

4541/1
Chemistry / Trial
Paper 1
September 2011
1 ¼ JAM

CHEMISTRY

FORM 5

Paper 1

Satu jam lima belas minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. This question paper consists of 50 questions.
Kertas soalan ini mengandungi 50 soalan.
2. Answer all questions
Jawab semua soalan.
3. The diagrams in the questions provided are not drawn to scale unless stated.
Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.
4. You may use a non-programmable scientific calculator.
Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogramkan.

Kertas soalan ini mengandungi 26 halaman bercetak dan 2 halaman tidak bercetak

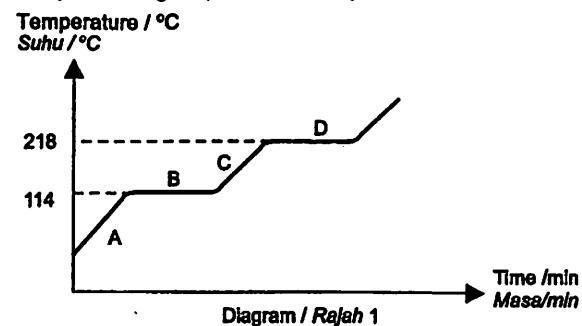
1. Which of the following is the correct sequence of scientific methods?
Manakah antara berikut merupakan urutan kaedah saintifik yang betul?
- A Interpreting data → collecting data → making conclusions → Identifying problems
Mentafsir data → mengumpul data → membuat kesimpulan → mengenal pasti masalah
- B Making observation → making inference → Identifying variables → making hypothesis
Membuat pemerhatian → membuat inferens → mengenal pasti pemboleh ubah → membuat hipotesis
- C Making hypothesis → carry out the experiment → making conclusion → making inference
Membuat hipotesis → menjalankan eksperimen → membuat kesimpulan → membuat inferens
- D Carry out the experiment → making hypothesis → interpreting data → making inference
Menjalankan eksperimen → membuat hipotesis → mentafsir data → membuat inferens
2. The following statements refer to the contributions of a scientist in the development of the atomic structure.
Pernyataan di bawah merujuk kepada sumbangan seorang saintis di dalam perkembangan struktur atom.

- | |
|---|
| <ul style="list-style-type: none"> • The nucleus of an atom contains protons and neutrons.
 <i>Nukleus suatu atom mengandungi proton dan neutron.</i> • Neutron is a neutral subatomic particle.
 <i>Neutron adalah zarah subatom yang neutral.</i> |
|---|

Who was the scientist who proposed the above statements?
Siapakah saintis yang mencadangkan pernyataan di atas?

- A J.J. Thompson
 B John Dalton
 C James Chadwick
 D Ernest Rutherford

3. Diagram 1 shows the heating curve of substance X.
Rajah 1 menunjukkan lengkung pemanasan bagi bahan X.



At which part of the graph does substance X exist in both liquid and gas states?
Pada bahagian graf yang manakah bahan X wujud dalam kedua-dua keadaan cecair dan gas?

4. Table 1 shows the proton number, nucleon number and electron arrangement of element W and Y.
Jadual 1 menunjukkan nombor proton, nombor nukleon dan susunan elektron bagi unsur W dan Y.

Element Unsur	Proton number Nombor proton	Nucleon number Nombor nukleon	Electron arrangement Susunan elektron
W	17	35	2.8.7
Y	17	37	2.8.7

Table 1 / Jadual 1

From Table 1, what can be concluded about Y atom?
Daripada Jadual 1, apakah kesimpulan yang boleh dibuat tentang atom Y?

- A Y atom is an isomer of W atom
Atom Y adalah isomer kepada atom W
- B Y atom is an isotope of W atom
Atom Y adalah isotop kepada atom W
- C Y is a cation for W atom
Y adalah kation kepada atom W
- D Y is an anion for W atom
Y adalah anion kepada atom W

8. Diagram 3 shows apparatus set up to determine the empirical formula of metal oxide.
Rajah 3 menunjukkan susunan radas untuk menentukan formula empirik bagi suatu oksida logam.

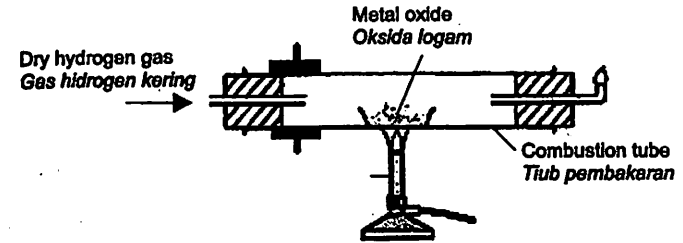


Diagram 3
Rajah 3

Which of the following metal oxides is suitable to be used in the experiment?
Antara oksida logam berikut, yang manakah paling sesuai digunakan di dalam eksperimen tersebut?

- | | | | |
|---|--------------------------------|---|--|
| A | Zinc oxide
Zink oksida | C | Lead (II) oxide
Plumbum (II) oksida |
| B | Sodium oxide
Natrium oksida | D | Magnesium oxide
Magnesium oksida |

9. The equation below shows the decomposition of a copper(II) nitrate salt.
Persamaan berikut menunjukkan penguraian garam kuprum(II) nitrat.



Calculate the volume of nitrogen dioxide, NO_2 gas at room condition if 0.1 mol of $\text{Cu}(\text{NO}_3)_2$ salt is heated.

[Molar volume = $24 \text{ dm}^3 \text{ mol}^{-1}$ at room conditions]

Hitung isipadu gas nitrogen dioksida, NO_2 pada keadaan bilik jika 0.1 mol garam $\text{Cu}(\text{NO}_3)_2$ dipanaskan?

[Isipadu molar = $24 \text{ dm}^3 \text{ mol}^{-1}$ pada suhu bilik]

- | | | | |
|---|--------------------|---|--------------------|
| A | 0.6 dm^3 | C | 2.4 dm^3 |
| B | 1.2 dm^3 | D | 4.8 dm^3 |

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

- A increasing number of electrons
peningkatan bilangan elektron
- B decreasing number of neutrons
penurunan bilangan neutron
- C increasing nucleon number
peningkatan nombor nukleon
- D increasing proton number
peningkatan nombor proton

11. Table 2 shows the elements in Period 3 of the Periodic Table of elements. The elements can react with oxygen to form oxides.

Jadual 2 menunjukkan unsur-unsur Kala 3 dalam Jadual Berkala Unsur. Unsur-unsur tersebut bertindak balas dengan oksigen membentuk oksida.

Element	Na	Mg	Al	Si	P	S	Cl
Unsur							

Table 2
 Jadual 2

Which of the following element form oxide that can react with both hydrochloric acid and sodium hydroxide solution?

Antara berikut unsur manakah membentuk oksida yang boleh bertindak balas dengan asid hidroklorik dan juga larutan natrium hidroksida?

- A Mg
- B Al
- C Si
- D P

12. Which of the following statement explains why the reactivity of the alkali metals increases when going down Group 1 in the Periodic Table?

Pernyataan yang manakah menjelaskan mengapa reaktiviti logam alkali meningkat apabila menuruni Kumpulan 1 di dalam Jadual Berkala Unsur?

- A The number of proton increase
Bilangan proton meningkat
- B The electronegativity of the atom decreases
Keelektronegatifan atom berkurangan
- C The number of shells filled with electron increase
Bilangan petala berisi elektron bertambah
- D The nuclei attraction towards valence electron becomes weaker
Daya tarikan nukleus terhadap elektron valens semakin lemah

50. Diagram 17 shows the structural formula of pent-1-ene.
Rajah 17 menunjukkan formula struktur bagi pent-1-ena.

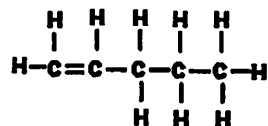
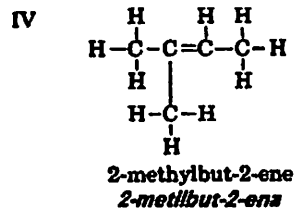
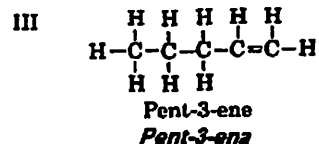
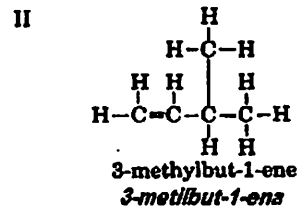
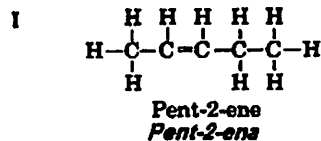


Diagram 17 / Rajah 17

Which of the following are the structural formulae and names for the isomers of pent-1-ene?
Antara berikut yang manakah adalah formula struktur dan nama isomer bagi pent-1-ena?



