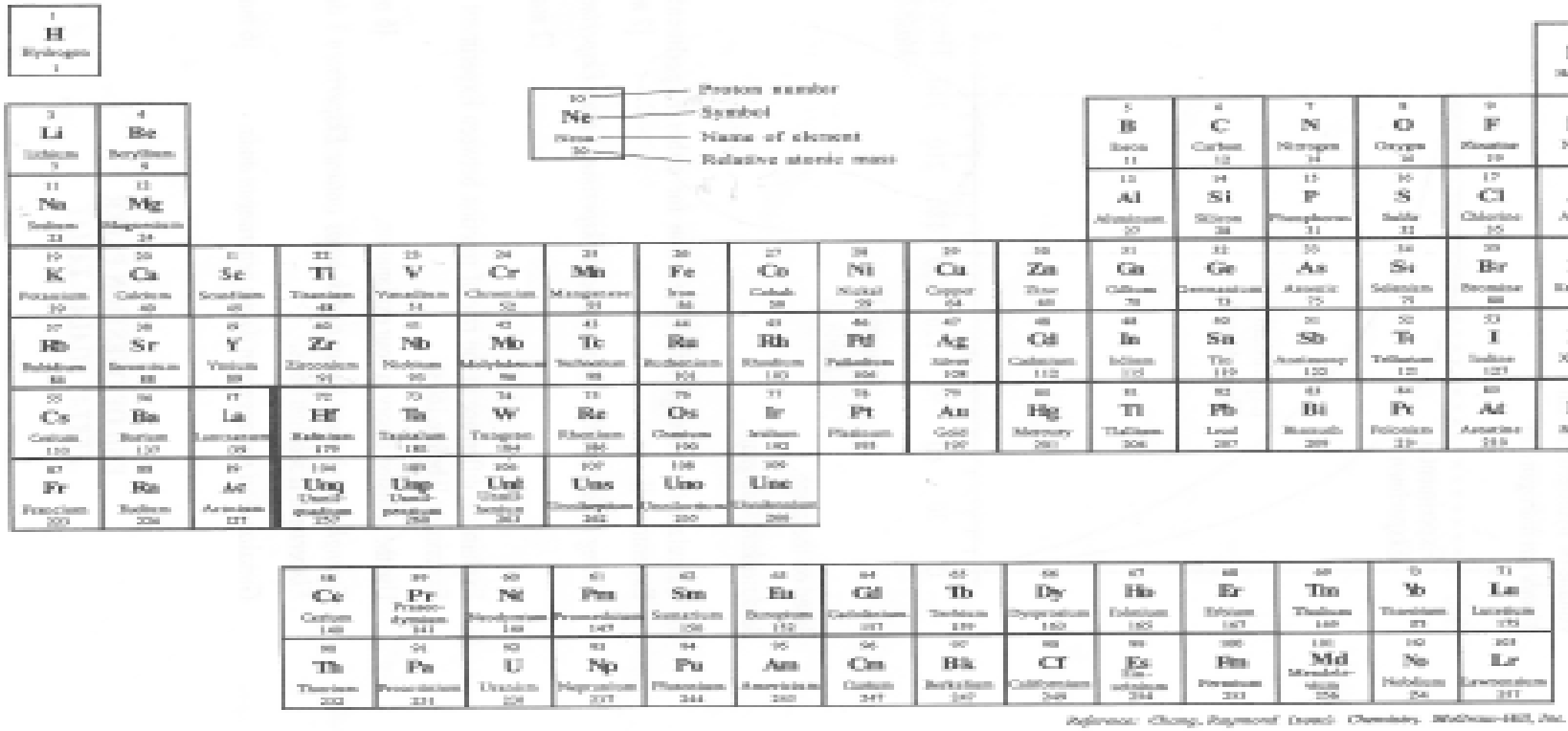
THE PERIODIC TABLE OF ELEMENTS



NAMA:..... Tingkatan :.....

4541/1
Chemistry
Kertas 1
Ogos
1 ¼ jam

PEPERIKSAAN PRASPM
SEKOLAH-SEKOLAH MENENGAH

2013

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. Tiap-tiap soalan diikuti oleh empat pilihan jawapan, iaitu **A, B, C** dan **D.** Bagi setiap soalan, pilih **satu jawapan sahaja.** Hitamkan jawapan anda pada kertas jawapan objektif yang disediakan.

4. Jika anda hendak menukar jawapan, padamkan tanda yang telah dibuat, kemudian hitamkan jawapan yang baru.

5. Rajah yang mengiringi soalan tidak dilukiskan mengikut skala kecuali dinyatakan

6. Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogramkan.

Kertas soalan ini mengandungi **24** halaman bercetak

This paper consists of **50** questions. Answer **all** questions. Every question is followed by four alternative answers **A**, **B**, **C** and **D**. For each question, choose **one** answer only. **Blacken** your answer on the objective answer sheet provided. If you wish to change your answer, erase the blackened mark that you have made. Then **blacken** the new answer.
*Kertas soalan ini mengandungi **50** soalan. Jawab **semua** soalan. Tiap-tiap soalan diikuti oleh empat pilihan jawapan iaitu **A**, **B**, **C**, dan **D**. Bagi setiap soalan, pilih **satu** jawapan sahaja. **Hitamkan** jawapan kamu pada kertas jawapan objektif yang disediakan. Jika kamu hendak menukar jawapan, padamkan tanda yang telah dibuat. Kemudian **hitamkan** jawapan yang baru.*

1 Diagram 1 shows the electron arrangement of atom *T*.
Rajah 1 menunjukkan susunan elektron atom T.

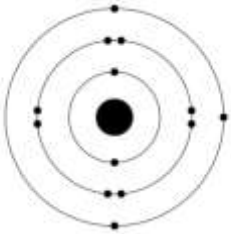
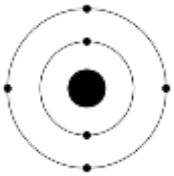


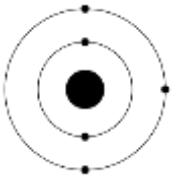
Diagram 1
Rajah 1

Which of the following electron arrangement has the same number of valence electron as the atom *T*?
Antara susunan elektron berikut, yang manakah mempunyai bilangan elektron valens yang sama dengan atom T?

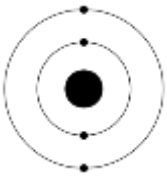
A



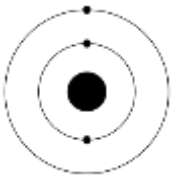
C



B



D



2 Which of the following shows the correct type of particle for each substance?
Antara yang berikut, yang manakah menunjukkan jenis zarah yang betul bagi setiap bahan?

	Atom ***Atom***	**Molecule** ***Molekul***	**Ion** ***Ion***
A	Sodium chloride *Natrium klorida*	Water *Air*	Carbon *Karbon*
B	Water *Air*	Sodium chloride *Natrium klorida*	Carbon *Karbon*
C	Sodium chloride *Natrium klorida*	Carbon *Karbon*	Water *Air*
D	Carbon *Karbon*	Water *Air*	Sodium chloride *Natrium klorida*

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

• Plotted the graph of the atomic volume against the atomic mass of the elements *Memplot graf isi padu atom melawan jisim atom bagi unsur-unsur* • Suggested that there is a periodic relationship of elements based on their relative atomic masses *Mencadangkan bahawa terdapat satu perhubungan berkala bagi unsur-unsur berdasarkan jisim atom unsur*

Who was the scientist?
Siapakah ahli sains itu?

A Johann W.Dobereiner
B John Newlands
C Henry Moseley
D Lothar Meyer

4 Which of the following contains 6.02×10^{23} molecules?
Antara berikut, yang manakah mengandungi 6.02×10^{23} molekul?

A 1 mole of zinc sulphate
1 mol zink sulfat
B 1 mole of oxygen gas
1 mol gas oksigen
C 1 mole of helium gas
1 mol gas helium
D 1 mole of copper
1 mol kuprum

5 Which of the following statements is **true** for one mole of a substance?
*Antara pernyataan berikut, yang manakah **benar** bagi satu mol bahan?*

A 1 mole of zinc contains 6.02×10^{23} atoms
1 mol zink mengandungi 6.02×10^{23} atom
B 1 mole of argon gas contains two times more atoms than in 1 mole of zinc
1 mol gas argon mengandungi dua kali lebih banyak atom daripada 1 mol zink
C 1 mole of water contains the same number of atoms as in 1 mole of copper
1 mol air mengandungi bilangan atom yang sama dengan 1 mol kuprum
D 1 mole of ammonia contains the same number of atoms as in 12 g of carbon-12
1 mol ammonia mengandungi bilangan atom yang sama dengan bilangan atom dalam 12 g karbon-12

6 Diagram 2 shows an incomplete Periodic Table.
Rajah 2 menunjukkan satu Jadual Berkala yang tidak lengkap.

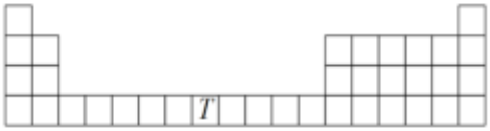


Diagram 2
Rajah 2

What is the special characteristic for element T?
Apakah ciri khas unsur T?

A Forms ions which have different oxidation numbers
Membentuk ion-ion yang mempunyai nombor pengoksidaan yang berbeza

B Reacts with both acids and bases
Bertindak balas dengan kedua-dua asid dan bes

C Reacts vigorously with water
Bertindak balas dengan air

D It is a semi-metal
Merupakan separuh logam

7 Which statement is true about the reaction of a sodium atom with sulphur to form sodium sulphide?
[Proton number: Na = 11, S = 16]
Pernyataan manakah yang benar tentang tindak balas atom natrium dengan sulfur untuk membentuk natrium sulfida?
[Nombor proton: Na = 11, S = 16]

A Two sodium atoms donate one electron to two sulphur atoms
Dua atom natrium menderma satu elektron kepada dua atom sulfur

B Two sodium atoms donate one electron each to one sulphur atom
Dua atom natrium menderma satu elektron kepada satu atom sulfur

C Two sodium atoms share one electron to two sulphur atoms
Dua atom natrium berkongsi satu elektron kepada dua atom sulfur

D Two sodium atoms share one electron to one sulphur atom
Dua atom natrium berkongsi satu elektron kepada satu atom sulfur

8 Which of the following substances is an electrolyte?
Antara bahan berikut, yang manakah ialah elektrolit?

A Molten lead(II) chloride
Plumbum(II) klorida lebur

B Tetrachloromethane
Tetraklorometana

C Alcohol
Alkohol

D Sulphur
Sulfur

9 Which of the following statements correctly describe a strong alkali?
Antara pernyataan berikut, yang manakah menerangkan tentang alkali kuat dengan betul?

I Exist as neutral covalent molecules in water
Wujud sebagai molekul dalam air
II Has a low concentration of hydroxide ions
Mempunyai kepekatan ion hidroksida yang rendah
III Ionises completely in water
Mengion dengan lengkap dalam air
IV Has a high pH value
Mempunyai nilai pH yang tinggi

A I and II
I *dan* II
B I and III
I *dan* III
C II and IV
II *dan* IV
D III and IV
III *dan* IV

10 Which of the following is **not** a chemical property of acids?
*Antara berikut, yang manakah **bukan** sifat kimia bagi asid?*

A Reacts with a metal carbonate to produce salt, water and carbon dioxide
Bertindak balas dengan karbonat logam untuk menghasilkan garam, air, dan karbon dioksida
B Reacts with a base to produce salt and hydrogen
Bertindak balas dengan bes untuk menghasilkan garam dan hidrogen
C Reacts with a reactive metal to produce salt and hydrogen
Bertindak balas dengan logam reaktif untuk menghasilkan garam dan hidrogen
D Turn blue litmus paper red
Menukarkan kertas litmus biru kepada merah

11 Diagram 3 shows a polymerisation process.
Rajah 3 menunjukkan suatu proses pempolimeran.

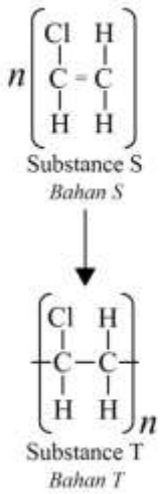


Diagram 3
Rajah 3

Which of the following properties is identical for substances S and T?
Antara sifat berikut, yang manakah sama bagi bahan S dan T?

A Density
Ketumpatan
B Boiling point
Takat didih
C Percentage composition
Peratusan komposisi
D Relative molecular mass
Jisim molekul relatif

12 The following equation represents the reaction between zinc and hydrochloric acid.
Persamaan berikut mewakili tindak balas antara zink dan asid hidroklorik.

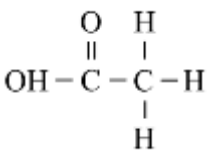
$$Zn(s) + 2HCl(aq) \rightarrow ZnCl_2(aq) + H_2(g)$$
$$Zn(p) + 2HCl(ak) \rightarrow ZnCl_2(ak) + H_2(g)$$

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

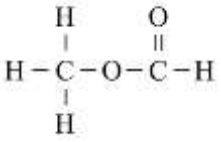
A Determine the change in the concentration of zinc chloride with time
Tentukan perubahan kepekatan zink klorida dengan masa
B Determine the volume of hydrogen gas given off with time
Tentukan isi padu gas hidrogen yang terbebas dengan masa
C Determine the change in the concentration of hydrochloric acid with time
Tentukan perubahan kepekatan asid hidroklorik dengan masa
D Determine the change in temperature of the solution with time
Tentukan perubahan suhu larutan dengan masa

13 Which of the following represents a structural formula of an alcohol?
Antara yang berikut, yang manakah mewakili formula struktur bagi satu alkohol?

A



C



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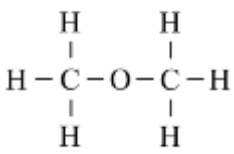
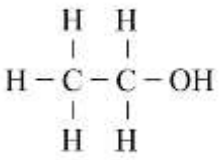
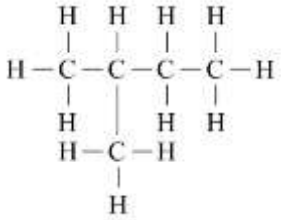


D

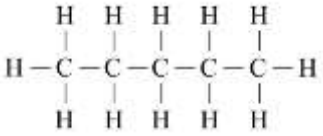


14 Which structural formulae are isomers of pentane?
Formula struktur manakah adalah isomer bagi pentana?

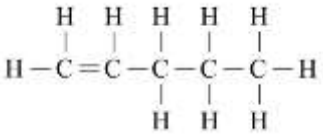
I



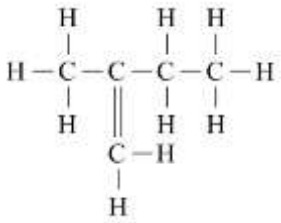
II



III



IV



A I and II
I dan II

B I and IV
I dan IV

C II and III
II dan III

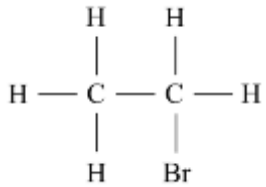
D I, III and IV
I, III dan IV

15 The following equation represents the reaction between ethene and bromine.
Persamaan berikut mewakili tindak balas antara etena dan bromin.

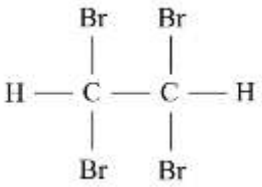
$$\text{Ethene} + Br_2 \rightarrow X$$
$$\textit{Etena} + Br_2 \rightarrow X$$

Which of the following is the structural formula of X?
Antara yang berikut, yang manakah formula struktur bagi X?

