mempunyai 80.0% *karbon dan* 20.0% *hidrogen.*
Diberi jisim molekul relatif hidrokarbon G *adalah* 30,
tentukan formula empirik dan formula molekul bagi G.
[*Jisim atom relatif* H =1; C =12]

[4 *marks*]
[4 *markah*]

(ii) Burning of G in the air produces carbon dioxide and water.
Write a chemical equation for the reaction.
Pembakaran G *di dalam udara menghasilkan karbon dioksida dan air.*
Tuliskan persamaan kimia bagi tindak balas ini.

[2 *marks*]
[2 *markah*]

(*c*) Diagram 7.2 shows the structural formula of two hydrocarbons.
Rajah 7.2 *menunjukkan formula struktur bagi dua hidrokarbon.*

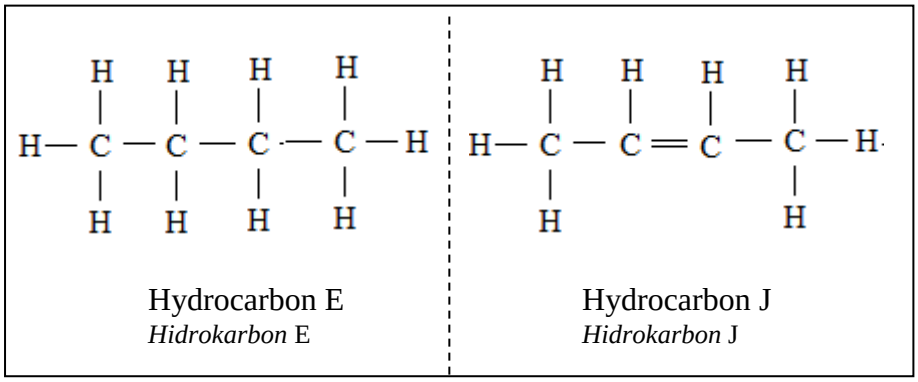


Diagram 7.2
Rajah 7.2

(i) State the homologous series, general formula and name of hydrocarbon E and J.
Nyatakan siri homolog, formula am dan nama bagi hidrokarbon E *dan* J.

[6 *marks*]
[6 *markah*]

(ii) Hydrocarbons E and J produce soot when burnt.
Compare the sootiness of the flame and explain your answer.
[Molar mass: E = 58 g mol^{-1}; J = 56 g mol^{-1}]
Hidrokarbon E *dan* J *menghasilkan jelaga apabila terbakar.*
Bandingkan kejelagaan nyalaan dan terangkan jawapan anda.
[*Jisim molar:* E = 58 g mol^{-1}; J = 56 g mol^{-1}]

[4 *marks*]
[4 *markah*]

8 (*a*) Table 8.1 shows two different substances and their uses.
Jadual 8.1 *menunjukkan dua bahan yang berbeza bersama kegunaannya.*

Substance ***Bahan***	**Uses** ***Kegunaan***
Alloy P *Aloi* P	To make medals and statues *Membuat pingat dan tugu*
Glass Q *Kaca* Q	To make laboratory glassware and glass cookware *Untuk membuat alat radas kaca makmal dan alatan memasak*

Table 8.1
Jadual 8.1

Based on Table 8.1,
Berdasarkan Jadual 8.1,

(i) State the name of alloy P and type of glass Q.
Give the specific properties of each substance to support your answer.
Namakan aloi P *dan jenis kaca* Q.
Berikan sifat khusus bagi setiap bahan untuk menyokong jawapan anda.

[4 *marks*]
[4 *markah*]

(ii) Draw the arrangement of atoms in pure copper and alloy P.
Compare the hardness of pure copper and alloy P.
Explain your answer in term of size and arrangement of atoms.
Lukiskan susunan atom dalam kuprum tulen dan aloi P.
Bandingkan kekerasan antara kuprum tulen dan aloi P.
Terangkan jawapan anda dari segi saiz dan susunan atom.