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

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

13. Which of the following is an ionic compound?
Antara berikut yang manakah sebatian ion?

- A Butane
Butana
- B Glucose
Glukosa
- C Calcium oxide
Kalsium oksida
- D Silicon dioxide
Silikon dioksida

14. Diagram 4 shows the position of element T and U in the Periodic Table.
Rajah 4 menunjukkan kedudukan unsur T dan U di dalam Jadual Berkala Unsur.

						U	
	T						

Diagram 4
Rajah 4

Which of the following is the formula of compound formed when T element reacts with U element?

Manakah antara berikut merupakan formula kimia bagi sebatian yang terbentuk apabila unsur T bertindak balas dengan unsur U?

- A TU_2
- B T_2U
- C T_2U_3
- D T_3U_2

15. Diagram 5 shows the apparatus set up used to investigate the electrical conductivity of ethanol.
Rajah 5 menunjukkan susunan radas yang digunakan untuk menyelidik kekonduksian elektrik bagi etanol.

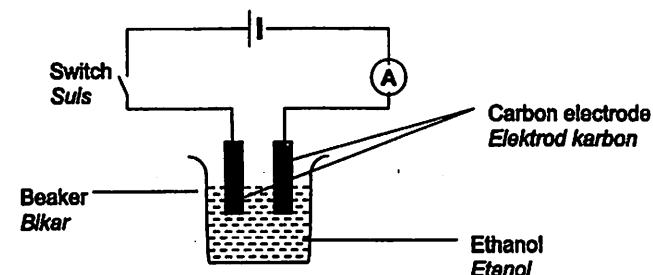


Diagram 5
Rajah 5

Why was the needle of ammeter not deflected when the switch was closed?
 Mengapakah jarum ammeter tidak terpesong apabila suis ditutupkan?

- A Ethanol is easily vaporised
Etanol mudah meruap
- B Rheostat is not in use
Reostat tidak digunakan
- C The ions are arranged in lattice structure
Ion-ion disusun di dalam struktur kekisi
- D Ethanol consists of only covalent molecules
Etanol mengandungi hanya molekul kovalen

16. Diagram 6 shows the electron arrangement for the compound formed between M and N atoms.

Rajah 6 menunjukkan susunan elektron bagi sebatian yang terbentuk di antara atom M dan atom N.

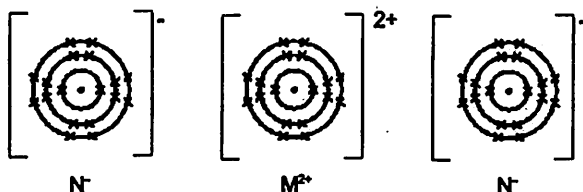


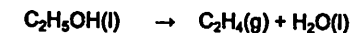
Diagram 6
Rajah 6

Which of the following is not true about the compound?

Antara yang berikut manakah tidak benar tentang sebatian tersebut?

- A The compound dissolves in water.
Sebatian tersebut larut di dalam air.
- B The compound has high melting point.
Sebatian tersebut mempunyai takat lebur yang tinggi.
- C The compound cannot conduct electricity in all states.
Sebatian tersebut tidak dapat mengalirkan elektrik dalam semua keadaan.
- D The compound is not vapourised at room temperature.
Sebatian tersebut tidak meruap pada suhu bilik.

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



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

- A Oxidation
Pengoksidaan
 - B Reduction
Penurunan
 - C Dehydration
Pendehidratan
 - D Fermentation
Penapaian
48. Which of the following is a reduction process?
 Antara yang berikut yang manakah proses penurunan?

- A A copper(II) ion gains two electrons
Ion kuprum(II) menerima dua elektron
- B Hydrogen sulphide loses its hydrogen
Hidrogen sulfida kehilangan hidrogen
- C Iron(II) ion converted to Iron(III) ion
Ion ferum(II) bertukar kepada ion ferum(III)
- D A magnesium atom loses two electrons
Satu atom magnesium kehilangan dua elektron

49. Which of the following characteristics shows that salt is used as food preservative?
 Antara ciri-ciri berikut yang manakah menunjukkan bahawa garam digunakan sebagai pengawet makanan?

- A Presence of chlorine
Kehadiran klorin
- B Saltiness
Rasa masin
- C Dehydrating property
Bersifat pengontang
- D Toxicity
Bertoksik

45. Why is benzoic acid added to chilli sauce?
Mengapakah asid benzoik ditambahkan kepada sos cili?

- | | |
|---|---|
| A To add nutrient
Menambahkan nutrisi | C To thicken the sauce
Memekatkan sos |
| B To enhance the taste
Meningkatkan rasa | D To extend the storage life
Memanjangkan tempoh penyimpanan |

46. Diagram 16 shows the energy level diagram for the reaction between zinc and copper(II) sulphate solution.
Rajah 16 menunjukkan gambarajah aras tenaga bagi tindak balas antara zink dan larutan kuprum(II) sulfat.

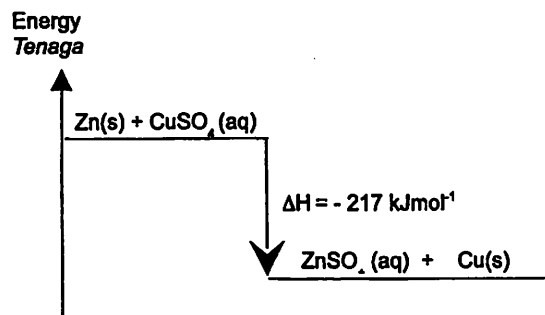


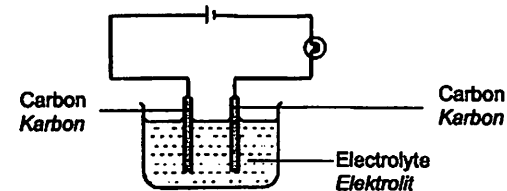
Diagram 16
Rajah 16

What is the change in temperature when 50 cm³ of 0.1 mol dm⁻³ copper(II) sulphate solution is reacted with excess zinc?
[Specific heat capacity of solution = 4.2 Jg⁻¹°C⁻¹]

Berapakah perubahan suhu jika 50 cm³ larutan kuprum(II) sulfat 0.1 mol dm⁻³ ditindakbalaskan dengan zink berlebihan?
[Muatan haba tentu larutan = 4.2 Jg⁻¹°C⁻¹]

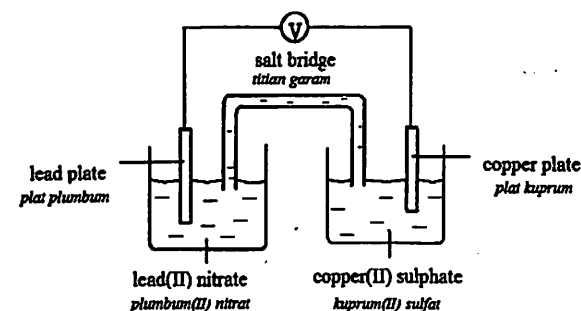
- A 2.1 °C
B 2.6 °C
C 5.2 °C
D 8.2 °C

17. Diagram 7 shows the set-up of the apparatus for electrolysis.
Rajah 7 menunjukkan susunan radas untuk elektrolisis.



Which of the following compound can be used as an electrolyte?
Antara sebatian berikut yang manakah boleh digunakan sebagai elektrolit?