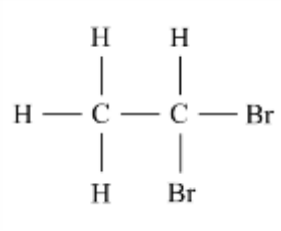
A



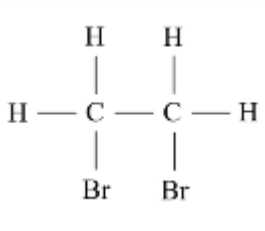
C



B



D



16 Diagram 7 shows a type of chemical cell.
Rajah 7 menunjukkan satu jenis sel kimia.

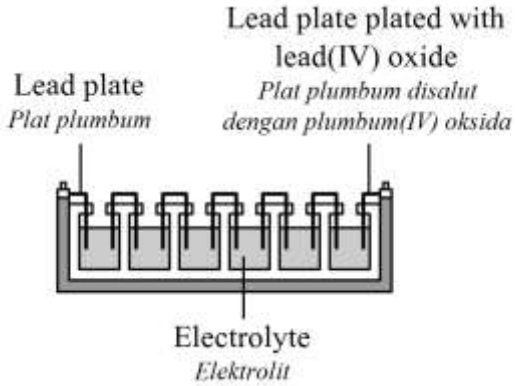


Diagram 7
Rajah 7

Which of the following statements is correct?
Antara pernyataan berikut, yang manakah betul?

A The chemical cell is not rechargeable
Sel kimia tersebut tidak boleh dicas semula
B The lead plate that is plated with lead(IV) oxide is the positive terminal of the cell
Plat plumbum yang disalut dengan plumbum(IV) oksida ialah terminal positif sel
C Oxidation reaction occurs at the positve terminal
TIndak balas pengoksidaan berlaku di terminal positif
D The electrolit used is nitric acid
Elektrolit yang digunakan ialah asid nitrik

17 The oxidation number of oxygen in oxygen gas, O_2 is
Nombor pengoksidaan oksigen dalam gas oksigen, O_2 ialah

A - 2 **B** - 1
C 0 **D** + 1

18 Which metals can displace zinc from zinc nitrate solution?
Logam manakah yang boleh menyesarkan zink daripada larutan zink nitrat?

I Magnesium
Magnesium
II Aluminium
Aluminium
III Silver
Argentum
IV Iron
Ferum

A I and II
I *dan* II
B I and III
I *dan* III
C II and IV
II *dan* IV
D III and IV
III *dan* IV

19 Diagram 8 shows energy profile of a reaction.
Rajah 8 menunjukkan profil tenaga bagi suatu tindak balas.

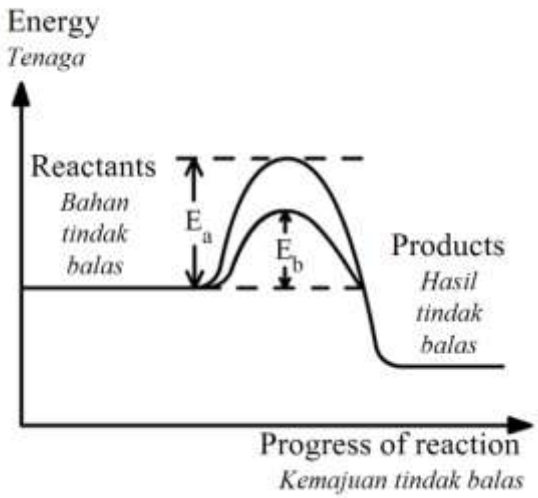


Diagram 8
Rajah 8

What change the activation energy from E_a to E_b?
Apakah yang mengubah tenaga pengaktifan daripada E_a kepada E_b?

A Temperature
Suhu
B Catalyst
Mangkin
C Total surface area
Jumlah luas permukaan
D Concentration
Kepekatan

20 Which of the following is **not** a function of food additives?
*Antara yang berikut, yang manakah **bukan** suatu fungsi bahan tambah makanan?*

A Preserving food
Mengawet makanan
B Improving the taste of food
Memperbaiki rasa makanan
C Ensuring nutritional balance of food
Memastikan keseimbangan nutrien makanan
D Making food look more attractive
Menjadikan makanan kelihatan lebih menarik

21 Diagram 9 shows the electron arrangement of X^- ion.
Rajah 9 menunjukkan susunan elektron bagi ion X^-.

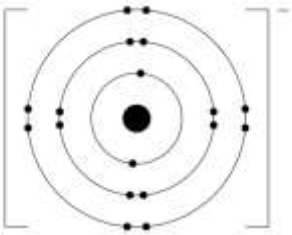


Diagram 9
Rajah 9

If an atom of element X contains 17 neutrons, what is the nucleon number of element X?
Jika atom bagi unsur X mengandungi 17 neutron, apakah nombor nukleon bagi unsur X?

A 32
B 33
C 34
D 35

22 Diagram 10 shows the inter-conversion of the states of matter.
Rajah 10 menunjukkan perubahan keadaan jirim.

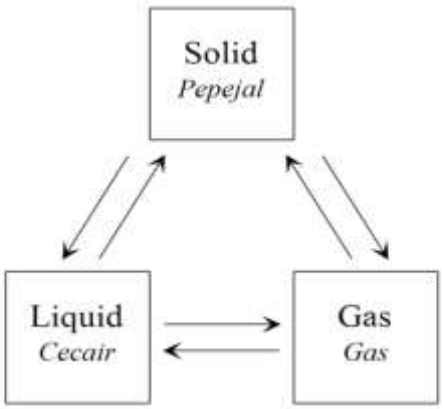


Diagram 10
Rajah 10

Which inter-conversion involves the release of energy?
Perubahan keadaan manakah yang melibatkan pembebasan tenaga?

A Gas → Solid
Gas → Pepejal

C Liquid → Gas
Cecair → Gas

B Solid → Gas
Pepejal → Gas

D Solid → Liquid
Pepejal → Cecair

23 The following equation represents the burning of ethene gas in excessive oxygen.
Persamaan berikut mewakili pembakaran gas etana dalam oksigen yang berlebihan.

$$C_2H_4 + 3O_2 \rightarrow 2CO_2 + 2H_2O$$

Which of the following statements is correct?
Antara pernyataan berikut, yang manakah betul?

A 1 mol of ethene reacts with 6 mol of oxygen molecules producing 2 mol of carbon dioxide and 2 mol of water
1 mol etena bertindak balas dengan 6 mol molekul oksigen menghasilkan 2 mol karbon dioksida dan 2 mol air

B 1 mol of ethane reacts with 3 mol of oxygen molecules producing 2 mol of carbon dioxide and 2 mol of water
1 mol etana bertindak balas dengan 3 mol molekul oksigen menghasilkan 2 mol karbon dioksida dan 2 mol air

C 1 mol of ethene reacts with 3 mol of oxygen molecules producing 2 mol of carbon dioxide and 2 mol of water
1 mol etena bertindak balas dengan 3 mol molekul oksigen menghasilkan 2 mol karbon dioksida dan 2 mol air

D 1 mol of ethane reacts with 3 mol of oxygen atoms producing 2 mol of carbon dioxide and 2 mol of water
1 mol etana bertindak balas dengan 3 mol atom oksigen menghasilkan 2 mol karbon dioksida dan 2 mol air

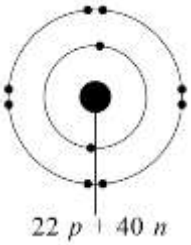
24 Table 1 shows the number of neutrons and nucleon number of an atom.
Jadual 1 menunjukkan bilangan neutron dan nombor nukleon bagi suatu atom.

Number of neutrons ***Bilangan neutron***	**Nucleon number** ***Nombor nukleon***
22	40

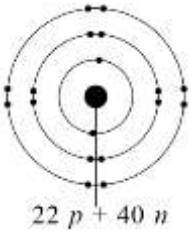
Table 1
Jadual 1

Which of the following diagram shows the atom?
Anatara rajah berikut, yang manakah menunjukkan atom itu?

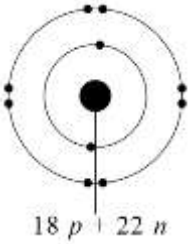
A



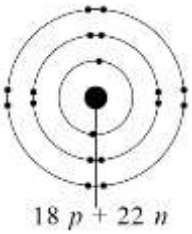
C



B



D



25 Table 2 shows the proton numbers of atoms of elements X, Y and Z.
Jadual 2 menunjukkan nombor proton bagi atom unsur X, Y, dan Z.

Element ***Unsur***	**Proton number** ***Nombor proton***
X	14
Y	15
Z	16

Table 2
Jadual 2

Which of the following is correct about the three elements according to the sequence of X, Y and Z?
Antara berikut, yang manakah betul tentang tiga unsur itu mengikut urutan X, Y, dan Z?

A Atomic radius increases
Jejari atom bertambah
B Electronegativity increases
Keelektronegatifan bertambah
C Metallic properties increases
Sifat kelogaman bertambah
D Number of valence electron decreases
Bilangan elektron valens berkurang

26 The electron arrangement of atom X is 2.8.3 and the electron arrangement of atom Y is 2.6. Element X and Y can react to form a compound.
Which statement is true about the formation of the compound?
Susunan elektron atom X ialah 2.8.3 dan susunan elektron atom Y ialah 2.6. Unsur X dan Y dapat bertindak balas untuk membentuk satu sebatian. Pernyataan manakah yang benar tentang pembentukan sebatian itu?

A The compound formed has a formula of XY_3
Sebatian yang terbentuk mempunyai formula XY_3
B An covalent compound is formed
Satu sebatian kovalen terbentuk
C Atom X releases 3 electrons
Atom X melepaskan 3 elektron
D Atom Y releases 6 electrons
Atom Y melepaskan 6 elektron

27 Table 3 shows information about three voltaic cells. Metals P, Q and R are used as electrodes in the cells.
Jadual 3 menunjukkan maklumat tentang tiga sel voltan. Logam-logam P, Q, dan R digunakan sebagai elektrod dalam sel itu.

Voltaic cell ***Sel voltan***	**Negative terminal** ***Terminal negatif***	**Positive terminal** ***Terminal positif***	**Voltage (V)** ***Voltan (V)***
I	P	Q	5.4
II	P	R	0.9
III	R	Q	4.3

Table 3
Jadual 3

What is the order of the metals from the most electropositive to the least electropositive?
Apakah susunan logam daripada yang paling elektropositif kepada yang paling kurang elektropositif?

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

28 Table 4 shows the results for displacement reactions to determine the Electrochemical Series.
Jadual 4 menunjukkan keputusan tindak balas penyesaran bagi menentukan Siri Elektrokimia.

	Solution ***Larutan***			
	$Cu(NO_3)_2$	$Pb(NO_3)_2$	$ZnSO_4$	$MgSO_4$
Metal W *Logam W*	✓	✓	✓	
Metal X *Logam X*		✗	✗	✗
Metal Y *Logam Y*	✓	✓		✗
Metal Z *Logam Z*	✓		✗	✗

Legend:
Petunjuk:
✓ – Displacement reaction occurs
Tindak balas penyesaran berlaku
✗ – Displacement reaction does not occurs
Tindak balas penyesaran tidak berlaku

Table 4
Jadual 4

Which of the following is the correct position of the metals, in decreasing order, of the tendency of the metals to form ions?
Antara berikut, yang manakah kedudukan betul dalam tertib menurun , bagi logam-logam itu dalam kecenderungannya membentuk ion?

A Y, W, X, Z
B X, Y, W, Z
C W, Y, Z, X
D W, Y, X, Z

29 Table 5 shows the degree of dissociation of four solutions of alkalis which have the same concentration.
Jadual 5 menunjukkan darjah penceraian bagi empat larutan alkali yang mempunyai sama kepekatan.

Solution ***Larutan***	**Degree of dissociation** ***Darjah penceraian***
W	Medium *Sederhana*
X	High *Tinggi*
Y	Very high *Sangat tinggi*
Z	Low *Rendah*

Table 5
Jadual 5

Which solution has the lowest pH value?
Larutan manakah yang mempunyai nilai pH yang paling rendah?

A W **C** Y
B X **D** Z

30 Which composite material is made from a mixture of molten silica and silver chloride?
Bahan komposit manakah yang dibuat daripada campuran leburan silika dan argentum klorida?

A Fibre glass
Gentian kaca
B Fibre optics
Gentian optik
C Superconductor
Superkonduktor
D Photochromic glass
Kaca fotokromik

31 Which of the following are the components of brass?
Antara berikut, yang manakah merupakan komponen bagi loyang?

A Copper and tin
Kuprum dan stanum
B Copper and zinc
Kuprum dan zink
C Tin, copper and antimony
Stanum, kuprum, dan antimoni
D Aluminium, copper, magnesium and manganese
Aluminium, kuprum, magnesium, dan mangan

32 Which of the following is true about the heat of combustion, ΔH, for butanol, ethanol and propanol?
Antara yang berikut, yang manakah benar tentang haba pembakaran, ΔH, bagi butanol, etanol dan propanol?

	Butanol ***Butanol***	**Ethanol** ***Etanol***	**Propanol** ***Propanol***
A	-2 015 kJ mol^{-1}	-2 676 kJ mol^{-1}	-1 376 kJ mol^{-1}
B	-2 015 kJ mol^{-1}	-1 376 kJ mol^{-1}	-2 676 kJ mol^{-1}
C	-1 376 kJ mol^{-1}	-2 015 kJ mol^{-1}	-2 676 kJ mol^{-1}
D	-2 676 kJ mol^{-1}	-1 376 kJ mol^{-1}	-2 015 kJ mol^{-1}

33 Diagram 11 shows the apparatus set-up for an experiment to determine the rate of reaction.
Rajah 11 menunjukkan susunan radas bagi satu eksperimen untuk menentukan kadar tindak balas.

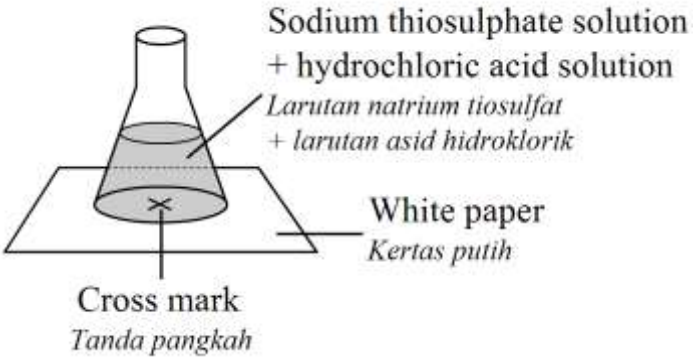


Diagram 11
Rajah 11

Which of the following techniques is the most suitable to determine the rate of reaction?
Antara teknik berikut, yang manakah paling sesuai untuk menentukan kadar tindak balas tersebut?

A Record the time taken to obtain the maximum temperature
Catatkan masa diambil untuk mendapatkan suhu maksimum

B Record the time taken for the change of the pH value
Catatkan masa diambil untuk perubahan nilai pH

C Record the time when the cross mark cannot be seen
Catatkan masa apabila tanda pangkah tidak kelihatan

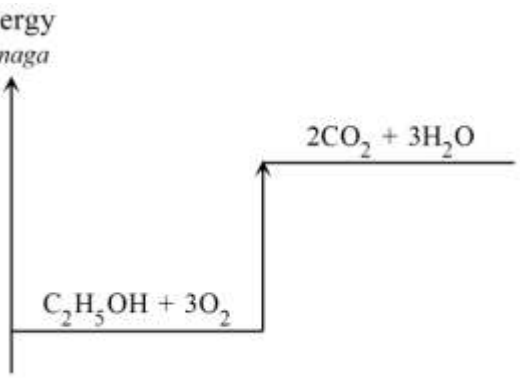
D Record the time when the precipitate is formed
Catatkan masa apabila mendakan terbentuk

34 *The following equation shows a combustion reaction of ethanol.*
Persamaan berikut menunjukkan tindak balas pembakaran etanol.