[6 *marks*]
[6 *markah*]

(*b*) Sulphuric acid, H_2SO_4 is manufactured in industry through Contact Process. This process consists of the following stages.
Asid sulfurik, H_2SO_4 *dihasilkan dalam industri melalui Proses Sentuh. Proses ini terdiri daripada peringkat-peringkat berikut:*

Stage 1 ***Peringkat* 1**	$S + O_2 \rightarrow SO_2$
Stage 2 ***Peringkat* 2**	Formation of sulphur trioxide in suitable condition. *Pembentukkan sulfur trioksida dalam keadaan sesuai.*
Stage 3 ***Peringkat* 3**	Step I / *Langkah* I: Sulphur trioxide ⟶ Oleum (*Sulfur trioksida* ⟶ *Oleum*); Step II / *Langkah* II: Oleum ⟶ Dilute sulphuric acid (*Oleum* ⟶ *Asid sulfurik cair*)

Table 8.2
Jadual 8.2

Based on Table 8.2,
Berdasarkan Jadual 8.2,

(i) Explain the process in Stage 2.
In your explanation, include the chemical equation involved.
Terangkan proses dalam Peringkat 2.
Di dalam penerangan anda, sertakan persamaan kimia yang terlibat.

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

(ii) Describe briefly Step I and Step II in Stage 3.
In your answer, write the chemical equations involved.
Huraikan secara ringkas Langkah I *dan Langkah* II *dalam Peringkat* 3.
Dalam jawapan anda, tulis persamaan kimia yang terlibat.

[4 *marks*]
[4 *markah*]

(iii) 48 g of sulphur is burnt completely in oxygen gas in Stage I.
Calculate the maximum volume of sulphur dioxide gas produced.
[Relative atomic mass; S = 32, O = 16; 1 mol of gas occupies 24 dm^3 at room condition]
48 g *sulfur dibakar dengan lengkap dalam gas oksigen dalam Peringkat* 1.
Hitungkan isi padu maksimum bagi sulfur dioksida yang terhasil.
[*Jisim atom relatif;* S = 32, O=16; 1 mol *gas menempati* 24 dm^3 *pada keadaan bilik*]

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

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 a voltaic cell using solution T and solution V. The observation is recorded in Table 9.
Rajah 9 *menunjukkan susunan radas sel volta menggunakan larutan* T *dan larutan* V. *Pemerhatian direkodkan dalam Jadual* 9.

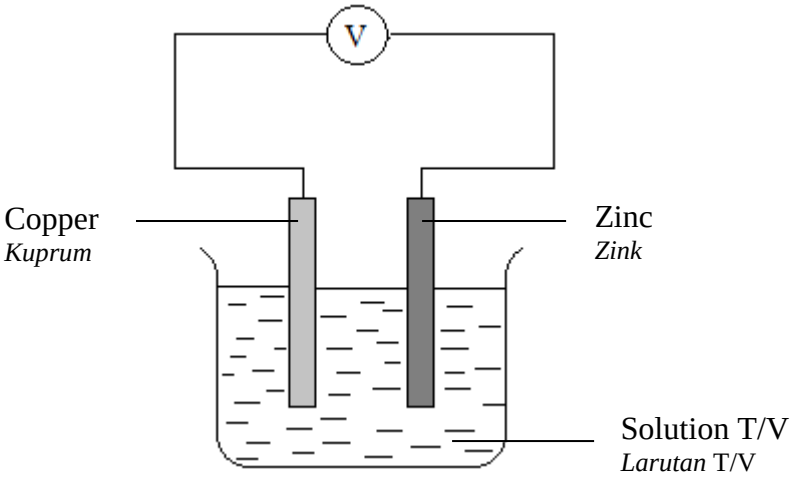


Diagram 9
Rajah 9

Solution ***Larutan***	**Deflection of voltmeter's needle** ***Pesongan jarum voltmeter***
T	Yes *Ya*
V	No *Tidak*

Table 9
Jadual 9

(i) Suggest suitable solutions for T and V.
Explain the differences in observation for solutions T and V.
Cadangkan larutan T *dan* V *yang sesuai*.
Terangkan perbezaan dalam pemerhatian bagi larutan T *dan* V.

[4 *marks*]
[4 *markah*]

(ii) Explain the process that occurs in the voltaic cell in Diagram 9 when solution T is used.
Your explanation should include the half equations involved.
Terangkan tindak balas yang berlaku di dalam sel volta di Rajah 9 *apabila larutan* T *digunakan.*
Penerangan anda perlu mengandungi setengah persamaan yang terlibat.