- | | |
|---------------------------------------|---|
| A Ammonia solution
Larutan ammonia | C Naphthalene
Naftalena |
| B Glucose solution
Larutan glukosa | D Solid lead(II) sulphate
Pepejal plumbum(II) sulfat |
18. Diagram 8 shows a chemical cell using a lead plate and a copper plate as the electrodes.
Rajah 8 menunjukkan sel kimia yang menggunakan plat plumbum dan plat kuprum sebagai elektrod.



Which of the following is true for the chemical cell?
Manakah antara berikut benar bagi sel kimia di atas?

- A The copper plate acts as the positive terminal.
Plat kuprum bertindak sebagai terminal positif.
- B The salt bridge acts as a medium for transferring of electrons.
Titian garam bertindak sebagai perantara untuk pemindahan elektron.
- C The electrons flow from copper plate to the lead plate through external circuit.
Elektron mengalir dari plat kuprum ke plat plumbum melalui litar luar.
- D The concentration of the Cu²⁺ ions in the copper(II) sulphate solution remains unchanged.
Kepekatan ion Cu²⁺ dalam larutan kuprum(II) sulfat tidak berubah.

19. Which of the following shows the correct set-up of apparatus for the purification of copper?
Antara susunan radas yang berikut, manakah menunjukkan proses penulenan logam kuprum yang betul?

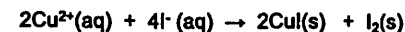
A

B

C

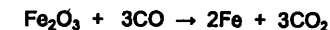
D

43. Copper(II) sulphate solution reacts with potassium iodide solution according to the equation below:
Larutan kuprum(II) sulfat bertindak balas dengan larutan kalium iodida mengikut persamaan berikut:



Which statement is true?
Pernyataan yang manakah benar?

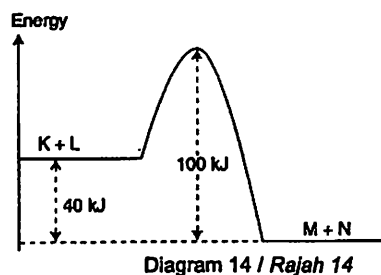
- I Iodide ions act as a reducing agent.
Ion iodida bertindak sebagai agen penurunan.
- II Oxidation number of copper changes from +2 to +1
Nombor pengoksidaan kuprum berubah dari +2 ke +1
- III Iodide ions lose electrons to form solid iodine.
Ion iodida kehilangan elektron untuk membentuk pepejal iodin.
- IV Copper(II) ion is oxidised.
Ion kuprum(II) telah dioksidakan.
- A I and II only
I dan II sahaja
- B II and III only
II dan III sahaja
- C I, II and III only
I, II dan III sahaja
- D I, III and IV
I, III dan IV
44. Iron is produced when haematite, Fe_2O_3 reacts with carbon monoxide as shown in the equation below:
Besi dihasilkan apabila hematit, Fe_2O_3 bertindak balas dengan karbon monoksida seperti persamaan di bawah:



Which changes in oxidation number of the iron, Fe and carbon, C are correct?
Perubahan nombor pengoksidaan besi, Fe dan karbon, C yang manakah betul?

	Iron besi	Carbon karbon
A	+2 → 0	0 → +2
B	+3 → 0	+2 → +4
C	+2 → +3	0 → +2
D	+3 → +2	+2 → +4

41. Diagram 14 shows the energy profile diagram for a reaction.
Rajah 14 menunjukkan gambar rajah profil tenaga bagi suatu tindak balas.



Determine the heat of reaction and the activation energy for the reaction.
Tentukan haba tindak balas dan tenaga pengaktifan bagi tindak balas ini.

	Heat of reaction Haba tindak balas / kJ	Activation Energy Tenaga Pengaktifan / kJ
A	-40	60
B	-60	40
C	+40	100
D	+60	100

42. Diagram 15 are the structural formulae which represent organic compounds of P and Q.
Rajah 15 menunjukkan formula struktur yang mewakili sebatian organik P dan Q.



What is the name of the compound formed when P reacts with Q using concentrated sulphuric acid as a catalyst?
Apakah nama sebatian yang terhasil apabila P bertindak balas dengan Q dengan menggunakan asid sulfurik sebagai mangkin?

- | | |
|------------------------------------|--------------------------------------|
| A Butyl ethanoate
Butil etanoat | C Propyl ethanoate
Propil etanoat |
| B Ethyl butanoate
Etil butanoat | D Ethyl propanoate
Etil propanoat |

20. Diagram 9 shows the set-up of apparatus of an experiment which pair of metal, X and Y are used as electrodes.

Rajah 9 menunjukkan susunan radas bagi satu eksperimen di mana pasangan logam X dan Y digunakan sebagai elektrod..

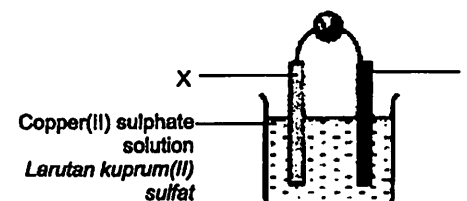


Diagram 9
Rajah 9

Table 3 shows voltmeter reading obtained when this experiment are repeated using different pair of metal. What is the value of a?

Jadual 3 menunjukkan bacaan voltmeter yang diperolehi apabila eksperimen diulangi dengan menggunakan pasangan logam yang bertlainan. Apakah nilai a?

Electrode / Elektrod		Voltmeter reading Bacaan voltmeter (V)
X	Y	
Copper Kuprum	Iron Ferum	0.8
Zinc Zink	Magnesium Magnesium	a
Iron Ferum	Zinc Zink	0.2
Copper Kuprum	Magnesium Magnesium	2.6

Table 3
Jadual 3

- | | |
|-------|-------|
| A 3.6 | C 1.6 |
| B 2.4 | D 1.4 |

21. Which of the following is a strong diprotic acid?
Manakah antara yang berikut adalah asid kuat dwibes?

- A HCl
B H₂CO₃
C H₂SO₄
D CH₃COOH

22. Why is ammonia considered as an alkali?
Mengapakah ammonia diambilkira sebagai suatu alkali?

- A It contains hydroxide ions.
ia mengandungi ion hidroksida.
- B It ionises in water to produce salt and water.
ia mengion di dalam air menghasilkan garam dan air.
- C It ionises in water to produce hydroxonium ion.
ia mengion di dalam air menghasilkan ion hidroksonium.
- D It ionises in water to produce hydroxide ions.
ia mengion di dalam air menghasilkan ion hidroksida.

23. Diagram 10 shows the set-up of apparatus used in an acid-base titration.
Rajah 10 menunjukkan susunan radas yang digunakan di dalam pentitratan asid-bes.

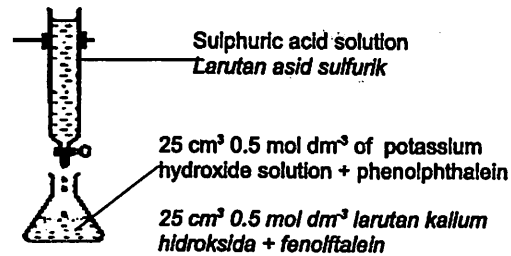


Diagram 10 / Rajah 10

In the titration, the initial reading of the burette is 5.00 cm³ and the final reading is 30.00 cm³. Which of the following is true?

Di dalam pentitratan tersebut, bacaan awal bagi buret adalah 5.00 cm³ dan bacaan akhir adalah 30.00 cm³. Manakah antara yang berikut adalah benar?