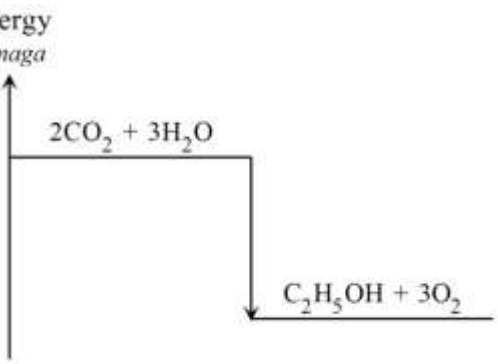
$C_2H_5OH(l) + 3O_2(g) \rightarrow 2CO_2(g) + 3H_2O(l) \quad \Delta H = -1288\ kJ\ mol^{-1}$
$C_2H_5OH(ce) + 3O_2(g) \rightarrow 2CO_2(g) + 3H_2O(ce) \quad \Delta H = -1288\ kJ\ mol^{-1}$

Which of the following diagrams represents the reaction?
Antara rajah berikut, yang manakah mewakili tindak balas tersebut?

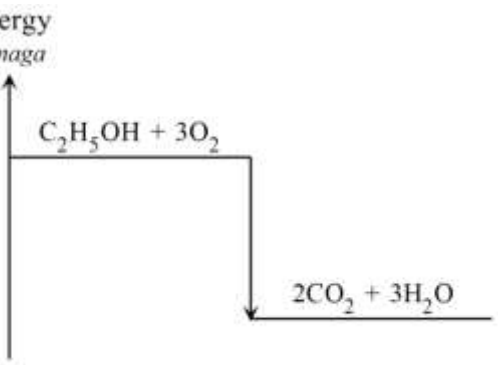
A



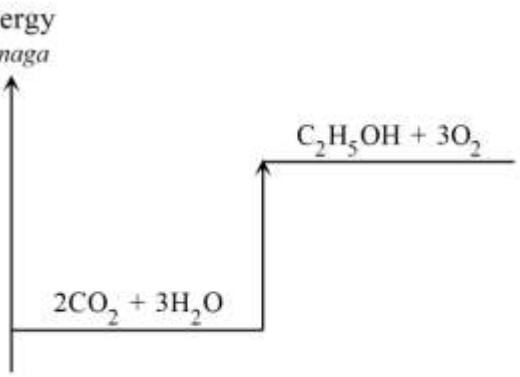
B



C



D



35 The following equation shows the reaction between lead(II) nitrate and sodium sulphate.
Persamaan berikut menunjukkan tindak balas antara plumbum(II) nitrat dan natrium sulfat.

$Pb(NO_3)_2(aq) + Na_2SO_4(aq) \rightarrow PbSO_4(s) + 2NaNO_3(aq) \quad \Delta H = -50.4 \text{ kJ mol}^{-1}$
$Pb(NO_3)_2(ak) + Na_2SO_4(ak) \rightarrow PbSO_4(p) + 2NaNO_3(ak) \quad \Delta H = -50.4$ kJ mol^{-1}

Which of the following shows that the reaction is an exothermic reaction?
Antara yang berikut, yang manakah menunjukkan bahawa tindak balas tersebut adalah tindak balas eksotermik?

A The reaction needs 50.4 kJ of heat energy to form 1 mol of lead(II) sulphate
Tindak balas tersebut memerlukan 50.4 kJ tenaga haba untuk membentuk 1 mol plumbum(II) sulfat

B Lead(II) sulphate precipitate is formed in the reaction
Mendakan plumbum(II) sulfat terbentuk dalam tindak balas tersebut

C The total energy absorbed to break the bonds is more than total energy released during the precipitation of lead(II) sulphate
Jumlah tenaga diserap untuk memecahkan ikatan adalah lebih banyak daripada jumlah tenaga dibebaskan semasa pemendakan plumbum(II) sulfat

D The energy contained in lead(II) nitrate and sodium sulphate is higher than the energy contained in lead(II) sulphate and sodium nitrate
Kandungan tenaga dalam plumbum(II) nitrat dan natrium sulfat adalah lebih tinggi daripada kandungan tenaga dalam plumbum(II) sulfat dan natrium nitrat

36 Which of the following gases contains 0.35 mol of atoms at room temperature and pressure?
[1 mole of a gas occupies the volume of 24 dm^3 at room temperature and pressure]
Antara gas berikut, yang manakah mengandungi 0.35 mol atom pada suhu dan tekanan bilik?
[1 mol gas menempati isi padu sebanyak 24 dm^3 pada suhu dan tekanan bilik]

A 8.4 dm^3 Ar **C** 8.4 dm^3 Cl_2
B 8.4 dm^3 CH_4 **D** 8.4 dm^3 CO_2

37 Diagram 13 shows a chemical cell.
Rajah 13 menunjukkan satu sel kimia.

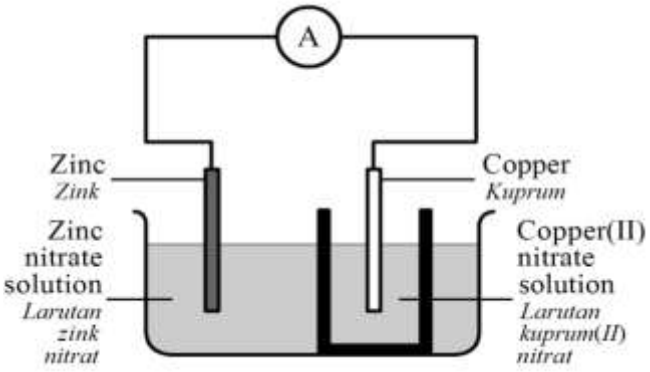


Diagram 13
Rajah 13

The chemical reaction that takes place at the negative terminal of the chemical cell is
Tindak balas kimia yang berlaku di terminal negatif sel kimia tersebut ialah

A $Zn(s) \rightarrow Zn^{2+}(aq) + 2e^-$
Zn(p) → Zn²⁺(ak) + 2e⁻
B $Cu^{2+}(aq) + 2e^- \rightarrow Cu(s)$
Cu²⁺(ak) + 2e⁻ → Cu(p)
C $Zn^{2+}(aq) + Cu(s) \rightarrow Zn(s) + Cu^{2+}(aq)$
Zn²⁺(ak) + Cu(p) → Zn(p) + Cu²⁺(ak)
D $Zn(s) + Cu^{2+}(aq) \rightarrow Zn^{2+}(aq) + Cu(s)$
Zn(p) + Cu²⁺(ak) → Zn²⁺(ak) + Cu(p)

38 Which of the following is a use of neutralisation in daily lives?
Antara berikut, yang manakah kegunaan peneutralan dalam kehidupan harian?

A Vineger cures wasp stings
Cuka merawat sengatan tebuan
B Conditioner cures ant bites
Perapi rambut merawat gigitan semut
C Ammonia neutralise soil acidity
Ammonia meneutralkan keasidan tanah
D Hydrochloric acid treats gastric pain
Asid hidroklorik merawat penyakit gastrik

39 20 cm^3 of 1.0 mol dm^{-3} lead(II) hydroxide solution, $Pb(OH)_2$, is titrated with sulphuric acid, H_2SO_4.
What volume of 0.5 mol dm^{-3} sulphuric acid is needed to neutralise this lead(II) hydroxide solution?
20 cm^3 larutan plumbum(II) hidroksida, $Pb(OH)_2$, 1.0 mol dm^{-3} dititratkan dengan asid sulfurik, H_2SO_4.
Berapakah isi padu asid sulfurik 0.5 mol dm^{-3} yang diperlukan untuk meneutralkan larutan plumbum(II) hidroksida ini?

A 40 cm^3 **C** 20 cm^3
B 39 cm^3 **D** 17 cm^3

40 Element T is in the same group as potassium in the Periodic Table. It reacts with oxygen gas to form a compound with the formula T_2O.
What is the formula of the carbonate of element T?
[Proton number: K = 19, C = 6, O = 8]
Unsur T berada dalam kumpulan yang sama dengan kalium dalam Jadual Berkala. Ia boleh bertindak balas dengan gas oksigen untuk membentuk satu sebatian yang mempunyai formula T_2O.
Apakah formula bagi karbonat bagi unsur T?
[Nombor proton: K = 19, C = 6, O = 8]

A T_2CO_3 **C** $T(CO_3)_2$
B T_3CO_3 **D** $T_2(CO_3)_2$

41 Which substances is suitable to be used to make car windscreens?
Bahan manakah yang sesuai digunakan untuk membuat cermin kereta?

A Polyvinyl chloride
Polivinil klorida
B Polythene
Politena
C Perspex
Perspeks
D Nylon
Nilon

42 Which of the following is the correct match of a low rate of reaction and a high rate of reaction?
Antara yang berikut, yang manakah pasangan betul tindak balas yang mempunyai kadar tindak balas rendah dan kadar tindak balas tinggi?

	Low rate of reaction ***Kadar tindak balas rendah***	**High rate of reaction** ***Kadar tindak balas tinggi***
A	Neutalisation between hydrochloric acid and sodium hydroxide *Peneutralan antara asid hidroklorik dan natrium hidroksida*	Rusting of iron *Pengaratan besi*
B	Fermentation of glucose solution *Penapaian larutan glukosa*	Double decomposition between lead(II) nitrate and potassium iodide *Penguraian ganda dua antara plumbum(II) nitrat dan kalium iodida*
C	Double decomposition between lead(II) nitrate and potassium iodide *Penguraian ganda dua antara plumbum(II) nitrat dan kalium iodida*	Neutalisation between hydrochloric acid and sodium hydroxide *Peneutralan antara asid hidroklorik dan natrium hidroksida*
D	Rusting of iron *Pengaratan besi*	Fermentation of glucose solution *Penapaian larutan glukosa*

43 Which of the following statements are true about vulcanised rubber?
Antara pernyataan berikut, yang manakah benar mengenai getah tervulkan?

I Easily oxidized
Mudah dioksidakan
II More elastic than natural rubber
Lebih kenyal daripada getah asli
III Stronger than natural rubber
Lebih kuat daripada getah asli
IV More heat resistant
Lebih tahan haba

A III only
III sahaja

B II and IV
II dan IV

C III and IV
III dan IV

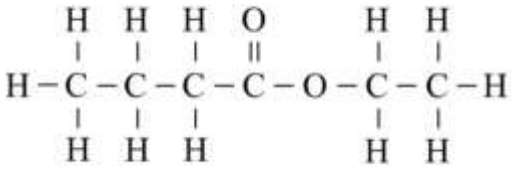
D II, III and IV
II, III dan IV

44 The following equation shows a chemical reaction.
Persamaan berikut menunjukkan satu tindak balas kimia.

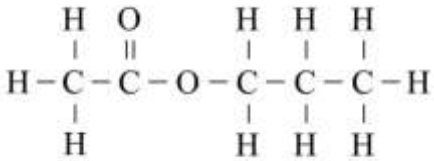
Propanoic acid + Ethanol → Compound X + Water
Asid propanoik + Etanol → Sebatian X + Air

What is the structural formula of compound X?
Apakah formula struktur bagi sebatian X?

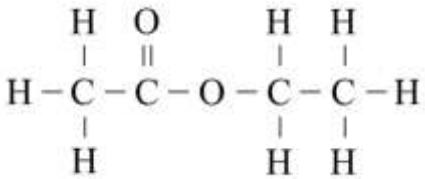
A



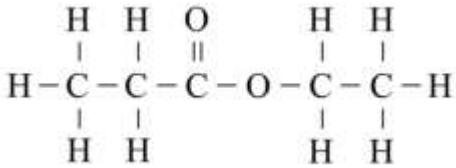
B



C



D



45 Diagram 15 shows a molecular formula.
Rajah 15 menunjukkan satu formula molekul.

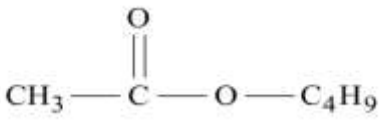


Diagram 15
Rajah 15

What is the name of the organic compound represented by the molecular formula?
Apakah nama sebatian organik yang diwakili oleh formula molekul tersebut?

A ethyl propanoate
etil propanoat

B propyl butanoate
propil butanoat

C butyl ethanoate
butil etanoat

D methyl methanoate
metil metanoat

46 Hui Ming wants to make her ring more beautiful and durable.
What is the best way to do it?
Hui Ming ingin menjadikan cincinnya lebih cantik dan tahan lama.
Apakah langkah yang paling baik dilakukan?

A Brush the ring with sandpaper
Memberuskan cincin dengan kertas pasir

B Wash the ring with detergent
Mencucikan cincin dengan detergen

C Plate the ring with silver
Menyadurkan cincin dengan argentum

D Immerse the ring in acid
Merendamkan cincin dalam asid

47 Diagram 16 shows a simple chemical cell built using an orange. Two different metals are used as electrodes.
Rajah 16 menunjukkan sel kimia ringkas yang dibina dengan menggunakan buah oren. Dua logam berlainan digunakan sebagai elektrod.

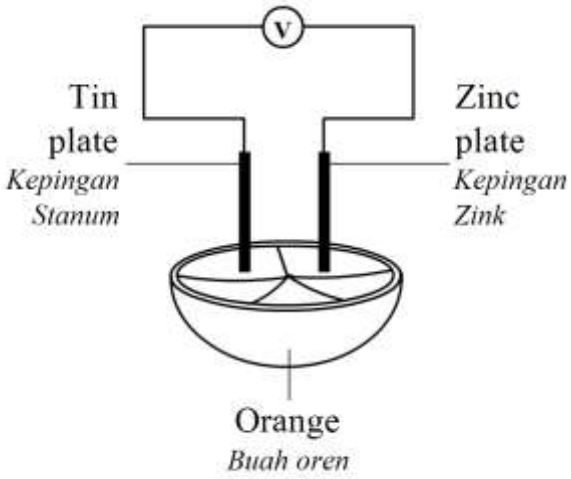


Diagram 16
Rajah 16

Which of the following metal can be used to replace the tin plate to obtain the highest voltage reading?, *yang manakah boleh digunakan untuk menggantikan kepingan stanum itu untuk mendapat bacaan voltan Antara logam berikut yang paling tinggi?*

A Iron
Ferum

C Lead
Plumbum

B Silver
Argentum

D Copper
Kuprum

48 Diagram 17 shows the mercury level of thermometer in a reaction.
Rajah 17 menunjukkan aras merkuri bagi suatu termometer dalam suatu tindak balas.

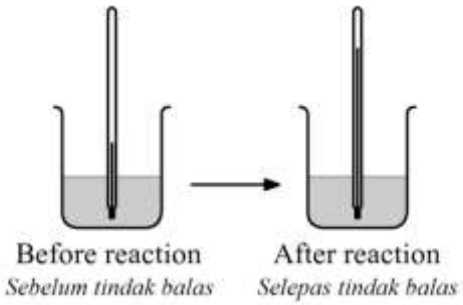


Diagram 17
Rajah 17

Which of the following is true about the reaction?
Antara yang berikut, yang manakah benar tentang tindak balas tersebut?

A The amount of energy in the product is higher than that of the reactants
Kandungan tenaga hasil tindak balas adalah lebih tinggi daripada kandungan bahan tindak balas

B Exothermic reaction
Tindak balas eksotermik

C Bond breaking in the reactants releases energy
Pemecahan ikatan dalam bahan tindak balas membebaskan tenaga

D Endothermic reaction
Tindak balas endotermik

49 4.8 g of magnesium powder is added to 100 cm^3 of 2.0 mol dm^{-3} copper(II) sulphate solution. The temperature of the mixture increases by 2.0°C. What is the heat of reaction in the reaction?
[Specific heat capacity of a solution = 4.2 J g^{-1} ℃ $^{-1}$; Relative atomic mass of Mg = 24]
4.8 g serbuk magnesium ditambahkan kepada 100 cm^3 larutan kurpum(II) sulfat 2.0 mol dm^{-3}. Suhu campuran meningkat sebanyak 2.0°C. Berapakah haba tindak balas dalam dalam tindak balas tersebut?
[Muatan haba tentu larutan = 4.2 J g^{-1} ℃ $^{-1}$; Jisim atom relatif Mg = 24]

A -4.20 kJ mol^{-1} **B** -2.10 kJ mol^{-1}
C -0.42 kJ mol^{-1} **D** -0.21 kJ mol^{-1}

50 The joint of a child's leg is swollen and painful.
The medicine that is suitable to be given to the child is
Sendi kaki seorang kanak-kanak bengkak dan berasa sakit.
Ubat yang sesuai diberikan kepada kanak-kanak tersebut ialah

A penicillin
penisillin

B paracetamol
parasetamol

C barbiturate
barbiturat

D aspirin
aspirin

Nama :..... Tingkatan :.....