[6 *marks*]
[6 *markah*]

(*b*) A standard solution can be prepared using dilution method.
Describe how you would prepare 100 cm^3 0.5 mol dm^{-3} sodium hydroxide solution from 2.0 mol dm^{-3} sodium hydroxide solution.
Satu larutan piawai boleh disediakan melalui kaedah pencairan.
Huraikan bagaimana anda boleh menyediakan 100 cm^3 *larutan natrium hidroksida* 0.5 mol dm^{-3} *daripada larutan natrium hidroksida* 2.0 mol dm^{-3}.

Your description should include the followings:
Penerangan anda perlu mengandungi perkara-perkara berikut:

- List of materials and apparatus
  Senarai bahan dan alat radas
- Calculation involved
  Pengiraan yang terlibat
- Procedure
  Prosedur

[10 *marks*]
[10 *markah*]

10 Table 10 shows the heat of displacement of copper using two different metals L and R.
Jadual 10 *menunjukkan haba penyesaran kuprum menggunakan dua logam yang berlainan,* L *dan* R.

Experiment *Eksperimen*	**Reactants** *Bahan tindak balas*	**Heat of displacement** *Haba penyesaran* **(kJ mol^{-1})**
I	50 cm^3 0.2 mol dm^{-3} copper(II) sulphate solution + metal L 50 cm^3 *larutan kuprum*(II) *sulfat* 0.2 mol dm^{-3} + *logam* L	-336
II	50 cm^3 0.2 mol dm^{-3} copper(II) sulphate solution + metal R 50 cm^3 *larutan kuprum*(II) *sulfat* 0.2 mol dm^{-3} + *logam* R	-217

Table 10
Jadual 10

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

(i) State one example which could be metal L and metal R.
Compare and explain why there is a difference in values of the heat of displacement in Experiment I and II.
Nyatakan satu contoh yang mungkin bagi logam L *dan logam* R.
Banding dan terangkan mengapa terdapat perbezaan nilai haba penyesaran dalam Eksperimen I *dan* II.

[4 *marks*]
[4 *markah*]

(ii) Write the chemical equation for Experiment I and calculate the change in temperature of the mixture.
[Specific heat capacity of solution = 4.2 Jg^{-1} ^{o}C^{-1}, density of solution = 1 g cm^{-3}]
Tulis persamaan kimia bagi Eksperimen I *dan hitung perubahan suhu bagi campuran*.
[*Muatan haba tentu larutan* = 4.2 Jg^{-1} ^{o}C^{-1}, *ketumpatan larutan* = 1 g cm^{-3}]

[6 *marks*]
[6 *markah*]

(*b*) Describe an experiment to determine the heat of precipitation by using a suitable example.
Huraikan satu eksperimen untuk menentukan haba pemendakan dengan menggunakan contoh yang sesuai.
Your description should include the following:
Penerangan anda perlu mengandungi perkara-perkara berikut:

- List of materials and apparatus
  Senarai bahan dan alat radas
- Procedure
  Prosedur

[10 *marks*]
[10 *markah*]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

Periodic Table of Elements

http://cikguadura.wordpress.com/

1												*13*	*14*	*15*	*16*	*17*	*18*
1 **H** Hydrogen 1	*2*																2 **He** Helium 4
3 **Li** Lithium 7	4 **Be** Beryllium 9					**Key:** 10 / **Ne** / Neon / 20 — Proton Number; Symbol; Name of element; Relative Atomic Mass						5 **B** Boron 11	6 **C** Carbon 12	7 **N** Nitrogen 14	8 **O** Oxygen 16	9 **F** Fluorine 19	10 **Ne** Neon 20
11 **Na** Sodium 23	12 **Mg** Magnesium 24	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	13 **Al** Aluminum 27	14 **Si** Silicon 28	15 **P** Phosphorus 31	16 **S** Sulfur 32	17 **Cl** Chlorine 35.5	18 **Ar** Argon 40
19 **K** Potassium 40	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** Tellurium 128	53 **I** Iodine 127	54 **Xe** Xenon 131
55 **Cs** Cesium 133	56 **Ba** Barium 137	57 **La** Lanthanum 139	72 **Hf** Hafnium 179	73 **Ta** Tantalum 181	74 **W** Tungsten 184	75 **Re** Rhenium 186	76 **Os** Osmium 190	77 **Ir** Iridium 192	78 **Pt** Platinum 195	79 **Au** Gold 197	80 **Hg** Mercury 201	81 **Tl** Thallium 204	82 **Pb** Lead 207	83 **Bi** Bismuth 209	84 **Po** Polonium 209	85 **At** Astatine 210	86 **Rn** Radon 222
87 **Fr** Francium 223	88 **Ra** Radium 226	89 **Ac** Actinium 227															