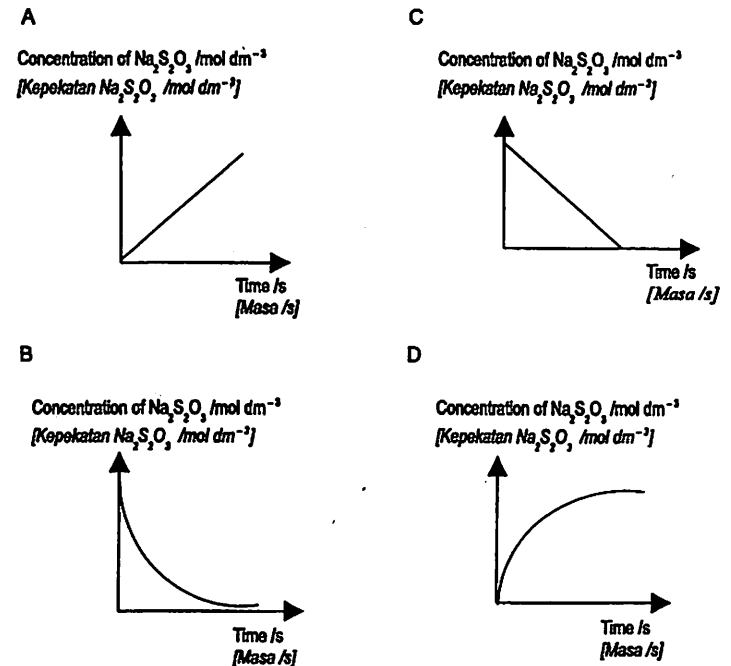
- I The colour changes from pink to colourless at the end point.
Warna berubah daripada merah jambu kepada tidak berwarna pada takat akhir.
- II The end point for the titration is 30.00 cm³.
Takat akhir untuk pentitratan ini adalah 30.00 cm³.
- III The concentration of the sulphuric acid solution used to neutralise potassium hydroxide solution is 0.50 mol dm⁻³.
Kepekatan larutan asid sulfurik yang digunakan untuk meneutralkan larutan kalium hidroksida ialah 0.50 mol dm⁻³.
- IV The products at the end point are potassium sulphate, water and hydrogen gas.
Hasil tindak balas pada takat akhir adalah kalium sulfat, air dan gas hidrogen.

40. The reaction between sodium thiosulphate and hydrochloric acid is shown in the chemical equation below:
Tindak balas antara natrium tiosulfat dan asid hidroklorik adalah ditunjukkan seperti persamaan kimia berikut:



Which graph represents the change in concentration of sodium thiosulphate with time for the reaction?

Graf yang manakah mewakili perubahan kepekatan natrium tiosulfat dengan masa bagi tindak balas ini?



38. Table 6 shows the volume of oxygen gas collected every 30 s for the decomposition of hydrogen peroxide, H₂O₂.
 Jadual 6 menunjukkan isi padu gas oksigen yang dikumpul pada setiap 30 s bagi penguraian hidrogen peroksida, H₂O₂.

Time / Masa(s)	0	30	60	90	120	150	180
Volume of oxygen gas Isi padu gas oksigen (cm ³)	0.0	5.0	9.0	12.0	14.5	16.5	18.0

Table 6 / Jadual 6

Calculate the average rate of decomposition of hydrogen peroxide from 60 s to 180 s.
 Hitungkan kadar purata penguraian hidrogen peroksida daripada 60 s ke 180 s.

- A 0.075 cm³ min⁻¹ C 9.0 cm³ min⁻¹
 B 4.5 cm³ min⁻¹ D 18.0 cm³ min⁻¹
39. The thermochemical equation for a neutralization reaction is given below.
 Persamaan termokimia untuk tindak balas peneutralan diberi di bawah.



Which neutralization reaction has the same value of the heat of neutralisation?
 Tindak balas peneutralan yang manakah mempunyai nilai haba peneutralan yang sama?

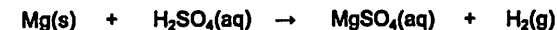
- A $\text{HCl} + \text{NH}_3 \rightarrow \text{NH}_4\text{Cl}$
 B $\text{CH}_3\text{COOH} + \text{KOH} \rightarrow \text{CH}_3\text{COOK} + \text{H}_2\text{O}$
 C $\text{NaOH} + \text{HNO}_3 \rightarrow \text{NaNO}_3 + \text{H}_2\text{O}$
 D $\text{CH}_3\text{COOH} + \text{NH}_4\text{OH} \rightarrow \text{CH}_3\text{COONH}_4 + \text{H}_2\text{O}$

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

24. Which of the following salt is soluble in water?
 Manakah antara garam berikut larut dalam air?

- A Iron(II) sulphate
Ferum(II) sulfat
 B Silver chloride
Argentum klorida
 C Calcium carbonate
Kalsium karbonat
 D Lead(II) bromide
Plumbum(II) bromida

25. The equation below shows the reaction between magnesium and sulphuric acid.
 Persamaan di bawah menunjukkan tindak balas antara magnesium dan asid sulfurik.



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

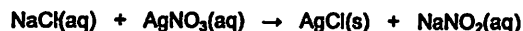
[Relative atomic mass of H = 1; Mg = 24; S = 32; O = 16]
 [Jisim atom relatif H = 1; Mg = 24; Cl = 35.5; O = 16]

- A 1 g of magnesium reacts completely with 1 g of sulphuric acid.
1 g magnesium bertindak balas lengkap dengan 1 g asid sulfurik.
 B 1 mol of magnesium reacts completely with 1 mol of hydrogen ions.
1 mol magnesium bertindak balas lengkap dengan 1 mol ion hidrogen.
 C 24 g of magnesium reacts completely with 98 g of sulphuric acid.
24 g magnesium bertindak balas lengkap dengan 98 g asid sulfurik.
 D 2 mol of hydrogen gas are produced when 1 mol of sulphuric acid reacts completely with excess magnesium.
2 mol gas hidrogen dihasilkan apabila 1 mol asid sulfurik bertindak balas lengkap dengan magnesium berlebihan.

26. Copper(II) chloride salt can be prepared by mixing hydrochloric acid and substance Q. What is substance Q?
Garam kuprum(II) klorida boleh disediakan dengan mencampurkan asid hidroklorik dan bahan Q. Apakah bahan Q?

- | | | | |
|---|---|---|---|
| A | Copper
Kuprum | C | Copper(II) carbonate
Kuprum(II) karbonat |
| B | Copper(II) nitrate
Kuprum(II) nitrat | D | Copper(II) sulphate
Kuprum(II) sulfat |

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



200 cm³ of 0.1 mol dm⁻³ sodium chloride solution reacts completely with excess silver nitrate solution.

200 cm³ 0.1 mol dm⁻³ larutan natrium klorida bertindak balas lengkap dengan larutan argentum nitrat berlebihan.

Calculate the mass of precipitate produced.

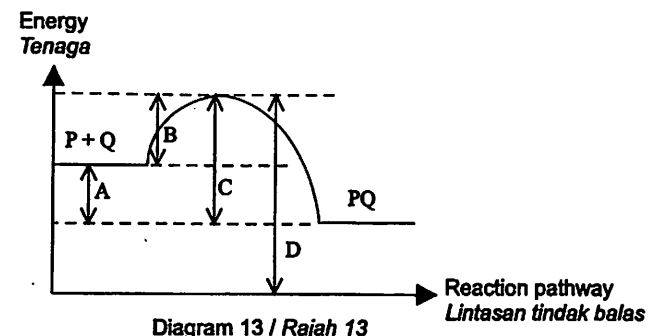
Hitungkan jisim mendakan yang terbentuk.

[Relative atomic mass Ag=108; Cl=35.5]

[Jisim atom relatif: Ag=108; Cl=35.5]

- | | | | |
|---|--------|---|--------|
| A | 2.78 g | C | 3.78 g |
| B | 2.87 g | D | 3.87 g |

36. Diagram 13 shows an energy level diagram for the reaction $\text{P} + \text{Q} \rightarrow \text{PQ}$.
Rajah 13 menunjukkan suatu gambarajah aras tenaga bagi tindak balas $\text{P} + \text{Q} \rightarrow \text{PQ}$.
Which of the following represents the heat of reaction, ΔH ?
Antara berikut yang manakah mewakili haba tindak balas, ΔH ?



37. The production of soap can be represented by the equation below.
Pembentukan sabun boleh diwakili dengan persamaan berikut.



Which of the following is true?

Yang manakah pernyataan yang benar?

- | | | | |
|-----|---|---|--|
| I | Glycerol is a type of alcohol
Gliserol merupakan sejenis alkohol | C | II and IV only
II dan IV sahaja |
| II | The reaction is known as saponification
Tindak balas dikenali sebagai saponifikasi | D | I, II and IV only
I, II dan IV sahaja |
| III | Sodium hydroxide is used as catalyst
Natrium hidroksida bertindak sebagai mangkin | | |
| IV | Animal fats or vegetable oils are commonly used
Lemak haiwan dan minyak sayuran biasanya digunakan | | |
| A | I and II only
I dan II sahaja | | |
| B | III and IV only
III dan IV sahaja | | |

34. Diagram 12 shows a flow chart showing the conversion of alkene to carboxylic acid and alkane.

Rejah 12 menunjukkan satu carta alir perubahan alkena kepada asid karboksilik dan alkana.