4541/2
Chemistry
Kertas 2
Ogos
2 ½ jam

PEPERIKSAAN PRASPM
SEKOLAH-SEKOLAH MENENGAH

2013

CHEMISTRY

Kertas 2

Dua jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Tuliskan nama dan tingkatan pada ruang yang disediakan.*
2. *Jawab **semua** soalan daripada **Bahagian A**. Tuliskan jawapan anda dalam ruang yang disediakan*
3. *Jawab **satu** soalan daripada **Bahagian B** dan **satu** soalan daripada **Bahagian C**. Jawapan kepada **Bahagian B** dan **Bahagian C** hendaklah ditulis pada kertas tulis.*
4. *Anda diminta menjawab dengan lebih terperinci untuk Bahagian B dan Bahagian C. Jawapan mestilah jelas dan logik. Persamaan, gambar rajah, jadual, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda boleh digunakan.*
5. *Anda hendaklah menyerahkan kertas tulis dan kertas tambahan, jika digunakan bersama-sama dengan kertas soalan.*
6. *Penggunaan kalkulator saintifik yang tidak boleh diprogramkan adalah dibenarkan.*

Untuk Kegunaan Pemeriksa			
Bahagian	Soalan	Markah penuh	Markah diperoleh
A	1	10	
	2	10	
	3	9	
	4	10	
	5	10	
	6	11	
B	7	20	
	8	20	
C	9	20	
	10	20	
		Jumlah	

Kertas soalan ini mengandungi **19** halaman bercetak

Section A / *Bahagian A*
[60 markah / 60 *marks*]
Answer **all** questions
Jawab semua soalan

1. Table 1 shows the proton number of elements P, Q, R, S and T in the Periodic Table of elements.
Jadual 1 menunjukkan nombor proton bagi unsur P, Q, R, S dan T dalam Jadual Berkala Unsur.

Element *Unsur*	Proton number *Nombor proton*
P	3
Q	6
R	9
S	18
T	19

Table 1 / *Jadual 1*

Based on Table 1, answer the following questions.
Berdasarkan Jadual 1, jawab soalan-soalan yang berikut.

(a) What is meant by proton number?
Apakah maksud nombor proton?

……
[1 mark / *1 markah*]

(b) (i) Write the electron arrangement of element T.
Tuliskan susunan elektron bagi unsur T.

……...
[1 mark / *1 markah*]

(ii) Where is element T located in the Periodic Table?
Dimanakah kedudukan unsur T dalam Jadual Berkala?

……..
[1 mark / *1 markah*]

(c) Why is element S chemically inert?
Mengapakah unsur S lengai secara kimia.

……..
[1 mark / *1 markah*]

(d) (i) Write the formula of the substance that is produced from element P and R.
Tuliskan formula bagi bahan yang terhasil dari unsur P dan R.

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

(ii) State the type of chemical bond for the substance produced in (d)(i).
Nyatakan jenis ikatan kimia bagi bahan yang terhasil di (d)(i).

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

(e) Which of the elements in Table 1 have the same chemical property?
Unsur manakah dalam Jadual 1 mempunyai sifat kimia yang sama?

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

(f) (i) Draw the electron arrangement of the substance that is produced from elements Q and R.
Lukis susunan elektron bagi bahan yang terhasil dari unsur Q dan R.

[2 marks / *2 markah*]

(ii) State one physical property of the substance produced in (c) (i).
Nyatakan satu sifat fizik bagi bahan yang terhasil di (c) (i).

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

2. Diagram 1 shows the structural formula of ascorbic acid (Vitamin C).
Rajah 1 menunjukkan formula struktur bagi asid askorbik (Vitamin C)

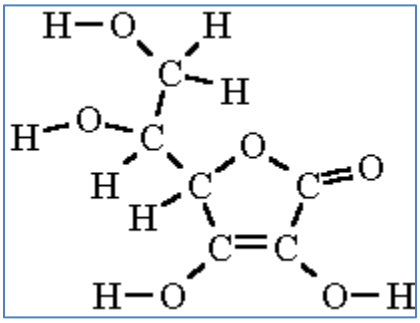


Diagram 1
Rajah 1

(a) (i) What is the meaning of molecular formula?
Apa maksud formula molekul?

…..……

……..
[2 marks / *2 markah*]

(ii) Write the molecular formula of compound X.
Tuliskan formula molekul bagi sebatian X.

…….
[1 mark / *1 markah*]

(iii) Calculate the relative molecular mass of compound X.
Given relative atomic mass of C = 12, H =1, O =16.
Hitungkan jisim molekul relatif bagi sebatian X.
Diberi jisim atom relative bagi C = 12, H =1, O =16.

……..

…….
[2 marks / *2 markah*]

(b) (i) A team of students took a 29.575 g sample of pure zinc, and burned it in air to produce a oxide of zinc with mass 36.855g. Find the empirical formula of this oxide.
Given the relative atomic mass of Zn = 65, O = 16.
Satu pasukan murid mengambil sampel zink tulen sebanyak 29.575g, dan membakarkan dalam udara untuk menghasilkan oksida zink dengan jisim 36.855. Carikan formula empirik untuk oksida ini.
Diberi jisim atom relatif Zn = 65, O = 16

[4 marks / *4 markah*]

(ii) State one physical property of oxides of zinc.
Nyatakan satu sifat fizik bagi oksida zinc.

……

[1 mark / *1 markah*]

3. Diagram 2 shows a Daniel cell.
Rajah 2 menunjukkan suatu sel Daniel.

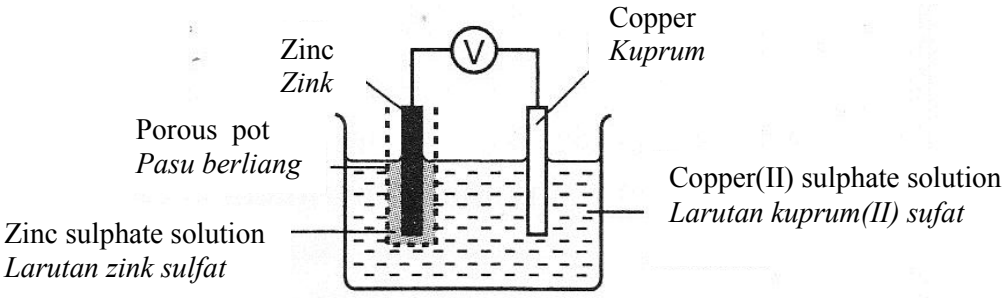


Diagram 2 / *Rajah 2*

(a) State the energy change in the cell.
Nyatakan perubahan tenaga di dalam sel.

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

(b) (i) Which electrode is negative terminal?
Elektrod manakah merupakan terminal negatif?

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

(ii) Give one reason for your answer in (b)(i).
Beri satu sebab bagi jawapan dalam (b)(i).

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

(c) Draw the direction of the flow of electrons in the diagram.
Lukiskan arah pengaliran elektron di dalam rajah.

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

(d) What is the function of the porous pot?
Apakah fungsi pasu berliang?

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

(e) (i) State the substance that acts as an oxidizing agent.
Nyatakan bahan yang bertindak sebagai agen pengoksidaan.

……
[1 mark / *1 markah*]

(ii) Write the oxidation half equation.
Tuliskan persamaan setengah bagi pengoksidaan.

……
[1 mark / *1 markah*]

(f) (i) If the voltmeter reading in Diagram 2 is 1.1 volt, predict the voltage produced, if the zinc electrode is replaced by magnesium electrode and zinc sulphate solution is replaced by magnesium sulphate solution.
Jika bacaan voltmeter dalam Rajah 2 ialah 1.1 volt, anggarkan voltan yang dihasilkan, jika elektrod zink diganti dengan elektrod magnesium dan larutan zink sulfat digantikan dengan larutan magnesium sulfat.

……
[1 mark / *1 markah*]

(ii) Explain your answer in 3(f)(i).
Terangkan jawapan anda di 3(f)(i).

……
[1 mark / *1 markah*]

4. Diagram 3 shows two experiments to investigate the effects of solvent on hydrogen chloride gas. The gas is passed through the solvent for several minutes. A spatula of magnesium powder is then added into the solvent and the observation is recorded as below.
Rajah 3 menunjukkan 2 eksperimen untuk mengkaji kesan pelarut ke atas gas hidrogen klorida. Gas dialirkan melalui pelarut selama beberapa minit. Satu spatula serbuk magnesium ditambah ke dalam pelarut dan pemerhatian dicatatkan seperti yang berikut.

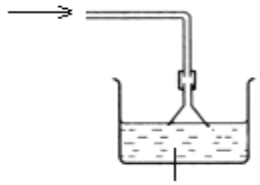
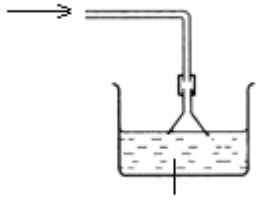
Experiment *Experimen*	Apparatus Set up *Pasangan alat radas*	Observation *Pemerhatian*
I	**hydrogen chloride gas** *gas hidrogen klorida*  **Solvent X** *pelarut X*	No visible change *Tiada perubahan diperhatikan*
II	**hydrogen chloride gas** *gas hidrogen klorida*  **Solvent Y** *pelarut Y*	Effervescence happened *Pembuakan gas berlaku*

Diagram 3
Rajah 3

(a) Suggest a substance for X and Y
Cadangkan bahan untuk X dan Y.

(i) X : .....

(ii) Y : .....
[2 marks / *2 markah*]

(b) (i) Write the chemical equation of the reaction in experiment II that produced effervescence.
Tuliskan satu persamaan kimia untuk tindak balas di eksperimen II yang menghasilkan pembuakan gas.

.....
[2 marks / *2 markah*]

(ii) Name the ions involved in the reaction in experiment II.
Namakan ion yang terlibat dalam tindak balas dalam eksperimen II.

……

[1 mark / *1 markah*]

(c) (i) In experiment II, a total of 240 cm^3 hydrogen chloride gas is dissolved into 250 cm^3 of solvent Y producing a solution with concentration Z mol dm^{-3}.
Given one mol of any gas is 24 dm^3 at room temperature and pressure, calculate the concentration of solution formed, Z.
Dalam eksperimen II, sejumlah 240 cm^3 gas hidrogen klorida telah dilarutkan ke dalam 250 cm^3 pelarut Y untuk menghasilkan kepekatan Z mol dm^{-3}, hitungkan kepekatan larutan yang terbentuk, Z.

$$\text{Molarity} = \frac{mol\ of\ substance}{volume\ of\ solution}$$

$$= \frac{[\qquad]}{[\qquad]}$$

= ……

[3 marks / *3 markah*]

(ii) Calculate the maximum mass of magnesium reacted
Kirakan jisim maksima bagi magnesium yang bertindakbalas.

[2 marks / *2 markah*]

5 An experiment is carried out to determine the heat of combustion of propanol.
Table 2 shows the results obtained.
Satu eksperimen telah dijalankan untuk menentukan haba pembakaran bagi propanol.
Jadual 2 menunjukkan keputusan yang diperolehi.

Mass of lamp + propanol before combustion /g *Jisim lampu + propanol sebelum pembakaran* / g	30.69
Mass of lamp + propanol after combustion / g *Jisim lampu + propanol selepas pembakaran* / g	29.85
Volume of water / cm^3 *Isipadu air* / cm^3	200
Initial temperature / °C *Suhu awal* / °C	28.0
Highest temperature /°C *Suhu tertinggi* / °C	59.0

Table 2
Jadual 2

(a) Draw a labelled diagram of apparatus set-up used in this experiment.
Lukiskan satu gambar rajah berlabel susunan radas yang digunakan dalam eksperimen ini.
[2 marks / *2 markah*]

(b) Write the chemical equation for the complete combustion of propanol.
Tuliskan persamaan kimia bagi pembakaran lengkap propanol.

.....
[2 marks / *2 markah*]

(c) Based on the results of the experiment, calculate:
Berdasarkan keputusan eksperimen, hitung;

(i) heat released when propanol is burnt.
[Given that the specific heat capacity for water is 4.2 J g^{-1} ℃ $^{-1}$]
haba yang dibebaskan apabila propanol dibakar
[Diberi muatan haba tentu air adalah 4.2 J g^{-1} ℃ $^{-1}$]

[1 mark / *1 markah*]

(ii) number of moles of propanol burnt.
[Given that relative molecular mass of propanol is 60]
bilangan mol propanol yang terbakar
[Diberi jisim molekul relatif propanol adalah 60]

[1mark / *1 markah*]

(iii) heat of combustion of propanol in this experiment
haba pembakaran propanol dalam eksperimen ini.

[2 marks / *2 markah*]

(iv) Draw the energy level diagram for this reaction.
Lukiskan gambar rajah aras tenaga bagi tindak balas ini.

[2 marks / *2 markah*]

6 (a) Diagram 4 shows an aloe vera plant.
Rajah 4 menunjukkan pokok aloe vera.

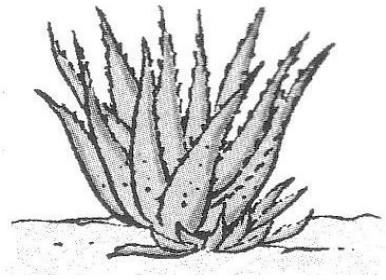


Diagram 4 / Rajah *4*

(i) What illness can be cured by using aloe vera?
Apakah penyakit yang boleh dirawat menggunakan aloe vera?

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

(ii) Which part of the plant is used to treat the illness?
Bahagian manakah pada tumbuhan tersebut digunakan untuk merawat penyakit?

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

(b) Paracetamol and aspirin are two analgesics.
Parasetamol dan aspirin adalah dua jenis analgesik.

(i) What is the function of analgesic?
Apakah fungsi bagi analgesik?

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

(ii) Which analgesic should not be given to a child of less than 12 years old?
Explain why.
Analgesik yang manakah tidak sepatutnya diberikan kepada kanak-kanak yang berusia kurang daripada 12 tahun?
T*erangkan mengapa.*

.....
[2 marks / 2 *markah*]

(c) (i) State one example of antibiotic.
Nyatakan satu contoh antibiotik.

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

(ii) Explain why antibiotic must be consumed completely.
Terangkan mengapa antibiotik perlu diambil sehingga habis.

.....

[1 mark / *1 markah*]

Table 3 shows various chemical compounds used as food additives.
Jadual 3 menunjukkan sebatian kimia yang digunakan sebagai bahan tambah dalam makanan.

Types of food additives *Jenis bahan tambah makanan*	Chemical compounds *Sebatian kimia*	Products *Produk*
R	Benzoic acid *Asid benzoik*	Oyster sauce, tomato sauce *Sos tiram, sos tomato*
S	Vitamin E *Vitamin E*	Cooking oil *Minyak masak*
Stabilisers *Penstabil*	U	Ice-cream *Aiskrim*
T	Tartrazine *Tartrazin*	Junk food *Makanan rapu*

Table 3/ *Jadual 3*

(d) (i) Identify the type of food additives for R.
Kenalpasti jenis bahan tambah bagi R.

.....

[1 mark / *1 markah*]

(ii) What is the function of food additive S?
Apakah fungsi bahan tambah S?

.....

[1 mark / *1 markah*]

(iii) State a side effect of tartrazine on children.
Nyatakan satu kesan sampingan tartrazin kepada kanak-kanak.

.....

[1 mark / *1 markah*]

(iv) What will happen to ice-cream when U is not added ?
Apakah yang akan berlaku kepada ais krim apabila U tidak ditambahkan?

.....