INFORMATION FOR CANDIDATES
MAKLUMAT UNTUK CALON

1. This question paper consists of **three** sections: **Section A, B** and **C.**
*Kertas soalan ini mengandungi tiga bahagian***: *Bahagian* A**, **B** *dan* **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**. *Tuliskan jawapan bagi* ***Bahagian*** **A** *dalam ruang yang disediakan dalam kertas soalan.*

3. Answer one question from **Section B** and **one** question from **Section C**. Write your answers for **Section B** and **C** on the lined pages at the end of the question paper. Answer questions in **Section B** and **C** in detail. You may use equations, diagrams, tables, graphs and other suitable methods to explain your answer.

Jawab ***satu*** *soalan daripada* ***Bahagian*** **B** *dan* ***satu*** *soalan daripada* ***Bahagian C****. Tuliskan jawapan bagi* ***Bahagian*** **B** *dan* **C** *pada halaman bergaris di bahagian akhir kertas soalan ini. Jawab* ***Bahagian*** **B** *dan* **C** *dengan terperinci. Anda boleh menggunakan persamaan, gambar 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 membatalkan sesuatu jawapan, buat garisan di atas jawapan itu.

6. The diagrams in the questions are not drawn to scale unless stated.
Rajah yang mengiringi soalan tidak dilukiskan 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 complete **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 kalkulator saintifik yang tidak boleh diprogramkan.

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

CONFIDENTIAL
4541/3
Chemistry
Paper 3
September
2014
1 ½ hours

Name : ……

Class : ……

Index No: ……..

SIJIL PENDIDIKAN
MAKTAB RENDAH SAINS MARA
2014

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CHEMISTRY

Paper 3

One hour thirty minutes

DO NOT OPEN THIS QUESTION BOOKLET UNTIL BEING TOLD TO DO SO

1. Write your name and class in the spaces provided.
   Tuliskan nama dan kelas anda pada ruang yang disediakan.

2. This question booklet is bilingual.
   Buku soalan ini adalah dalam dwibahasa.

3. Candidates are required to answer all questions.
   Calon dikehendaki menjawab semua soalan.

For Examiner's Use		
Question	Full Marks	Marks
1	18	
2	15	
3	17	
Total	50	

This question booklet contains 9 printed pages.

For Examiner's Use

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

1 A student carried out a neutralization experiment to determine the concentration of sodium hydroxide solution using 0.1 mol dm^{-3} hydrochloric acid.
25.0 cm^3 of sodium hydroxide solution is poured into a conical flask and three drops of phenolphthalein are added.
The solution is then titrated with 0.1 mol dm^{-3} hydrochloric acid.
The initial readings of the burette and the final readings at the end point are shown in Table 1.
Seorang pelajar menjalankan satu eksperimen peneutralan untuk menentukan kepekatan larutan natrium hidroksida menggunakan larutan asid hidroklorik 0.1 mol dm^{-3}.
25.0 cm^3 *larutan natrium hidroksida dituangkan ke dalam sebuah kelalang kon dan ditambahkan tiga titis larutan penunjuk fenolftalein.*
Larutan itu dititratkan dengan larutan asid hidroklorik 0.1 mol dm^{-3}.
Bacaan awal dan bacaan akhir buret pada takat akhir ditunjukkan dalam Jadual 1.