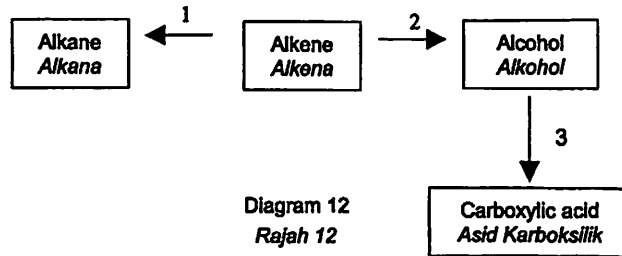


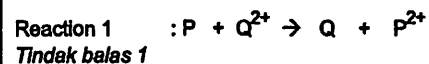
Diagram 12
Rejah 12

What are reaction of 1, 2 and 3?
Apakah tindak balas 1, 2 dan 3?

	1	2	3
A	Hydrogenation <i>Penghidrogenan</i>	Hydration <i>Penghidratan</i>	Oxidation <i>Pengoksidaan</i>
B	Hydrogenation <i>Penghidrogenan</i>	Oxidation <i>Pengoksidaan</i>	Dehydration <i>Pendehidratan</i>
C	Oxidation <i>Pengoksidaan</i>	Hydration <i>Penghidratan</i>	Dehydration <i>Pendehidratan</i>
D	Hydration <i>Penghidratan</i>	Hydrogenation <i>Penghidrogenan</i>	Oxidation <i>Pengoksidaan</i>

35. P, Q and R are metals. Based on the ionic equations below, which of the following statement is true?

P, Q dan R adalah logam. Berdasarkan persamaan ion di bawah, pernyataan yang manakah benar?



- A. P and Q are oxidised
P dan Q teroksidakan
- B. P is more electropositive than R.
P adalah lebih elektropositif daripada R
- C. Q can displace P from its salt solution.
Q boleh menyesarkan P daripada larutan garamnya
- D. Q is lower than R in the electrochemical series.
Q adalah di bawah R dalam siri elektrokimia.

28. A series of test were carried out on a salt X solution. Table 4 shows the results of the tests.

Satu siri ujian telah dijalankan ke atas larutan garam X. Jadual 4 menunjukkan keputusan ujian tersebut.

Test <i>Ujian</i>	Observation <i>Pemerhatian</i>
Add lead(II) nitrate solution. <i>Tambahkan larutan plumbum(II) nitrat</i>	White precipitate dissolves in water when heated. <i>Mendakan putih, larut dalam air apabila dipanaskan.</i>
Add dilute sulphuric acid. <i>Tambahkan asid sulfurik cair.</i>	No change. <i>Tiada perubahan.</i>
Add sodium hydroxide solution until in excess. <i>Tambahkan larutan natrium hidroksida sehingga berlebihan.</i>	White precipitate is formed. It is insoluble in excess sodium hydroxide solution. <i>Mendakan putih terbentuk. Ia tidak larut dalam larutan natrium hidroksida berlebihan.</i>
Add ammonia solution until in excess. <i>Tambahkan larutan akueus ammonia sehingga berlebihan.</i>	White precipitate is formed. It is insoluble in excess ammonia solution. <i>Mendakan putih terbentuk. Ia tidak larut dalam larutan akueus ammonia berlebihan.</i>

Table 4
Jadual 4

Based on the results of the experiment, X salt is
Berdasarkan keputusan eksperimen, garam X ialah

- A. Zinc chloride
Zink klorida
- B. Calcium carbonate
Kalsium karbonat
- C. Aluminium sulphate
Aluminium sulfat
- D. Magnesium chloride
Magnesium klorida

29. Which of the following pairs of elements is correct?
Antara pasangan unsur berikut yang manakah betul?

	Main Element <i>Unsur utama</i>	Element added <i>Unsur yang ditambah</i>	Type of alloy <i>Jenis aloi</i>
A	Copper <i>Kuprum</i>	Zinc <i>Zink</i>	Brass <i>Loyang</i>
B	Copper <i>Kuprum</i>	Iron <i>Ferum</i>	Bronze <i>Gangsa</i>
C	Tin <i>Stanium</i>	Carbon <i>Karbon</i>	Pewter <i>Pewter</i>
D	Iron <i>Ferum</i>	Tin <i>Stanium</i>	Steel <i>Keluli</i>

30. X atom is added to molten iron to form an alloy. Which of the following is not the properties of the alloy?

Atom X ditambahkan kepada leburan besi untuk membentuk sejenis aloi. Antara yang berikut, yang manakah bukan sifat aloi tersebut?

- A Harder
Leblh keras
- B Malleable
Mulur
- C High melting point
Takat lebur tinggi
- D More resistance to rusting
Leblh tahan terhadap pengurangan

31. Which of the following changes is true when a reaction occurs?
Antara perubahan yang berikut, yang manakah benar apabila sesuatu tindak balas berlaku?

- A Increasing in the concentration of a reactant with time.
Peningkatan kepekatan suatu bahan tindak balas dengan masa.
- B Increasing in the mass of a reactant with time.
Peningkatan jisim suatu bahan tindak balas dengan masa.
- C Increasing in the volume of a reactant with time.
Peningkatan isipadu suatu bahan tindak balas dengan masa.
- D Increasing in the volume of a product with time.
Peningkatan isipadu suatu hasil tindak balas dengan masa.

32. Table 5 shows the volume of hydrogen gas collected at a regular time intervals for the reaction between zinc powder with hydrochloric acid.
Jadual 5 menunjukkan isipadu gas hidrogen yang dikumpul pada sela masa tertentu bagi tindak balas antara serbuk zink dengan asid hidroklorik.

Time/min <i>Masa</i>	0	0.5	1.0	1.5	2.0	2.5
Volume of hydrogen gas/cm ³ <i>Isipadu gas hidrogen</i>	0.00	7.50	14.80	20.40	25.00	30.50

Table 5 / *Jadual 5*

What is the average rate of reaction between the first minute and the second minute?
Apakah kadar tindak balas purata antara minit pertama dengan minit kedua?

- A 7.50 cm³ min⁻¹
- B 10.20 cm³ min⁻¹
- C 12.50 cm³ min⁻¹
- D 14.80 cm³ min⁻¹

33. The graph in Diagram 11 shows the result of Experiment I and Experiment II. Both experiments used 5 g of calcium carbonate powder and hydrochloric acid.
Graf dalam Rajah 11 menunjukkan keputusan bagi Eksperimen I dan Eksperimen II. Kedua-dua eksperimen itu menggunakan 5 g serbuk kalsium karbonat dan asid hidroklorik.

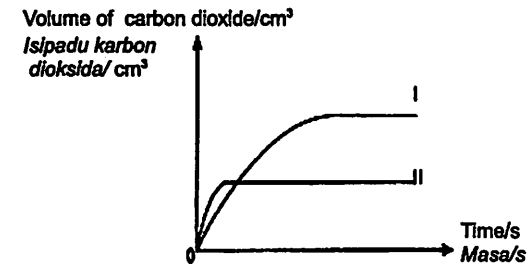


Diagram 11
Rajah 11

Which of the following conditions produce the graph?
Antara keadaan-keadaan yang berikut, yang manakah menghasilkan graf itu?