[1 mark / *1 markah*]

Section B *Bahagian B*

[20 markah / *20 marks*]

Answer any **one** *question.*

Jawab mana-mana ***satu*** *soalan daripada bahagian ini.*

7. A group of students carried out two experiments to investigate the factor that affecting the rate of reaction. Table 4 shows information about the reactants and the time taken for the reaction to be completed in each experiment.

Sekumpulan murid telah menjalankan dua eksperimen untuk mengkaji kesan faktor yang mempengaruhi kadar tindak balas. Jadual 4 menunjukkan maklumat tentang bahan tindak balas dan masa yang diambil untuk tindak balas selesai bagi setiap eksperimen.

Experiment *Eksperimen*	Reactants *Bahan Tindak Balas*	Time / minutes *Masa / minit*
I	Excess zinc powder and 50 cm^3 of 1.0 mol dm^{-3} hydrochloric acid solution *Serbuk zink berlebihan dan 50 cm^3 larutan asid hidroklorik 1.0 mol dm^{-3}*	2.5
II	Excess zinc powder and 50 cm^3 of 1.0 mol dm^{-3} hydrochloric acid solution and 2 g copper(II) sulphate solids *Serbuk zink berlebihan dan 50 cm^3 larutan asid hidroklorik 1.0 mol dm^{-3} dengan 2g pepejal kuprum(II) sulfat*	1.5

Table 4

Jadual 4

a) (i) State the factor that affect the rate of reaction refer to the experiments stated above.

Nyatakan faktor yang mempengaruhi kadar tindak balas bagi eksperimen-eksperimen yang dinyatakan di atas.

[1 mark / *1 markah*]

(ii) Sketch a graph of volume of gas against the time of reaction based on the information above.

Lakarkan satu graf isipadu gas melawan masa tindak balas berdasarkan maklumat di atas.

[2 marks / *2 markah*]

(iii) Based on Table 4, compare the rate of reaction between the two experiments.
Explain the difference in rate of reaction with reference to the collision theory.

Berdasarkan Jadual 4, bandingkan kadar tindak balas antara dua eksperimen itu. Terangkan perbezaan dalam kadar tindak balas dengan merujuk kepada teori perlanggaran.

[4 marks / *4 markah*]

iv) The chemical equation below shows the reaction between zinc and hydrochloric acid.

$$Zn(s) + 2HC\ell(aq) \longrightarrow ZnC\ell_2(aq) + H_2(g)$$

Calculate the maximum volume of hydrogen gas released in both experiments.
Given that relative atomic mass of H =1, Cℓ = 35.5 and the molar volume of any gas is 24 dm^3 at room temperature and pressure.

Persamaan kimia di bawah menunjukkan tindak balas antara kalsium karbonat dengan asid hidroklorik. Hitung isipadu maksimum gas hydrogen yang terhasil dalam kedua-dua eksperimen ini.
Diberi jisim atom relatif bagi H =1, Cℓ = 35.5 dan isipadu molar sebarang gas adalah 24 dm^3 pada suhu dan tekanan bilik.

[3 marks / *3 markah*]

v) Calculate the average rate of reaction of experiment I and II in $cm^3\ s^{-1}$.
Hitungkan kadar tindak balas purata bagi eksperimen I dan II dalam $cm^3\ s^{-1}$.

[2 marks / *2 markah*]

vi) Draw the energy profile diagram to represent the reaction in Experiment I and II. In the diagram , label the following

- E_a , activation energy without copper(II) sulphate
- E'_a , activation energy with copper(II) sulphate
- ΔH , heat of reaction

Lukiskan satu gambar rajah profil tenaga untuk mewakili tindak balas di Eksperimen I dan II. Dalam diagram labelkan yang berikut
- E_a *, tenaga pengaktifan dengan kuprum (II) sulfat*
- E'_a, *tenaga pengaktifan tanpa kuprum (II)sulfat*
- ΔH *, haba tindak balas*

Based on the diagram that you have drawn, state four informations you can obtain.
Berdasarkan gambar rajah yang anda lukis, nyatakan empat maklumat yang boleh anda perolehi.

[8 marks / *8 markah*]

Type of acid ***Jenis asid***	**Ethanoic acid** ***Asid etanoik***	**Hydrochloric acid** ***Asid hidroklorik***
Concentration ***Kepekatan***	1.0 mol dm^{-3}	1.0 mol dm^{-3}
pH value ***Nilai pH***	4	1

Table 5 / *Jadual 5*

8. (a) Based on Table 5, explain why the pH value of 1.0 mol dm^{-3} ethanoic acid and 1.0 mol dm^{-3} hydrochloric acid are different.
Berdasarkan Jadual 4, terangkan mengapa nilai pH bagi 1.0 mol dm^{-3} asid etanoik dan 1.0 mol dm^{-3} asid hikroklorik berbeza.

[5 marks / *5 markah*]

(b) Diagram 5 is an incomplete flow chart which shows the tests for the cation and anion in salt X.
Rajah 5 menunjukkan carta alir yang tidak lengkap bagi ujian kation dan anion garam X.

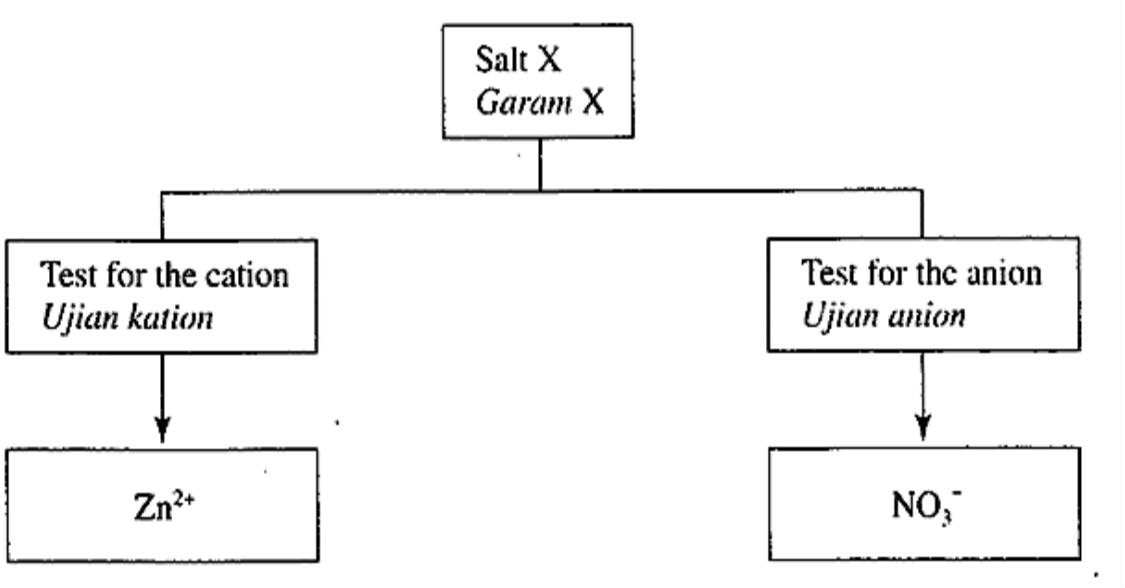


Diagram 5 / *Rajah 5*

Describe a chemical test to confirm that salt X contains NO_3^- ions
Terangkan satu ujian kimia untuk menentusahkan bahawa garam X itu mengandungi ion NO_3^-

[5 marks / *5 markah*]

(c) (i) Explain the meaning of standard solution.
Terangkan maksud larutan piawai.

[1 mark / 1 *markah*]

(ii) Describe how you would prepare 100 cm^3 of 0.5 mol dm^{-3} sodium hydroxide solution from a 2.0 mol dm^{-3} sodium hydroxide solution
In your description, include the calculation involved.

Terangkan bagaimana anda boleh menyediakan 100 cm^3 larutan natrium hidroksida 0.5 mol dm^{-3} dari larutan natrium hidroksida 2.0 mol dm^{-3}.

Di dalam penerangan anda, tunjukkan pengiraan yang terlibat.
[Given / *Diberi* : RAM of Na=23, H=1, O=16]

[9 marks / *9 markah*]

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

9. (a) Define redox reaction in terms of transfer of electrons.
Takrifkan tindak balas redoks dari segi pemindahan elektron.

[2 marks / *2 markah*]

(b) Describe the electrolysis of concentrated copper(II) chloride solution using carbon electrodes in terms of redox reaction. In your description , include all the half equations.
Huraikan elektrolisis bagi larutan kuprum(II) sulfat pekat menggunakan elektrod karbon merujuk kepada tindak balas redoks. Dalam huraian anda, sertakan semua persamaan ion.

[8 marks / 8 *markah*]

(c)

Transfer of electrons in a distance will happen when an oxidizing agent is connected to a reducing agent with the presence of electrolyte.

Pemindahan elektron dalam satu jarak yang jauh boleh berlaku apabila satu agen pengoksidaan disambung kepada satu agen penurunan dengan kehadiran suatu elektrolit.

Using appropriate chemical substances and apparatus, describe an experiment to support the statement above.

Dengan menggunakan bahan kimia dan alat radas yang sesuai, huraikan satu eksperimen untuk menyokong kenyataan di atas.

[10 marks / 10 *markah*]

10. The flow chart in Diagram 6 shows the relationship between four organic compounds.
Carta alir pada Rajah 6 menunjukkan perkaitan antara empat sebatian organik.

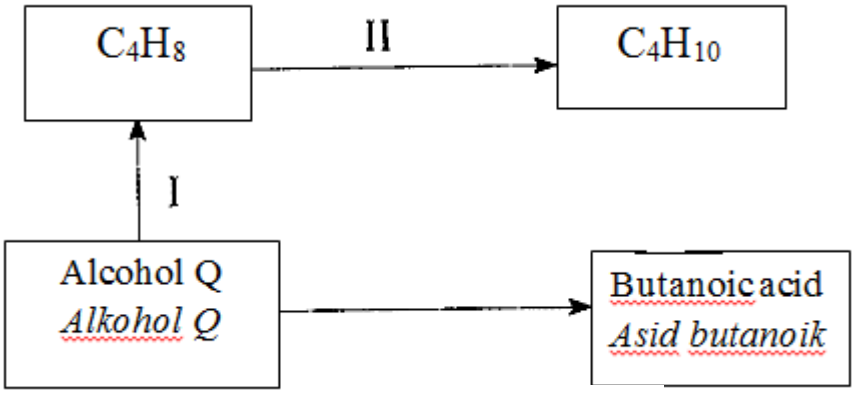


Diagram 6 / *Rajah 6*

(a) Alcohol Q can be changed into an alkene C_4H_8, through process I. Draw the apparatus setup for the process.
Alkohol Q boleh ditukar kepada suatu alkena C_4H_8, melalui Proses 1. Lukiskan susunan alat radas untuk melakukan proses tersebut.

[2 marks / *2 markah*]

(b) (i) Name the alcohol Q.
Namakan alkohol Q.

(ii) Name the Process I
Namakan Proses 1

[2 mark / *2 markah*]

(c) (i) What is meant by isomerism?.
Apakah maksud isomerism

[2 mark / 2 *markah*]

(ii) Draw and name two isomers of alcohol Q
Lukis dan namakan dua isomer bagi alkohol Q.

[4 marks / 4 *markah*]

(d) Through oxidation process, alcohol Q is changed to butanoic acid.
Explain a chemical test to differentiate between alkane,C_4H_{10} and butanoic acid.
In the description, you should include : apparatus and materials used, procedures and observations
Melalui proses pengoksidaan, alcohol Q ditukarkan kepada asid butanoik.
Terangkan satu ujian kimia untuk membezakan antara alkana, C_4H_{10} dan asid butanoik.
Di dalam penerangan, anda mesti menyatakan : susunan alat radas dan bahan, prosedur dan pemerhatian.

[10 marks / 10 *markah*]

SOALAN TAMAT

Nama : ……... Tingkatan : .....…...……

4541/3
Chemistry
Kertas 3
Ogos
1 ½ jam

PEPERIKSAAN PRASPM
SEKOLAH-SEKOLAH MENENGAH

2013

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 dwibahasa.*
3. *Soalan dalam bahasa Inggeris mendahului soalan yang sepadan dalam bahasa Melayu.*

Untuk Kegunaan Pemeriksa		
Soalan	**Markah Penuh**	**Markah Diperoleh**
1	33	
2	17	
JUMLAH	50	

INFORMATION FOR CANDIDATES

1. This question paper consists of **two** questions. Answer **all** questions.
   *Kertas soalan ini mengandungi **dua** soalan. Jawab semua soalan.*

2. Write your answer for **Question 1** in the spaces provided in the question paper.
   *Tulis jawapan anda bagi **Soalan 1** pada ruang yang disediakan dalam kertas soalan ini.*

3. Write your answers for **Question 2** on your own test pad.
   *Tulis jawapan anda bagi **Soalan 2** pada kertas kajang anda sendiri.*

4. You may use equations, diagrams, tables, graph and other suitable methods to explain your answer.
   Anda boleh menggunakan, rajah, jadual, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda.

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

6. 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.

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

8. The time suggested to answer each of the questions is 45 minutes.
   Masa yang dicadangkan untuk menjawab setiap soalan ialah 45 minit.

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

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

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

1. Figure 1 shows the set-up of apparatus for an experiment to compare the hardness of a metal and its alloy.
Rajah 1 menunjukkan susunan radas bagi satu eksperimen untuk membandingkan kekerasan satu logam dan aloinya

For Examiner's Use

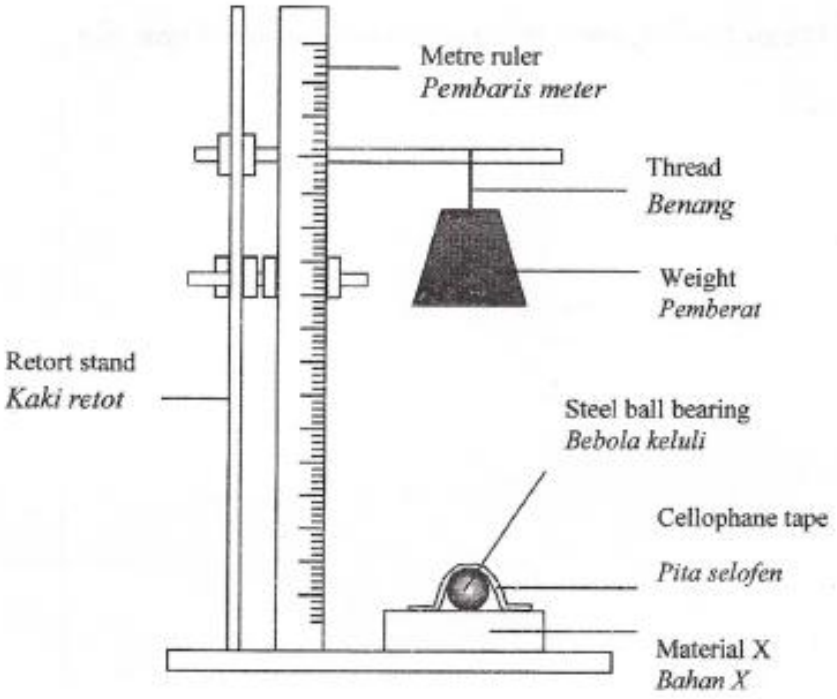


Figure 1
Rajah 1

The experiment was carried out according to the following steps:
Eksperimen tersebut dijalankan berdasarkan langkah-langkah berikut:

Step 1 : A steel ball bearing is taped onto the material X block
Langkah 1 : *Satu bebola keluli dilekatkan di atas blok bahan X*

Step 2 : A 1 kg weight is hung at a height of 50 cm above the material X block as shown in Figure 1
Langkah 2 : : *Pemberat 1 kg digantung pada ketinggian 50 cm di atas blok bahan X seperti yang ditunjukkan dalam Rajah 1*

Step 3 : The weight is allowed to drop onto the ball bearing
Langkah 3 : Pemberat dijatuhkan ke atas bebola keluli

Step 4 : The diameter of the dent made on the material X block was measured
Langkah 4 : *Diameter lekukan yang terbentuk pada blok bahan X diukur*

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Step 5 : Step 1 to 4 are repeated on two other parts of the material X block in order to obtain an average value for the diameter of dents formed

Langkah 5 : *Langkah 1 hingga 4 diulang pada dua bahagian lain blok bahan X untuk mendapatkan purata diameter lekukan yang terbentuk.*

Step 6 : Step 1 to 5 are repeated by replacing the material X block with material Y block

Langkah 6 : *Langkah 1 hingga 5 diulang untuk menggantikan blok bahan X dengan blok bahan Y*

Figure 2 shows the top view of the dents made on the material X and Y.
Rajah 2 menunjukkan pandangan atas lekukan yang terbentuk pada bahan X dan Y.