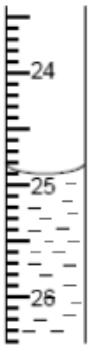
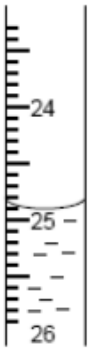
Titration 1 *Pentitratan* I	**Titration II** *Pentitratan* II	**Titration III** *Pentitratan* III
 Initial reading *Bacaan awal* …….. cm^3	 Initial reading *Bacaan awal* …….. cm^3	 Initial reading *Bacaan awal* …….. cm^3
 Final reading *Bacaan akhir* …….. cm^3	 Final reading *Bacaan akhir* …….. cm^3	 Final reading *Bacaan akhir* …….. cm^3

Table 1
Jadual 1

For Examiner's Use

(*a*) Record all the burette readings in the spaces provided in Table 1.
Rekod semua bacaan buret di ruang yang disediakan dalam Jadual 1.

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

1(*a*)
3

(*b*) Construct a table to record the initial burette readings, final burette readings and volume of hydrochloric acid of the titration.
Bina satu jadual untuk merekod bacaan awal buret, bacaan akhir buret dan isi padu asid hidroklorik bagi pentitratan tersebut.

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

1(*b*)
3

(*c*) (i) Calculate the average volume of hydrochloric acid required to neutralise 25.0 cm^3 of sodium hydroxide solution.
Hitungkan isi padu purata larutan asid hidroklorik yang diperlukan untuk meneutralkan 25.0 cm^3 *larutan natrium hidroksida*.

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

1(*c*)(i)
3

(ii) Based on your answer in (*c*)(i), determine the concentration of sodium hydroxide solution.
Berdasarkan jawapan anda dalam (*c*)(i), *tentukan kepekatan larutan natrium hidroksida*.

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

1(*c*)(ii)
3

For Examiner's Use

(*d*) Hydrochloric acid is replaced by sulphuric acid of the same concentration. Predict the volume of sulphuric acid required to neutralise 25.0 cm^3 of sodium hydroxide solution.
Explain your answer.
Asid hidroklorik di gantikan dengan asid sulfurik berkepekatan sama.
Ramalkan isi padu asid sulfurik yang diperlukan untuk meneutralkan 25.0 cm^3 *larutan natrium hidroksida.*
Terangkan jawapan anda.

.....

.....

.....

.....

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

1(*d*)

3

(*e*) Classify the following acids into strong acids and weak acids.
Kelaskan asid-asid berikut kepada asid kuat dan asid lemah.

• Carbonic acid *Asid karbonik*	• Ethanoic acid *Asid etanoik*	• Sulphuric acid *Asid sulfurik*
• Methanoic acid *Asid metanoik*	• Nitric acid *Asid nitrik*	• Hydrochloric acid *Asid hidroklorik*

Strong acid	**Weak acid**

1(*e*)

3

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

Total 1

18

For Examiner's Use

2 Table 2 shows two experiments to investigate the rate of reaction between marble chips and dilute hydrochloric acid. Stop watch reading is taken after 10 cm^3 of gas is collected.
Jadual 2 menunjukkan dua eksperimen untuk mengkaji kadar tindak balas antara marmar dan asid hidroklorik cair. Bacaan jam randik diambil selepas 10 cm^3 gas telah dikumpul.

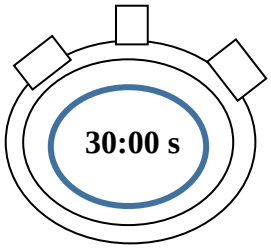
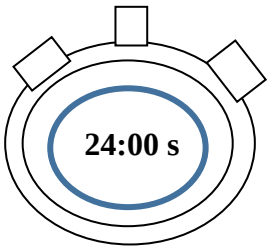
Experiment *Eksperimen*	**Mixture of reactants** *Campuran bahan tindak balas*	**Observation** *Pemerhatian*
I	5 g of large marble chips and 20 cm^3 of 0.2 mol dm^{-3} hydrochloric acid. 5 g *ketulan besar marmar dan* 20 cm^3 *asid hidroklorik* 0.2 mol dm^{-3}	 Stop watch *Jam randik*
II	5 g of marble chips powder and 20 cm^3 of 0.2 mol dm^{-3} hydrochloric acid . 5 g *serbuk marmar dan* 20 cm^3 *asid hidroklorik* 0.2 mol dm^{-3}	 Stop watch *Jam randik*

Table 2
Jadual 2

(*a*) Based on the observation in Table 2, state the inference for both experiments.
Berdasarkan pemerhatian dalam Jadual 2, nyatakan inferens untuk kedua-dua eksperimen ini.