	Experiment I <i>Eksperimen I</i>			Experiment II <i>Eksperimen II</i>		
	Temperature/°C <i>Suhu/°C</i>	Volume of HCl <i>Isipadu HCl / cm³</i>	Concentration of HCl <i>Kepekatan HCl / mol dm³</i>	Temperature/°C <i>Suhu/°C</i>	Volume of HCl <i>Isipadu HCl / cm³</i>	Concentration of HCl <i>Kepekatan HCl / mol dm³</i>
A	40	200	1.0	50	200	1.0
B	40	400	0.5	50	100	1.0
C	50	100	1.0	40	200	0.5
D	50	100	0.5	40	200	0.5

4541/2
Chemistry / Trial
Paper 2
September 2011
2 ½ JAM

NAME :	
CLASS :	

CHEMISTRY

FORM 5

Paper 2

Two hours and thirty minutes

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

- Kertas soalan ini adalah dalam dwibahasa.
- Soalan dalam bahasa Inggeris mendahului soalan yang sepadan dalam bahasa Melayu.
- Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam bahasa Inggeris atau Bahasa Melayu.
- Kertas soalan ini mengandungi tiga bahagian: Bahagian A, Bahagian B dan Bahagian C.
- Jawab semua soalan dalam Bahagian A. Jawapan anda bagi Bahagian A hendaklah ditulis pada ruang yang disediakan dalam kertas soalan ini.
- Jawab satu soalan daripada Bahagian B dan satu soalan daripada Bahagian C. Jawapan anda bagi Bahagian B dan Bahagian C hendaklah ditulis dalam helaian tambahan.

<i>Untuk kegunaan Pemeriksa</i>			
Bahagian	Soalan	Markah penuh	Markah Diperolehi
A	1	9	
	2	9	
	3	10	
	4	10	
	5	11	
	6	11	
B	7	20	
	8	20	
C	9	20	
	10	20	
Jumlah			

Kertas soalan ini mengandungi 22 halaman bercetak dan 2 halaman tidak bercetak

Section A
[60 marks]
[60 markah]

Answer all questions
 Jawab semua soalan

1. (a) Table 1 shows the proton number and the nucleon number of atom X, Y and Z.
 Jadual 1 menunjukkan nombor proton dan nombor nukleon atom X, Y dan Z.

Atom Atom	Proton number Bilangan proton	Nucleon number Bilangan neutron
X	6	12
Y	6	14
Z	8	16

Table 1 / Jadual 1

- (i) What is meant by nucleon number?
 Apakah yang dimaksudkan dengan nombor nukleon?
-
- [1 mark]
- (ii) Which atoms are isotopes? Give reason to your answer.
 Atom-atom yang manakah merupakan isotop? Berikan sebab kepada jawapan anda.
-
-
- [2 mark]
- (iii) State the valence electron of atom of X.
 Nyatakan elektron valens atom X.
-
- [1 mark]
- (iv) State the number of neutrons of atom of Y.
 Nyatakan bilangan neutron atom Y.
-
- [1 mark]

- (v) State the position of element of Z in the Periodic Table of Element.
Nyatakan kedudukan unsur bagi Z dalam Jadual Berkala Unsur.

.....

[1 mark]

- (b) Diagram 1 shows the information of glucose.
Rajah 1 menunjukkan maklumat bagi glukosa

- | |
|---|
| <ul style="list-style-type: none"> • Empirical formula CH_2O • Relative molecular mass of glucose is 180 • Formula empirik CH_2O • Jisim molekul relatif glukosa adalah 180 |
|---|

Diagram 1 / Rajah 1

Determine the molecular formula of glucose.
Tentukan formula molekul glukosa.

[3 marks]

2. Diagram 2 shows part of the Periodic Table of Element. D, E, G, H, J, and Q do not represent the actual symbol of the elements.
Rajah 2 menunjukkan sebahagian daripada Jadual Berkala Unsur. D, E, G, H, J, dan Q tidak mewakili simbol sebenar unsur-unsur berkenaan.

Diagram2/Rajah 2

Using the letters in the Periodic Table of Elements in Diagram 2, answer the following questions.

Dengan menggunakan huruf-huruf yang terdapat dalam Jadual Berkala pada Rajah 3, jawab soalan-soalan berikut.

- (a) State the position of element D in the Periodic Table.
Nyatakan kedudukan unsur D dalam Jadual Berkala.

.....
[2 marks]

- (b) Choose one element which exhibits different oxidation numbers in its compounds.
Pilih satu unsur yang mempunyai pelbagai nombor pengoksidaan di dalam sebatianannya.

.....
[1 mark]

- (c) Element D combines with element G to form a compound.
Unsur D bergabung dengan unsur G untuk membentuk suatu sebatian.

- (i) Write the chemical formula of this compound.
Tuliskan formula kimia bagi sebatian ini.

.....
[1 mark]

- (ii) State one physical property of this compound.
Nyatakan satu sifat fizik sebatian ini.

.....
[1 mark]

- (d) E and J have the same chemical properties.
E dan J mempunyai sifat-sifat kimia yang sama.

- (i) Which element is more reactive?
Unsur yang manakah yang lebih reaktif?

.....
[1 mark]

- (ii) Explain your answer in (c)(i).
Terangkan jawapan anda dalam (c)(i).

.....
.....
[2 marks]

- (i) Name a suitable substance that can be used as solvent X and solvent Y.
Namakan bahan yang sesuai yang boleh digunakan sebagai pelarut X dan pelarut Y.
[2 marks]

- (ii) Describe a chemical test to differentiate the two solutions of hydrogen chloride in solvent X and solvent Y.
Huralkan satu eksperimen untuk membezakan dua larutan hidrogen klorida di dalam pelarut X dan pelarut Y.
[6 marks]

- (b) (i) From Table 10, choose suitable hydrogen chloride solution that can be used to prepare a soluble zinc salt? Explain your answer.
Dari Jadual 10, pilih larutan hidrogen klorida yang sesuai yang digunakan untuk menyediakan satu garam zink terlarut. Terangkan jawapan anda.
[2 marks]

- (ii) Hydrogen chloride dissolves in water to form hydrochloric acid. Using hydrochloric acid and one suitable substance, describe an experiment to prepare dried zinc chloride crystals.
Hidrogen klorida larut dalam air membentuk asid hidroklorik. Dengan menggunakan asid hidroklorik dan satu bahan yang sesuai, huralkan satu eksperimen untuk menyediakan hablur garam terlarut zink klorida yang kering.
[10 marks]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

- (i) Describe an experiment on how alcohol P undergoes dehydration to produce propene. Your answer should include a labeled diagram and a chemical equation.

Huraikan satu eksperimen bagaimana alkohol P menjalani pendehidratan menghasilkannya propena. Jawapan anda perlu merangkumi gambar rajah bertabel dan persamaan kimia.

[8 marks]

- (ii) State the name of compound R and identify its functional group. *Nyatakan nama sebatian R dan kenalpasti kumpulan fungsinya.*

[2 marks]

- (iii) Describe two chemical tests to differentiate propene and compound R. *Huraikan dua ujian kimia untuk membezakan propena dan sebatian R.*

[6 marks]

10. (a) Diagram 10 shows the set-up of apparatus to prepare two solutions of hydrogen chloride in solvent X and solvent Y.

Rajah 10 menunjukkan susunan radas untuk menyediakan dua larutan hidrogen klorida di dalam pelarut X dan pelarut Y.

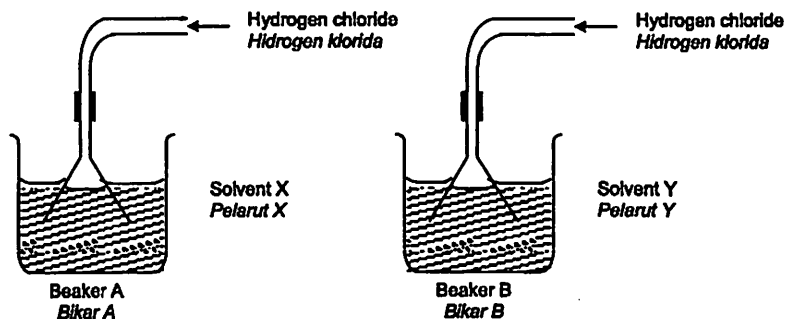


Diagram 10 / Rajah 10

Table 10 shows the pH values of two solutions of hydrogen chloride in solvent X and solvent Y. *Jadual 10 menunjukkan nilai pH bagi dua larutan hidrogen klorida dalam pelarut X dan pelarut Y.*

Solution / Larutan	pH Value / Nilai pH
Hydrogen chloride in solvent X / Hidrogen klorida dalam pelarut X	7
Hydrogen chloride in solvent Y / Hidrogen klorida dalam pelarut Y	1