For Examiner's Use

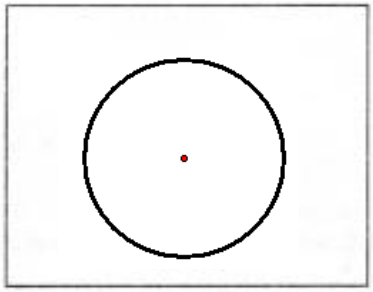
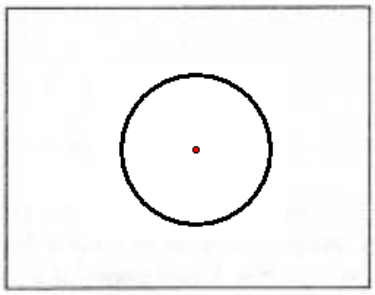
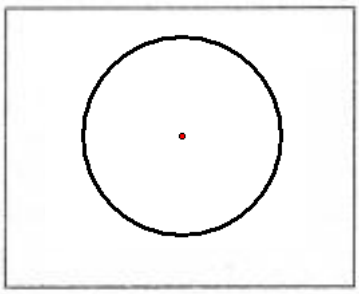
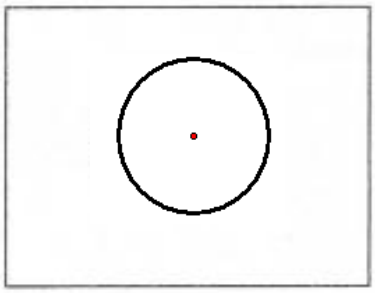
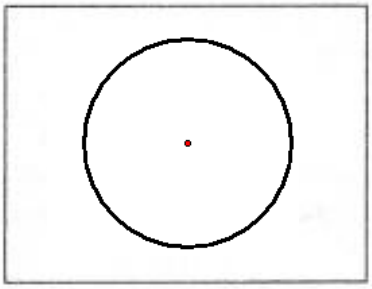
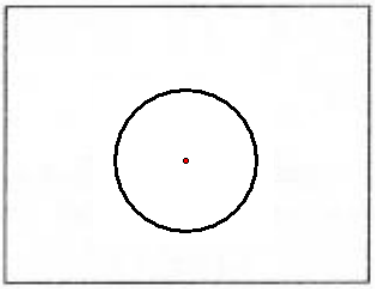
Experiment *Eksperimen*	Material X *Bahan X*	Material Y *Bahan Y*
I	 Diameter : _____ *Diameter*	 Diameter : _____ *Diameter*
II	 Diameter : _____ *Diameter*	 Diameter : _____ *Diameter*
III	 Diameter : _____ *Diameter*	 Diameter : _____ *Diameter*

Figure 2
Rajah 2

a) i) By using a **ruler provided at the end of this question paper**, measure the diameters of the dents made on materials X and Y. Record all the diameters of the dents in Figure 2.
*Dengan menggunakan **pembaris yang telah di sediakan pada penghujung kertas soalan**, ukur semua diameter lekukan yang terbentuk pada bahan X dan Y. Rekod semua diameter lekukan pada Rajah 2.*

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1(a)(i)

[3 marks]
[3 markah]

ii) Construct a table to record the diameter of the dent and average diameter on material X and material Y
Bina satu jadual bagi merekodkan diameter lekukan dan purata diameter untuk bahan X dan bahan Y

1 (a) (ii)

[3 marks]
[3 markah]

b) State one observation that can be obtained from this experiment.
Nyatakan satu pemerhatian yang dapat diperolehi daripada eksperimen ini

.....

.....

1 (b)

[3 marks]
[3 markah]

c) Based on the average diameter of the dents on material X and Y, state the inference that can be make.
Berdasarkan purata diameter lekukan pada bahan X dan Y, nyatakan inferens yang boleh dibuat.

For Examiner's Use

.....

.....

.....

1 (c)

[3 marks]
[3 markah]

d) State the operational definition for alloy.
Nyatakan definisi secara operasi bagi aloi.

.....

.....

.....

1 (d)

[3 marks]
[3 markah]

e) Explain why there is a difference in diameter of the dents on material X and Y.
Terangkan mengapa terdapat perbezaan diameter lekukan pada bahan X dan bahan Y.

.....

.....

.....

1 (e)

[3 marks]
[3 markah]

f) Suggest a suitable material for X and Y.
Cadangkan bahan yang sesuai bagi X dan Y

For Examiner's Use

.....

1 (f)

[3 marks]
[3 markah]

g) State the hypothesis for this experiment.
Nyatakan hipotesis untuk eksperimen ini.

.....

.....

1 (g)

[3 marks]
[3 markah]

h) Complete Table 1 based on the experiment.
Lengkapkan Jadual 1 berdasarkan eksperimen ini.

For Examiner's Use

Name of variables ***Nama pembolehubah***	**Action to be taken** ***Tindakan yang perlu diambil***
i) Manipulated variable: *Pembolehubah dimanipulasikan:*	i) The way to manipulate variable: *Cara mengubah pembolehubah dimanipulasikan:* ....
ii) Responding variable: *Pembolehubah bergerak balas:*	ii) What to observe in the responding variable: *Apa yang diperhatikan dalam pembolehubah bergerak balas:* .....
iii) Controlled variable: *Pembolehubah dimalarkan:*	iii) The way to maintain the controlled variable: *Cara menetapkan pembolehubah dimalarkan:* ....

1 (h)

[6 marks]
[6 markah]

i) The following is a list of materials:
Berikut ialah senarai beberapa bahan:

Brass, Pewter, Tin, Copper, Stainless steel, Iron
Loyang , Piuter, Timah, Kuprum, Keluli tahan karat, Besi

Classify these material into pure metal and alloy
Kelaskan bahan-bahan ini kepada logam tulen dan aloi.

For Examiner's Use

1 (i)

[3 marks]
[3 markah]

Total 33

2. Rusting is the corrosion of iron. Rusting will occur if iron is exposed to oxygen and water. However, rusting is inhibited when iron is in contact with a more electropositive metal.

Pengaratan merupakan kakisan besi. Pengaratan akan berlaku jika terdedah kepada oksigen dan air. Walau bagaimanapun pengaratan besi tidak akan berlaku apabila besi bersentuhan dengan logam yang lebih elektropositif.

You are given some iron nails, magnesium ribbon and copper strip.
Plan a laboratory experiment to investigate the effect of other metal on the corrosion of iron.
Anda diberi paku besi, pita magnesium, kepingan kuprum.
Rancang satu eksperimen dalam makmal untuk mengkaji kesan logam lain terhadap pengaratan besi.

Your planning should include the following:
Perancangan anda hendaklah mengandungi perkara-perkara beikut:

a) Statement of the problem
Pernyataan masalah

b) All the variables
Semua pembolehubah

c) Hypothesis
Hipotesis

d) List of materials nad apparatus
Senarai bahan dan radas

e) Procedure
Prosedur

f) Tabulation of data
Penjadualan data

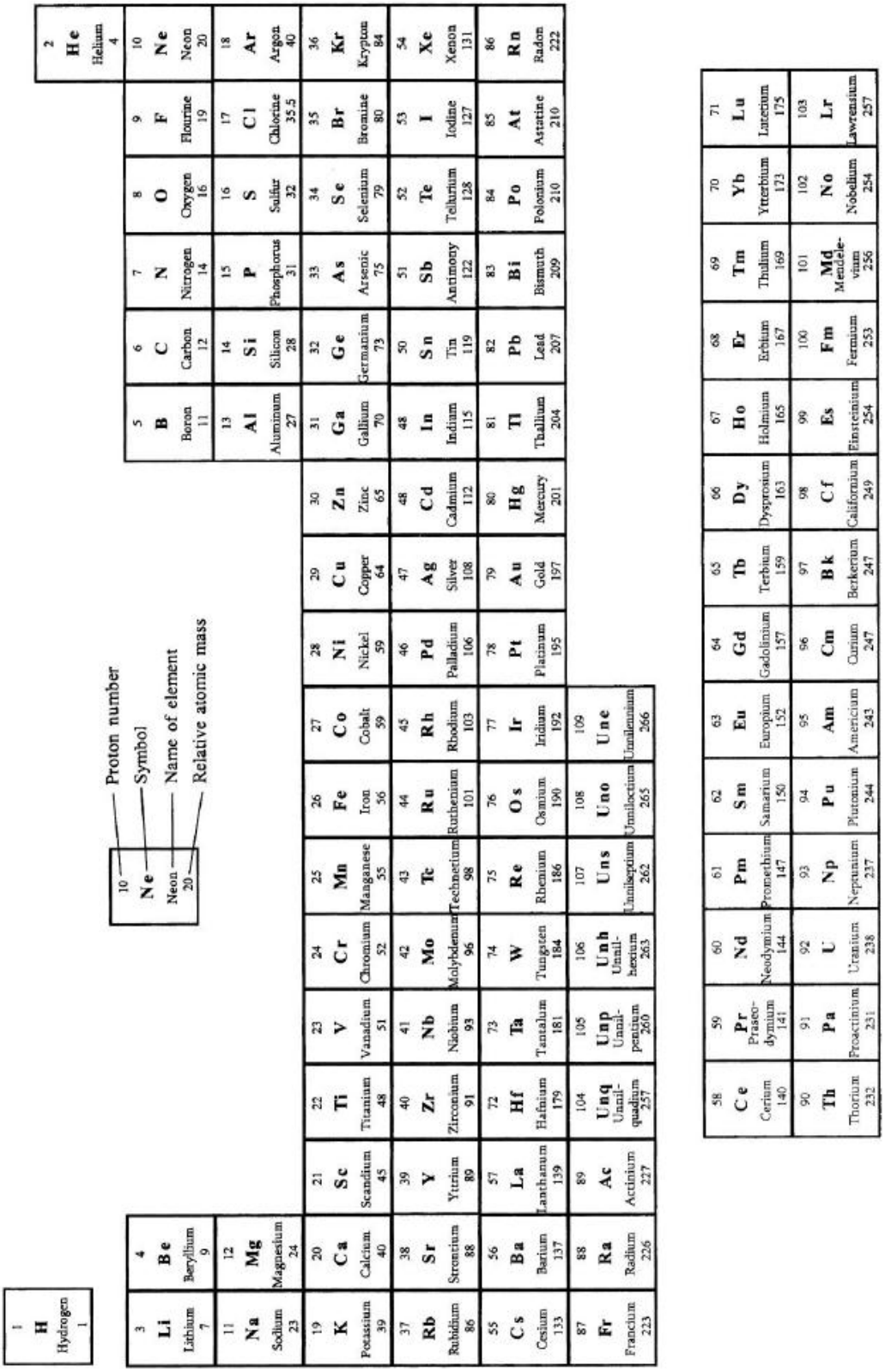
[17 marks]
[17 markah]

2

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

LAMPIRAN 1

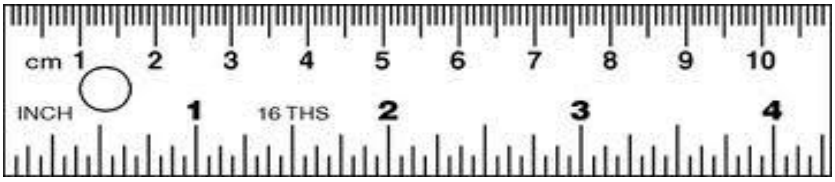
PERIODIC TABLE OF THE ELEMENTS



1 H Hydrogen 1																	2 He Helium 4
3 Li Lithium 7	4 Be Beryllium 9											5 B Boron 11	6 C Carbon 12	7 N Nitrogen 14	8 O Oxygen 16	9 F Flourine 19	10 Ne Neon 20
11 Na Sodium 23	12 Mg Magnesium 24											13 Al 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 39	20 Ca Calcium 40	21 Sc Scandium 45	22 Ti Titanium 48	23 V Vanadium 51	24 Cr Chromium 52	25 Mn Manganese 55	26 Fe Iron 56	27 Co Cobalt 59	28 Ni Nickel 59	29 Cu Copper 64	30 Zn Zinc 65	31 Ga Gallium 70	32 Ge Germanium 73	33 As Arsenic 75	34 Se Selenium 79	35 Br Bromine 80	36 Kr Krypton 84
37 Rb Rubidium 86	38 Sr Strontium 88	39 Y Yttrium 89	40 Zr Zirconium 91	41 Nb Niobium 93	42 Mo Molybdenum 96	43 Tc Technetium 98	44 Ru Ruthenium 101	45 Rh Rhodium 103	46 Pd Palladium 106	47 Ag Silver 108	48 Cd Cadmium 112	49 In Indium 115	50 Sn Tin 119	51 Sb Antimony 122	52 Te Telurium 128	53 I Iodine 127	54 Xe Xenon 131
55 Cs Cesium 133	56 Ba Barium 137	57 La Lanthanum 139	72 Hf Hafnium 179	73 Ta Tantalum 181	74 W Tungsten 184	75 Re Rhenium 186	76 Os Osmium 190	77 Ir Iridium 192	78 Pt Platinum 195	79 Au Gold 197	80 Hg Mercury 201	81 Tl Thallium 204	82 Pb Lead 207	83 Bi Bismuth 209	84 Po Polonium 210	85 At Astatine 210	86 Rn Radon 222
87 Fr Francium 223	88 Ra Radium 226	89 Ac Actinium 227	104 Unq Unnil-quadium 257	105 Unp Unnil-pentium 260	106 Unh Unnil-hexium 263	107 Uns Unilseptium 262	108 Uno Unniloctium 265	109 Une Unilennium 266									

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

LAMPIRAN 2



CHEMISTRY
PRASPM

SEKOLAH-SEKOLAH MENENGAH
2013

MARKING SCHEME

PAPER 2

Chemistry
Kertas 1
Ogos
1 ¼ jam

PEPERIKSAAN PRASPM
SEKOLAH-SEKOLAH MENENGAH

2013

CHEMISTRY
Kertas 1

Satu jam lima belas minit

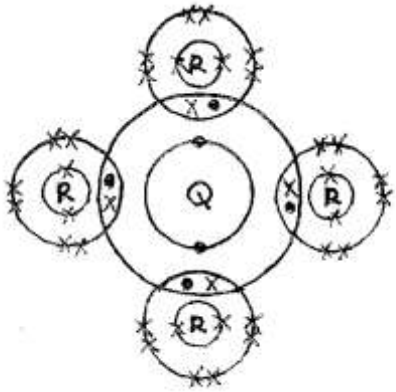
SKEMA JAWAPAN

Answer:

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

A = 13
B = 12
C = 13
D = 12

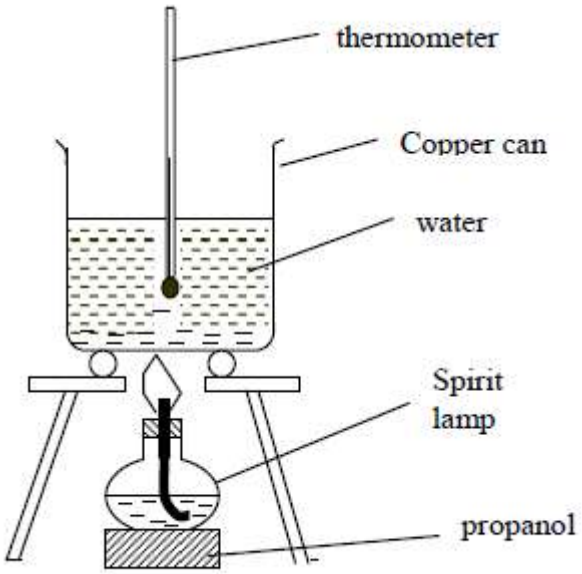
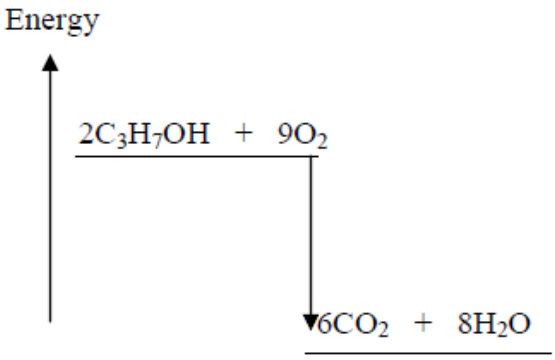
SKEMA JAWAPAN : **SECTION A**

No	Rubric	Marks
1 (a)	The number of proton in the nucleus of an atom *Bilangan proton di dalam nukleus suatu atom*	1
(b)(i)	2.8.8.1	1
(ii)	Group 1, Period 4 *Kumpulan 1, Kala 4*	1
(c)	because atom S has achieved a stable octet electron arrangement *kerana atom S telah mencapai susunan oktet yang stabil*	1
(d)(i)	PR	1
(ii)	Ionic bond *Ikatan ionik*	1
(e)	P dan T	1
(f)(i)		1 1
(ii)	Low melting/boiling point //do not dissolve in water // do not conduct electricity // highly volatile *Takat lebur/didih rendah //tidak larut dalam air // tidak mengkonduksi elektrik // mudah meruap*	1
	Jumlah	10

No	Rubric	Marks
2.(a)(i)	(a)(i) formula that shows the **exact number of atom of each element in a molecule** *formula yang menunjukkan* ***bilangan sebenar atom setiap unsur dalam suatu molekul***	1 1
(ii)	$C_6H_8O_6$	1
(iii)	6(12) + 8(1) + 6(16) = 176	1 1
(b)(i)	<table><tr><td></td><td>Zn</td><td>O</td></tr><tr><td>Mass / g</td><td>29.575</td><td>7.28</td></tr><tr><td>Mol of atom</td><td>$\frac{29.575}{65}$ = 0.455</td><td>$\frac{7.28}{16}$ =0.455</td></tr><tr><td>Simplest ratio</td><td>1</td><td>1</td></tr></table> Empirical formula = ZnO	1 1 1 1
(ii)	Conduct electricity in molten state //*alir arus elektrik dalam keadaan leburan* High melting and boiling point //*takat lebur dan didih tinggi* Solid at room temperature // *pepejal pada suhu bilik*	1
	Total	10

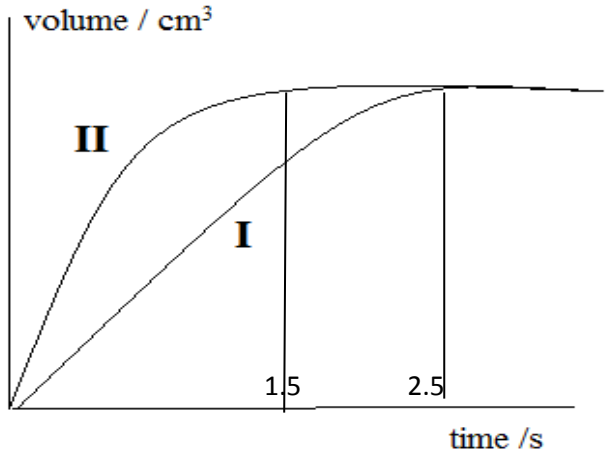
No	Rubric	Marks
3(a)	Chemical to electrical *Kimia kepada elektrik*	1
(b)(i)	Zinc atom *Atom Zink*	1
(ii)	Zinc atom is more electropositive than copper atom // Zn is higher than Cu in the electrochemical series *Zink lebih elektropositif daripada kuprum / Zn lebih tinggi daripada Cu dalam siri elektrokimia*	1
(c)	Zinc to copper	1
(d)	To separate the two solutions // to allow the flow of ions *Untuk mengasingkan dua larutan // membenarkan pengaliran ion-ion*	1
(e)(i)	Copper ions, Cu^{2+} *Ion-ion kuprum, Cu^{2+}*	1
(ii)	$Zn \rightarrow Zn^{2+} + 2e$	1
(f)(i)	[1.3 – 2.0] v	1
(ii)	The distance between Mg and Cu is further than the distance between Zn and Cu in the Electrochemical Series *Jarak di antara Mg dan Cu lebih jauh berbanding jarak antara Zn dan Cu dalam Siri Elektrokimia*	1
	Jumlah	9 markah

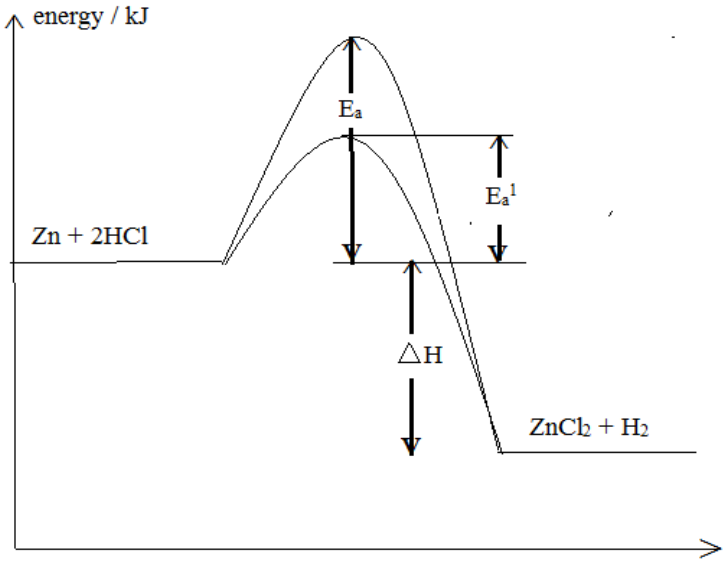
No	Rubric	Marks
4 (a) (i)	X : methylbenzene // benzene // acetone // ethanol // tetrachloromethane (appropriate organic solvent) *Metilbenzena, benzena, aseton, etanol, tetraklorometana (mana-mana pelarut organik yang sesuai)*	1
(ii)	Y : water // *air*	1
(b)(i)	Formula all correct Equation balanced $Mg + 2HCl \longrightarrow MgCl_2 + H_2$	1 1
(ii)	Hydrogen ions	1
(c)(i)	Mol of HCl gas = $\frac{240}{24000}$ =0.01 mol Molarity = $\frac{0.01}{0.25}$ = 0. 04 mol dm^{-3}	1 1 1
(ii)	Mass of Mg = 0.005 x 24 = 0.12 g	1 1
	Total	10

No	Rubric	Marks
5(a)	1. Functional apparatus 2. Label  	1 1
(b)	1. Correct formula of reactant and product 2. Balanced $2C_3H_7OH + 9O_2 \rightarrow 6CO_2 + 8H_2O$	1 1
(c)(i)	Heat release = 200 X 4.2 X 31 = 26040 J 1	1
(ii)	$\text{Mole} = \frac{0.84}{060}$ // 0.014	1
(iii)	$\Delta H = \frac{26040}{0.014}$ $= -1860\ \text{kJmol}^{-1}$	1 1
(ii)	1. arrow upward with energy label and two level 2. exothermic reaction and correct formula of reactant and product  	1 1
	Total	10

No	Rubric	Marks
6(a)(i)	Wounds //itchiness *Luka kecil // melecet*	1
(ii)	Juice from leaves *Jus daripada daun*	1
(b)(i)	Relieve pain / pain killer // reduce fever *Mengurangkan sakit / penahan sakit // mengurangkan demam*	1
(ii)	Aspirin. Cause internal bleeding / stomach ulcer *Aspirin.* *Menyebabkan pendarahan dalaman / ulser usus*	1 1
(c)(i)	Penicillin / streptomycin *Penicilin / streptomicin*	1
(ii)	To kill all micorganisms *Untuk membunuh semua mikroorganisma*	1
(d)(i)	Preservative *Pengawet*	1
(ii)	Prevent food from oxidised // Antioxidants *Halang makanan daripada teroksida // Pengantioksida*	1
(iii)	Hyperactivity // asthma // rashes *Terlampau aktif // asma // ruam*	1
(iv)	Form two layers *Membentuk dua lapisan*	1
	Jumlah	11 markah

Section B

No	Rubric	Marks
7(a)(i)	Catalyst // mangkin	1
(ii)	 Graph shape correct with correct labelling of y-axis and x-axis II steeper than I	 1 1
(iii)	Exp. II has higher rate of reaction [r : faster rate] Exp. II **use catalyst** $CuSO_4$ that **lower the activation energy** // provide an alternative path with lower activation energy The **frequency of effective collisions** between **Zn atoms and hydrogen ions** increased [r : between particles]	1 1+1 1
(iv)	Mol of HCl = $\frac{1(50)}{1000}$	1

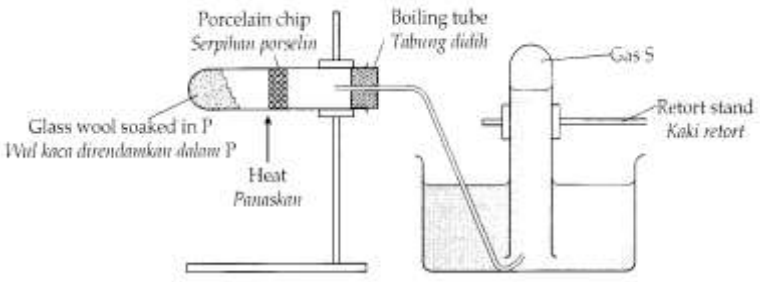
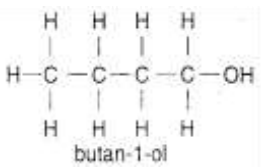
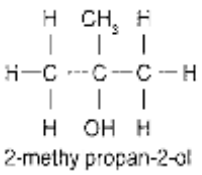
	=0.05 mol 2 mol HCl $\longrightarrow$ 1 mol H_2 0.05 mol HCl $\longrightarrow$ 0.025 mol H_2 Volume of H_2 = 0.025 x 24 = 0.6 dm^3	 1 1
(v)	Exp. I = $\frac{600}{150}$ = 4 cm^3 s^{-1} Exp. I = $\frac{600}{90}$ = 6.667 cm^3 s^{-1} [if 2 answers correct but wrong unit or without unit, give 1 mark]	1 1
(vi)	 1. this is exothermic reaction // *tindak balas eksotermik* 2. activation energy using catalyst is lower // *tenaga pengaktifan menggunakan magkin lebih rendah* 3. activation energy is from level of reactans to the peak of the curve// *Tenaga pengaktifan ialah dari aras bahan hingga ke puncak graf* 4. heat of reaction is between the level of reactants and level of products *Haba tindak balas ialah di antara aras bahan dan aras hasil* 5. energy content of reactants is higher than the products *Kandungan tenaga bahan lebih tinggi daripada hasil* 6. heat energy absorbed when breaking chemical bonds of reactants is less than the heat energy released when formation of new bonds in the products *Tenaga haba yang diserap semasa pemecahan ikatan bahan kurang daripada tenaga haba dibebas semasa pembentukan ikatan kimia baru dalam hasil tindak balas* (whichever 4)	1 – graph shape 1 – label E_a 1 – label E_a^1 1 – label ΔH 1 1 1 1
	Total	20

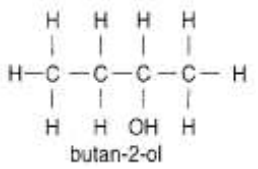
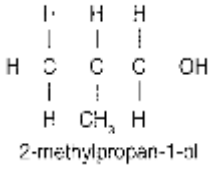
No	Rubric	Marks
8(a)	-Hydrochloric acid is a strong acid whereas ethanoic acid is a weak acid *Asid hidroklorik adalah asid kuat manakala asid etanoik adalah asid lemah*	1
	-Hydrochloric acid ionises completely in water to produce a high concentration of hydrogen ion *Asid hidroklorik mengion penuh di dalam air menghasilkan kepekatan ion hidrogen yang tinggi*	1
	-Ethanoic acid ionises partially in water to produce a low concentration of hydrogen ion *Asid etanoik mengion separa di dalam air menghasilkan kepekatan ion hidrogen yang rendah*	1
	-The concentration of hydrogen ions in hydrochloric acid is higher than that in ethanoic acid *Kepekatan ion hidrogen dalam asid hidroklorik lebih tinggi berbanding dalam asid etanoik*	1
	-Thus, hydrochloric acid has lower value of pH compared to ethanoic acid *Oleh sebab itu, asid hidroklorik mempunyai nilai pH yang rendah berbanding asid etanoik*	1
(b)	Brown Ring Test	
	1. Pour 2 cm^3 of unknown solution into a test tube *Tuang 2 cm^3 larutan ke dalam satu tabung uji*	1
	2. Add iron(II) sulphate solution *Tambahkan larutan ferum(II) sulfat*	1
	3. Followed by dilute sulphuric acid. *Diikuti dengan asid sulfuric cair.*	1
	4. Slowly add 5-6 drops of concentrated sulphuric acid along test tube side *Titiskan 5-6 titis asid sulfurik pekat perlahan-lahan*	1
	5. Brown ring form – confirms presence of nitrate, NO_3^- *Cincin perang terbentuk – pengesahan kehadiran nitrat,* NO_3^-	1
(c)(i)	A solution which has a known concentration *Satu larutan yang diketahui kepekatannya*	1
(ii)	Apparatus : volumetric flask (100 cm^3), bulb pipette (25 cm^3), distilled water	1
	1. To prepare 100 cm^3 sodium hydroxide solution 0.5 mol dm^{-3}	
	$M_1V_1=M_2V_2$	1
	$\therefore V_1 = \frac{M_2V_2}{M_1}$	
	$= \frac{0.5 \times 100}{2.0}$	1
	$= 25\ cm^3$	1
	1. 25 cm^3 of 2.0 mol dm^{-3} sodium hydroxide solution is transfer into a 100 cm^3 volumetric flask	1
	2. Distilled water is added to the 100 cm^3 mark	1
	3. The flask is closed	1
	4. Then shaken	1
	5. A 0.5 mol dm-3 sodium hydroxide solution is obtained	1
	Maximum 9 marks	
	Negeri Sembilan SPM 2013 Jumlah	20 markah