……

……

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

2(*a*)
3

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(*b*) For both experiments, state the:
Bagi kedua-dua eksperimen, nyatakan:

(i) Manipulated variable :
Pembolehubah dimanipulasikan:

……

(ii) Responding variable :
Pembolehubah bergerak balas:

……

(iii) Constant variable :
Pembolehubah dimalarkan:

……

2(*b*) 3

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

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

2(*c*) 3

……

……

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

(*d*) State the operational definition for the rate of reaction in the experiment.
Nyatakan definisi secara operasi bagi kadar tindak balas dalam eksperimen ini.

2(*d*) 3

……

……

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

For Examiner's Use

(*e*) Diagram 2 shows two situations how clothes can be dried.
Rajah 2 *menunjukkan dua situasi bagaimana pakaian boleh dikeringkan.*

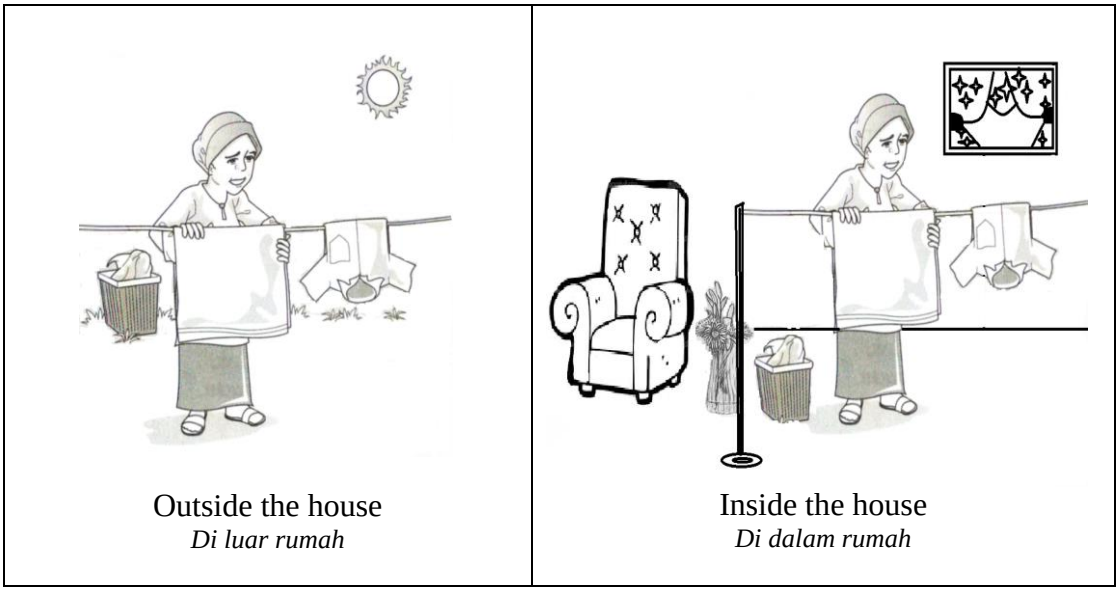

Diagram 2
Rajah 2

Based on Diagram 2, state the relationship between the temperature of the surrounding and rate of drying clothes.
Berdasarkan Rajah 2, *nyatakan hubungan antara suhu persekitaran dan kadar pengeringan baju.*

……...

……... **2**(*e*)

……...