Table 10 / Jadual 10

- (e) (i) Which element is a noble gas? *Unsur yang manakah merupakan suatu gas adi?*

[1 mark]

- (ii) Why element in (d)(i) does not react with other elements. *Mengapa unsur di (d)(i) tidak bertindak balas dengan unsur lain.*

[1 mark]

3. Table 3 shows the observation for two experiments, Experiment I and Experiment II to investigate the electrolysis of copper(II) chloride solution using carbon electrodes. *Rajah 3 menunjukkan pemerhatian bagi dua eksperimen, Eksperimen I dan Eksperimen II untuk mengkaji elektrolisis larutan kuprum(II) klorida menggunakan electrode karbon.*

Experiment / Eksperimen	Observation / Pemerhatian
Experiment I: Electrolysis of 0.0001 mol dm ⁻³ copper(II) chloride solution <i>Eksperimen I: Elektrolisis larutan kuprum(II) klorida 0.0001 mol dm⁻³</i>	Anode: Gas bubbles are released. <i>Anod: Gelembung gas terbebas</i> Cathode: <i>Katod:</i>
Experiment II: Electrolysis of 1.0 mol dm ⁻³ copper(II) chloride solution. <i>Eksperimen II: Elektrolisis larutan kuprum(II) klorida 1.0 mol dm⁻³</i>	Anode: Gas bubbles are released. <i>Anod: Gelembung gas terbebas</i> Cathode: <i>Katod:</i>

Table 3 / Jadual 3

- (a) State the cations present in copper(II) chloride solution.
Nyatakan kation yang hadir dalam larutan kuprum(II) klorida.

.....
[1 mark]

- (b) State the observation at cathode in Table 3.
Nyatakan pemerhatian di katod dalam Jadual 3.

[2 marks]

- (c) Based on Experiment I,
Berdasarkan Eksperimen I,

- (i) State the name of the gas released at anode.
Nyatakan nama gas yang terbebas di anod.

.....
[1 mark]

- (ii) Suggest a test to confirm the gas in b(ii).
Cadangkan satu ujian untuk mengesahkan hasil yang terbentuk di b(ii).

.....
[1 mark]

- (d) Based on experiment II,
Berdasarkan eksperimen II,

- (i) State the ion that is selected to be discharged at the anode. Give reason to your answer.
Nyatakan ion yang dipilih untuk dinyahcas di anod. Berikan sebab kepada jawapan anda

.....
[2 mark]

- (ii) Write the half equation for the reaction at the anode.
Tuliskan setengah persamaan untuk tindak balas di anod.

.....
[2 marks]

- (iii) State the product formed at anode.
Nyatakan hasil yang terbentuk di anod.

.....
[1 mark]

Section C
Bahagian C

[20 marks]
[20 markah]

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

9. Diagram 9 shows the flow chart for the conversion of alcohol P.
Rajah 9 menunjukkan carta alir penukaran bagi alkohol P.

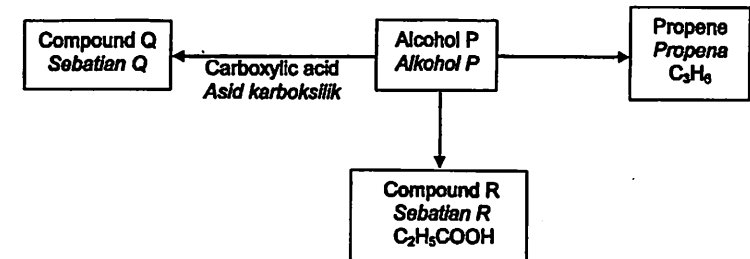


Diagram 9 / Rajah 9

- (a) Alcohol P has two isomers. Draw the structural formula for the two isomers of alcohol P.
Alkohol P mempunyai dua isomer. Lukis formula struktur bagi kedua-dua isomer alkohol P.
[2 marks]
- (b) Compound Q is produced when alcohol P reacts with carboxylic acid. By using carboxylic acid that has less than four carbon atoms, state the name and draw the structural formula of compound Q.
Sebatian Q dihasilkan apabila alkohol P bertindak dengan asid karboksilik. Dengan menggunakan asid karboksilik yang mempunyai kurang daripada empat atom karbon, nyatakan nama dan lukis formula struktur sebatian Q.
[2 marks]
- (c) Alcohol P undergoes dehydration reaction to produce propene and alcohol P also can undergo oxidation reaction to produce compound R.
Alkohol P menjalani tindak balas pendehidratan menghasilkan propena dan alkohol P juga menjalani tindak balas pengoksidaan menghasilkan sebatian R.

- (ii) State the name of the anion present in salt J. Then describe one chemical test to determine the presence of anion in salt J.
Nyatakan nama anion yang hadir dalam garam J. Kemudian huraikan satu ujian kimia untuk menentukan kehadiran anion dalam garam J.

[5 marks]

8. (a) (i) Polythene and polyvinyl chloride (PVC) is an examples of synthetic polymer. Explain how disposal and burning of synthetic polymers causes environmental pollution.

Politena dan polivinil klorida (PVC) adalah contoh-contoh polimer sintetik. Terangkan bagaimana pembuangan dan pembakaran bahan polimer sintetik menyebabkan masalah pencemaran alam sekitar.

[6 marks]

- (ii) Suggest steps that can be taken to overcome environmental pollutions that stated in 8(a)(i).

Cadangkan langkah-langkah yang boleh diambil untuk mengatasi masalah pencemaran alam sekitar yang dinyatakan di 8(a)(i).

[4 marks]

- (b) (i) Composite materials are produced from combination of two or more different compounds. Fibre glass is a type of composite compound. Describe on fibre glass in terms of:

- main component
- special properties
- uses

Bahan komposit ialah bahan yang dihasilkan daripada gabungan dua atau lebih sebatian-sebatian. Gentian kaca adalah sejenis bahan komposit. Huraikan gentian kaca dari segi:

- komponen utama
- ciri istimewa
- penggunaan

[4 marks]

- (c) (i) State the main component of glass and one difference between ceramic and glass. Nyatakan komponen utama kaca dan berikan satu perbezaan antara seramik dengan kaca.

- (ii) State the uses of ceramic in the fields of construction, electronics, medical and astronomy.

Nyatakan penggunaan seramik dalam bidang pembinaan, elektronik, perubatan dan astronomi.

[6 marks]

4. The following equation shows the decomposition of hydrogen peroxide at room condition using a catalyst.

Persamaan berikut menunjukkan penguraian hidrogen peroksida pada keadaan bilik menggunakan suatu mangkin.



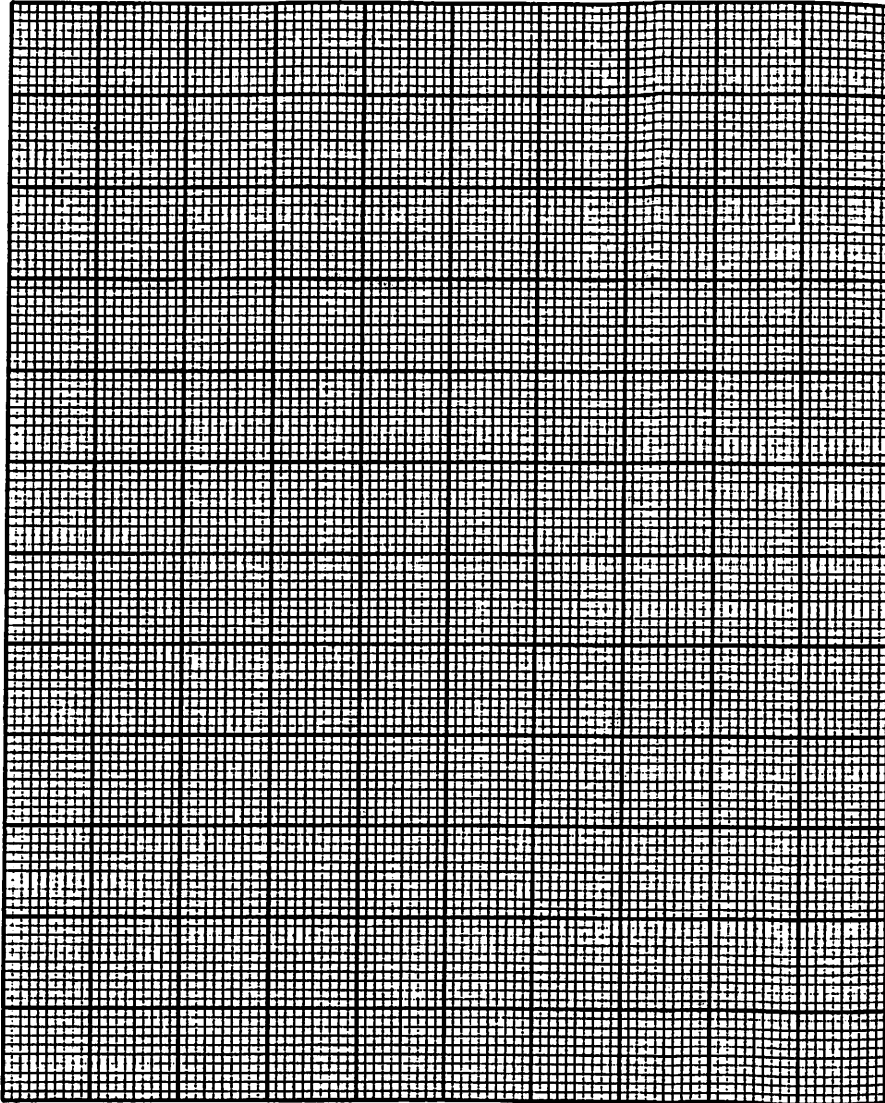
Oxygen gas was collected and the result shown in Table 4.