Section C

No	Rubric	Marks
9 (a)	Oxidation is process of releasing//donating // losing electrons [r : throwing electrons] Reduction is process of receiving//gaining electrons *Pengoksidaan ialah proses kehilangan elektron manakala penurunan ialah proses penerimaan elektron*	1 1
(b)	Cu^{2+} ions and H^+ ions are attracted to cathode Cu^{2+} ions are selected discharged because position of Cu^{2+} ions is lower in the electrochemical series Cu^{2+} ions are then reduced to Cu atoms by receiving electrons $Cu^{2+} + 2e^- \longrightarrow Cu$ OH^- ions and $C\ell^-$ ions are attracted to anode $C\ell^-$ ions are selected discharged because concentration of $C\ell^-$ ions is higher $C\ell^-$ ions are then oxidised to $C\ell$ atoms by releasing electrons $2C\ell^- \longrightarrow C\ell_2 + 2e^-$ *Ion Cu^{2+} dan ion H^+ ditarik ke katod* *Ion Cu^{2+} dipilih untuk dinyahcas kerana kedudukan dalam siri elektrokimia lebih rendah* *Ion Cu^{2+} diturunkan kepada atom Cu dengan cara menerima elektron* *$Cu^{2+} + 2e^- \longrightarrow Cu$* *Ion OH^- dan ion $C\ell$ ditarik ke anod* *Ion klorida dipilih dinyahcas kerana kepekatan ion klorida yang tinggi* *Ion klorida dioksidakan kepada atom klorin dengan cara melepaskan elektron* *$2C\ell \longrightarrow C\ell_2 + 2e^-$*	1 1 1 1 1 1 1 1
(c)	**Apparatus** : U-tube, graphite rods, connecting wires with crocodile clips, retort stand and clamp, droppers, galvanometer **Materials** : acidified potassium manganite (VII) solution, ferrum(II) sulphate solution, diluted sulphuric acid **Procedure** : 1. Pour carefully dilute sulphuric acid into the U-tube until its level are 6 cm away from the mouths of the U-tubes 2. Clamp the U-tube to a retort stand. 3. Using a dropper, carefully add a freshly prepared iron(II) sulphate solution to one of the arms of the U-tube until the layer of $FeSO_4$ reaches the height of 3cm 4. Step 3 is repeated by adding acidified $KMnO_4$ solution to the other arm of the U-tube 5. Place a graphite rod in the $FeSO_4$ solution and another graphite rod into acidified $KMnO_4$ solution. 6. Connect the electrodes to a galvanometer and record the observation. After a while, the needle in the galvanometer deflects ***Alat radas :*** *Tiub-U, rod grafit, wayar penyambung dengan klip buaya, kaki retort , penitis, galvanometer* ***Bahan kimia*** *: larutan kalium manganat (VII) berasid, larutan ferum(II) sulfat, asid sulfuric cair*	1 1+1 1 1 1 1 1 1 1

	Prosedur *:* *1. Tuangkan dengan berhati-hati larutan asid sulfuric cair ke dalam tiub-U sehingga aras dari mulut tiub-U ialah 6cm.* *2. Ikatkan tiub-U pada kaki retort* *3. Menggunakan penitis, dengan cermat titiskan larutan ferum(II) sulfat ke dalam lengan tiub-U sehingga lapisan $FeSO_4$ setinggi 3 cm* *4. Langkah 3 diulangi dengan menggunakan larutan $KMnO_4$ berasid untuk lengan yang satu lagi* *5. Celupkan batang rod grafit ke dalam larutan $FeSO_4$ dan larutan $KMnO_4$ (VII) berasid.* *6. Sambungkan dawai penyambung kepada galvanometer dan catatkan pemerhatian.* *Pemerhatian : jarum galvanometer terpesong selepas seketika*	
	Total	20

No	Rubric	Marks
10(a)	 Functional apparatus *Alat radas berfungsi* Labelled *Berlabel*	 1 1
(b)(i)	Butanol	1
(ii)	Dehydration *Dehidrasi*	1
(c)(i)	The existence of two or more compounds having the same molecular formulae but different structural formulae *Kewujudan dua atau lebih sebatian yang mempunyai formula molekul yang sama tetapi berlainan struktur*	1 1
(ii)	 	1 1

	  Any two structural formula with naming *Mana-mana dua formula struktur beserta nama*	
(d)	Apparatus : test tube *Radas : tabung uji* Material : butane, butanoic acid, metal (magnesium ribbon) or carbonate (calcium carbonate) *Bahan : butana, asid butanoik, logam (pita magnesium) atau karbonate (kalsium karbonat)* Procedure : 1. Magnesium ribbon is cleaned with sand paper *Pita magnesium dibersihkan dengan kertas pasir* 2. Test tune A is filled with 3 cm^3 butane *Tabung uji A didisi dengan 3 cm^3 butana* 3. A piece of magnesium ribbon is added into the test tube *Satu pita magnesium dimasukkan ke dalam tabung uji* 4. Any changes is observed *Sebarang perubahan diperhatikan* 5. Steps 1 – 4 is repeated using butanoic acid *Langkah 1 – 4 diulang menggunakan asid butanoik* Observation : Substances / Observation Butane + Mg / No changes Butanoic acid + Mg / Air bubbles produces	1 1 1 1 1 1 1 1 1 1
	Jumlah	20 markah

<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 two decimal point with unit.

Sample answer:

<table>
<tr><th>Experiment</th><th>Material X</th><th>Material Y</th></tr>
<tr><td>I</td><td>2.60 cm</td><td>2.00 cm</td></tr>
<tr><td>II</td><td>2.60 cm</td><td>2.00 cm</td></tr>
<tr><td>III</td><td>2.70 cm</td><td>1.90 cm</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 with unit
#readings to two decimal point without unit

Sample answer:

<table>
<tr><th>Experiment</th><th>Material X</th><th>Material Y</th></tr>
<tr><td>I</td><td>2.6 cm</td><td>2.0 cm</td></tr>
<tr><td>II</td><td>2.6 cm</td><td>2.0 cm</td></tr>
<tr><td>III</td><td>2.7 cm</td><td>1.9 cm</td></tr>
</table>
Sample answer:

<table>
<tr><th>Experiment</th><th>Material X</th><th>Material Y</th></tr>
<tr><td>I</td><td>2.60</td><td>2.00</td></tr>
<tr><td>II</td><td>2.60</td><td>2.00</td></tr>
<tr><td>III</td><td>2.70</td><td>1.90</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>
</table>

<table>
<tr><th colspan="2">Question</th><th>Details</th><th>Score</th></tr>
<tr><td>1.</td><td>a)
ii)</td><td>Able to construct a table to record the diameters of the dents and average diameters for material X and Y that contain:

1. Correct titles
2. Readings and unit

<u>Sample answer:</u>

<table>
<tr><td rowspan="2">Material</td><td colspan="3">Diameter of dents (cm)</td><td rowspan="2">Average diameter (cm)</td></tr>
<tr><td>1</td><td>2</td><td>3</td></tr>
<tr><td>X</td><td>2.60</td><td>2.60</td><td>2.70</td><td>2.63</td></tr>
<tr><td>Y</td><td>2.00</td><td>2.00</td><td>1.90</td><td>1.97</td></tr>
</table></td><td>3</td></tr>
<tr><td></td><td></td><td>Able to construct a less accurate that contains the following:

1. Titles
2. Readings

<u>Sample answer:</u>

<table>
<tr><td rowspan="2">Material</td><td colspan="3">Diameter of dents</td><td rowspan="2">Average diameter</td></tr>
<tr><td>1</td><td>2</td><td>3</td></tr>
<tr><td>X</td><td>2.60</td><td>2.60</td><td>2.70</td><td>2.63</td></tr>
<tr><td>Y</td><td>2.00</td><td>2.00</td><td>1.90</td><td>1.97</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 rowspan="2"></td><td colspan="3">Diameter of dents (cm)</td></tr>
<tr><td>1</td><td>2</td><td>3</td></tr>
<tr><td>X</td><td></td><td></td><td></td></tr>
<tr><td>Y</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>
</table>

Question		Details	Score
1.	b)	*Able to state correct observation.* **Sample answer:** The diameter of dents made on material Y/X is smaller/bigger than material X/Y	3
		Able to state the observation incompletely **Sample answer:** The diameter of dents made on material Y/X is smaller/bigger	2
		Able to state an idea of the observation **Sample answer** The diameter of dent for Y is small//The diameter of dent for X is big.	1
		No response or wrong response	0

Question		Details	Score
1.	c)	*Able to state the inference correctly* **Sample answer:** Material Y/X is harder/softer than material X/Y	3
		Able to state the inference incompletely **Sample answer:** Material Y/X is harder/softer	2
		Able to state an idea of inference **Sample answer** Material Y/X is hard/soft	1
		No response or wrong response	0

Question		Details	Score
1.	d)	*Able to state the correct operational definition for alloy* **Sample answer:** Material that form smaller diameter of dent is harder	3
		Able to state the meaning of alloy, incompletely **Sample answer:** Material that form small dent is hard	2
		Able to state an idea of alloy **Sample answer** Alloy form dent. //Alloy is hard	1
		No response or wrong response	0

Question		Details	Score
1.	e)	*Able to give all three explanations correctly* **Sample answer:** 3. Atoms in material X are in orderly arrangement 4. Atoms in material Y are not in orderly arrangement 5. Layers of atoms in material Y difficult to slide on each other.	3
		Able to give any two correct explanations	2
		Able to give any one correct explanation.	1
		No response or wrong response	0

Question		Details	Score
1.	f)	*Able to state any alloy for material Y and its **major** pure metal for material X correctly* **Sample answer:** Material X: Copper // Iron // any suitable metal Material Y: Bronze / Brass // Stainless steel // any suitable alloy for the pure metal given	3
		Able to state any alloy for material Y and its pure metal for material X. **Sample answer:** Material X: Tin / zinc // chromium / nickel // any suitable metal (not major metal) Material Y: Bronze // Brass // Stainless steel // any suitable alloy for the pure metal given	2
		Able to state any alloy for material Y or any metal for material X **Sample answer:** Material X: Magnesium // aluminium // zinc // any metal Material Y: Pewter // bronze // stainless steel // any alloy	1
		No response or wrong response	0

Question		Details	Score
1.	g)	*Able to state the relationship correctly between the manipulated variable and the responding variable with direction.* **Sample answer:** The harder/softer the material, the smaller/bigger the diameter of the dent.	3
		Able to state the relationship between the manipulated variable and the responding variable with direction.. **Sample answer:** Alloy/pure metal will form smaller/bigger dent than pure metal/alloy// The smaller/bigger the diameter of the dent, ther harder/softer the material	2
		Able to state the idea of hypothesis **Sample answer:** Y is harder // X is softer // Alloy is harder	1
		No response or wrong response	0

<table>
<tr><th colspan="2">Question</th><th>Details</th><th>Score</th></tr>
<tr><td>1.</td><td>h)</td><td>
Able to state all three variables and all the three actions correctly

<u>Sample answer:</u>
<table>
<tr><th colspan="2">Name of variable</th><th colspan="2">Action to be taken</th></tr>
<tr><td>i)</td><td>Manipulated variable
Type of materials / material X and Y</td><td>i)</td><td>The way to manipulate variable
Change pure metal /alloy with alloy/pure metal.</td></tr>
<tr><td>ii)</td><td>Responding variable
Diameter of dent</td><td>ii)</td><td>What to observe in the responding variable:
The diameter of the dent formed on material X and Y</td></tr>
<tr><td>iii)</td><td>Controlled variable
Mass of the weight// Height of the weight// size of steel ball bearing</td><td>iii)</td><td>The way to maintain the controlled variable:
Use same mass of weight// same height of weight//same size of steel ball bearing</td></tr>
</table>
</td><td>3</td></tr>
<tr><td></td><td></td><td>Able to state any two variables and any two actions correctly.</td><td>2</td></tr>
<tr><td></td><td></td><td>Able to state any one variable and any one action correctly</td><td>1</td></tr>
<tr><td></td><td></td><td>No response or wrong response</td><td>0</td></tr>
</table>

<table>
<tr><th colspan="2">Question</th><th>Details</th><th>Score</th></tr>
<tr><td>1.</td><td>i)</td><td>Able to classify all the six materials correctly

<u>Sample answer:</u>
<table><tr><th>Pure metal</th><th>Alloy</th></tr><tr><td>Tin</td><td>Brass</td></tr><tr><td>Copper</td><td>Pewter</td></tr><tr><td>Iron</td><td>Stainless steel</td></tr></table></td><td>3</td></tr>
<tr><td></td><td></td><td>Able to classify any four materials correctly</td><td>2</td></tr>
<tr><td></td><td></td><td>Able to classify any two materials correctly</td><td>1</td></tr>
<tr><td></td><td></td><td>No response or wrong response</td><td>0</td></tr>
</table>

<table>
<tr><th colspan="2">Question</th><th>Details</th><th>Score</th></tr>
<tr><td>2.</td><td>a)</td><td>Able to give the statement of the problem accurately and response is in question form

<u>Sample answer:</u>
How do different types of metals in contact with iron affect rusting?</td><td>3</td></tr>
<tr><td></td><td></td><td>Able to give the statement of the problem correctly

<u>Sample answer:</u>
How do different types of metals affect rusting?</td><td>2</td></tr>
<tr><td></td><td></td><td>Able to give an idea of statement of the problem correctly

<u>Sample answer:</u>
Do metal affect rusting// To investigate/study the effect of metal on the corrosion of iron.</td><td>1</td></tr>
<tr><td></td><td></td><td>No response or wrong response</td><td>0</td></tr>
</table>

Question		Details	Score
2.	b)	*Able to state **the three** variables correctly* **Sample answer:** Manipulated variable: Different metal in contact with iron Responding variable: Rusting of iron//rate of rusting Controlled variable: Iron nails//medium in which the iron nails are kept//temperature	3
		*Able to state **any two** variables correctly*	2
		*Able to state **any one** variable correctly*	1
		No response or wrong response	0

Question		Details	Score
2.	c)	*Able to state the relationship between the manipulated variable and the responding variable correctly with direction* **Sample answer:** When a more/less electropositive metal is in contact with iron, the metal inhibits/speeds up rusting	3
		Able to state the relationship between the manipulated variable and the responding variable with direction **Sample answer:** The metal inhibits/speeds up rusting when a more/less electropositive metal is in contact with iron	2
		Able to state the idea of hypothesis **Sample answer:** Different types of metals speed up / inhibits rusting	1
		No response or wrong response	0

Question		Details	Score
2.	d)	*Able to give adequate list of materials and apparatus* **Sample answer:** **Materials** 1. Iron nails 2. Magnesium ribbon, copper strip 3. Hot jelly solution with a little potassium hexacyanoferrate (III) and phenolphthalein 4. Sand paper **Apparatus** 1. Test tubes 2. Test tube rack	3
		Able to give a list of materials and apparatus **Sample answer:** **Materials** 1. Iron nails 2. Magnesium / copper strip 3. Hot jelly solution with a little potassium hexacyanoferrate (III) and phenolphthalein **Apparatus** Test tubes/beaker/any container	2
		Able to give an idea of materials and apparatus **Sample answer:** **Materials** Any material **Apparatus** Test tube/beaker/any container	1
		No response or wrong response	0

Question		Details	Score
2.	e)	*Able to state the following five steps:* **Sample answer:** 4. Clean all the three iron nails, magnesium ribbon and copper strip with sand paper 5. Coil two iron nails tightly with magnesium ribbon and copper strip respectively 6. Place all the iron nails in the different test tubes 7. Pour hot jelly solution containing potassium hexacyanoferrate (III) and phenolphthalein indicator into the test tube until completely cover the nails. 8. Keep the test tube in a test rack and leave them aside for a day. 9. Record the observations.	3
		Steps 2,3,4 and 6	2
		Step 3	1
		No response or wrong response	0

<table>
<tr><th colspan="2">Question</th><th>Details</th><th>Score</th></tr>
<tr><td>2.</td><td>f)</td><td>Able to tabulate the data that includes the following information:
1. Correct list
2. Complete list of iron and the metals in contact with iron

<u>Sample answer:</u>

<table><tr><td>Test tube</td><td>Observation // Intensity of blue colouration // presence of pink colouration</td></tr><tr><td>Fe</td><td></td></tr><tr><td>Fe + Mg</td><td></td></tr><tr><td>Fe + Cu</td><td></td></tr></table></td><td>3</td></tr>
<tr><td></td><td></td><td>Able to construct a table with
1. At least one title
2. Incomplete list of iron and the metals in contact with iron

<u>Sample answer:</u>

<table><tr><td>Test tube/metal</td><td>Observation // Intensity of blue colouration // presence of pink colouration</td></tr><tr><td>Fe onle</td><td></td></tr><tr><td>Fe + Mg / Cu</td><td></td></tr></table></td><td>2</td></tr>
<tr><td></td><td></td><td>Able to construct a table
1. Heading for observation

<u>Sample answer:</u>

<table><tr><td>Test tube/metal</td><td>Observation // Intensity of blue colouration // presence of pink colouration</td></tr><tr><td>Fe</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

4541/3
Chemistry
Kertas 3
Ogos

PEPERIKSAAN PRASPM
SEKOLAH-SEKOLAH MENENGAH

2013

ANSWER SCHEME
CHEMISTRY
Kertas 3