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

Total 2

15

3 Diagram 3 shows a conversation between two students, Siti and Ahmad.
Rajah 3 *menunjukkan perbualan antara dua orang pelajar, Siti dan Ahmad.*

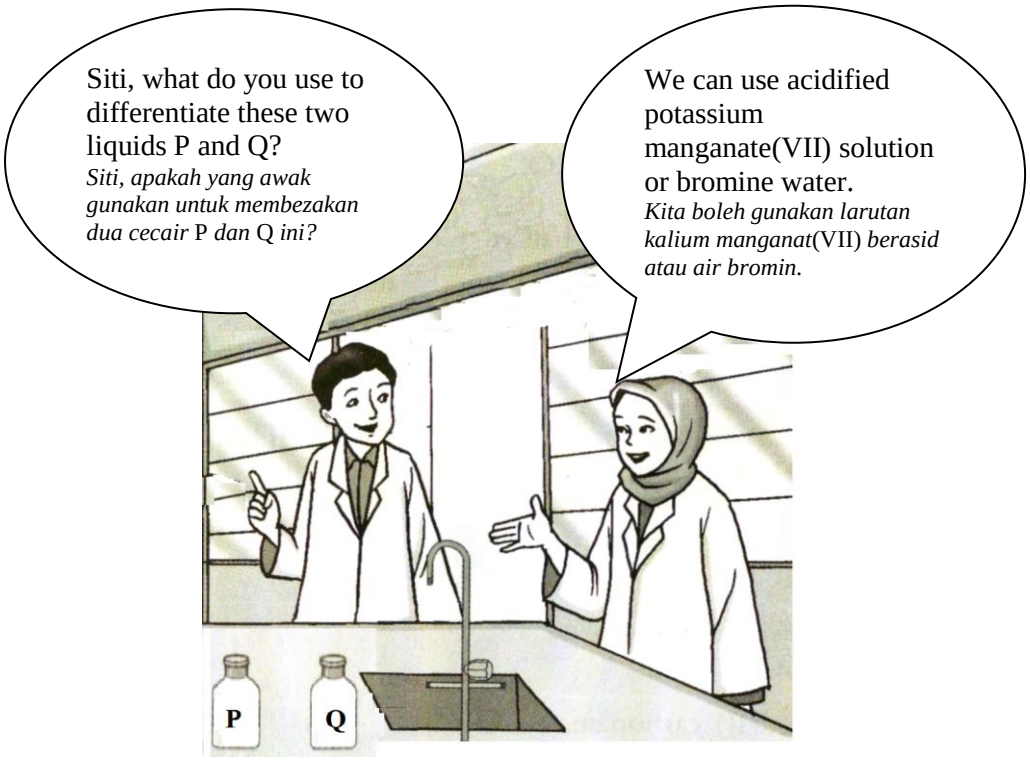

Diagram 3
Rajah 3

Referring to the conversation in Diagram 3, plan a laboratory experiment to differentiate two colourless liquids, hexane and hexene using suitable reagents.
Merujuk kepada perbualan di dalam Rajah 3, *rancangkan satu eksperimen makmal untuk membezakan dua cecair, heksana dan heksena menggunakan reagen yang sesuai.*

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

(*a*) Problem Statement
Penyataan masalah

(*b*) All the variables
Semua pembolehubah

(*c*) Statement of the hypothesis
Penyataan hipotesis

(*d*) Lists of materials and apparatus
Senarai bahan serta 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

INFORMATION FOR CANDIDATES

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 the questions. Write your answers for **Question 1 and Question 2** in the spaces provided in this question paper.
   Jawab semua soalan. Jawapan anda bagi ***Soalan* 1** *dan* ***Soalan* 2** *hendaklah ditulis dalam ruang yang disediakan dalam kertas soalan ini.*

3. Write your answers 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 answer.
   Tulis jawapan anda bagi ***Soalan* 3** *dalam helaian tambahan yang dibekalkan oleh pengawas peperiksaan. Anda boleh menggunakan persamaan, gambar 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 akan 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. 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 diprogramkan.*

9. You are advised to spend 45 minutes to answer **Question 1** and **Question 2** and 45 minutes for **Question 3**.
   Anda dinasihati supaya mengambil masa 45 minit untuk menjawab ***Soalan* 1** *dan* ***Soalan* 2** *dan* 45 *minit untuk menjawab* ***Soalan* 3**.

10. Tie the '*helaian tambahan*' together with this question paper and hand in to the invigilator at the end of the examination.
    Ikat helaian tambahan bersama-sama kertas soalan ini dan serahkan kepada pengawas peperiksaan pada akhir peperiksaan.