Gas oksigen telah dikumpulkan keputusan ditunjukkan dalam Jadual 4.

Time (s) Masa	Volume of oxygen gas (cm ³) Isipadu
0	0.0
10	15.0
20	25.0
30	32.5
40	38.0
50	42.0
60	45.5
70	47.5
80	49.0
90	50.0
100	50.0

Table 4 / Jadual 4

- (a) Plot the graph of the volume of oxygen gas against time on the graph paper in page 9. Plot graf isi padu oksigen melawan masa pada kertas graf yang disediakan di mukasurat 9.



[3 marks]

- the volume of lead(II) nitrate solution that had reacted completely with 5.0 cm³ of 1.0 mol dm⁻³ potassium iodide
- calculate the number of moles of lead(II) ions and iodide ions
- calculate the number of moles of iodide ions that has reacted with 1 mol of lead(II) ions.
- write the ionic equation for the formation of lead(II) iodide.

Tentukan bilangan mol bagi ion plumbum(II) dan ion iodida yang diperlukan untuk pembentukan plumbum(II) iodida. Jawapan anda hendaklah mengandungi perkara berikut:

- isipadu larutan plumbum(II) nitrat yang telah bertindak balas lengkap dengan 5.0 cm³ larutan kalium iodida 1.0 mol dm⁻³.
- hitung bilangan mol ion plumbum(II) dan bilangan mol ion iodida
- hitung bilangan mol ion iodida yang bertindak balas dengan 1 mol ion plumbum(II).
- Tulis persamaan ion bagi pembentukan plumbum(II) iodida.

[7 marks]

- (b) Diagram 7 shows the flow chart of reaction of salt J. X oxide which is brown when hot and yellow when cold is formed when salt J is heated strongly. Salt J dissolves in water to form colourless solution. The solution formed is tested with potassium iodide, KI solution.

Rajah 7 menunjukkan carta alir garam X dipanaskan dengan kuat menghasilkan oksida X yang perang semasa panas dan kuning semasa sejuk. Garam J dilarutkan dalam air menghasilkan larutan tanpa warna. Larutan yang terbentuk diuji dengan larutan kalium iodida, KI.

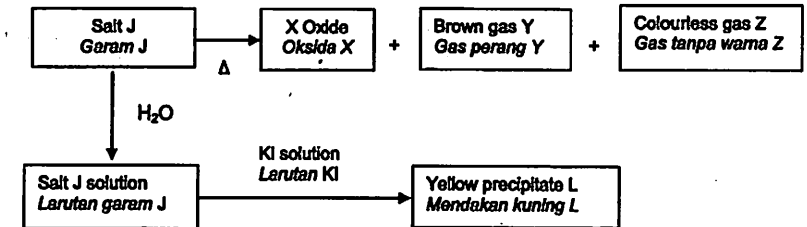


Diagram 7/ Rajah 7

Based on the information in Diagram 7:
Berdasarkan maklumat dalam Rajah 7:

- (i) Identify salt J, X oxide, Brown gas J, colourless gas Z and yellow precipitate L. Kenal pasti garam J, oksida X, gas perang Y, gas tak berwarna Z dan mendakan kuning L.

[5 marks]

Section B
Bahagian B

[20 marks]
[20 markah]

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

7. (a) A student has carried out an experiment to construct an ionic equation for the formation of lead(II) iodide. Seven test tubes of the same size were labeled 1 to 7. A fixed volume of 5.0 cm³ of 1.0 mol dm⁻³ potassium iodide solution was poured in each test tube. The volume of 1.0 mol dm⁻³ lead(II) nitrate solution that added are shown in Table 7. The height of precipitate formed in each test tube was measured. The results are shown in Table 7.

Seorang pelajar telah menjalankan satu eksperimen untuk membina persamaan ion bagi pembentukan plumbum(II) iodida. Tujuh buah tabung uji yang sama saiz dilabelkan dengan 1 hingga 7. Isi padu tetap 5.0 cm³ larutan kalium iodida 1.0 moldm⁻³ dituang ke dalam setiap tabung uji. Isi padu 1.0 mol dm⁻³ larutan plumbum(II) nitrat yang ditambahkan adalah seperti dalam Jadual 7. Tinggi mendakan yang terbentuk dalam setiap tabung uji diukur. Keputusan ditunjukkan dalam Jadual 7.

Test tube Tabung uji	1	2	3	4	5	6	7
Volume of 1.0 moldm ⁻³ lead(II) nitrate solution / cm ³ Isipadu 1.0 moldm ⁻³ larutan plumbum(II) nitrat	0.5	1.0	1.5	2.0	2.5	3.0	3.5
Height of precipitate /cm Tinggi mendakan	1.1	2.2	3.4	4.4	5.5	5.5	5.5

Table 7 / Jadual 7

- (i) Based on Table 7, plot a graph of the height of precipitate against volume of lead(II) nitrate solution.
Berdasarkan Jadual 7, plotkan graf tinggi mendakan melawan isi padu larutan plumbum(II) nitrat.
- (ii) Determine the number of moles of lead(II) ions and iodide ions that are required for the formation of lead(II) iodide. Your answer should consist of the following:

[3 marks]

- (b) Based on your graph in (a), calculate the rate of reaction at 20 s.
Berdasarkan graf anda di (a), hitung kadar tindak balas pada 20 s.

[2 marks]

- (c) Why does the decomposition of hydrogen peroxide decreases with time?
Mengapakah penguraian hidrogen peroksida berkurang dengan masa?

[1 mark]

- (d) (i) State one suitable substance that can be used as catalyst for this reaction.
Nyatakan satu bahan yang sesuai untuk digunakan sebagai mangkin bagi tindak balas ini.

[1 mark]

- (ii) With reference to the collision theory, explain how does catalyst in (d)(i), affects the rate of decomposition of hydrogen peroxide.
Dengan merujuk kepada teori pelanggaran, jelaskan bagaimana mangkin di (d)(i), mempengaruhi kadar penguraian hidrogen peroksida.

[3 marks]

5. An experiment is conducted to study the heat of displacement for reaction between copper(II) sulphate and excess zinc powder. 50.0 cm³ of 0.5 mol dm⁻³ copper(II) sulphate solution is poured into a polystyrene cup and the initial temperature is recorded. The excess zinc powder is added to the same polystyrene cup. The mixture is stirred slowly and the highest temperature is recorded.

Satu eksperimen dijalankan untuk mengkeji haba penyesaran bagi tindak balas antara larutan kuprum(II) sulfat dengan serbuk zink berlebihan. 50.0 cm³ larutan kuprum(II) sulfat 0.5 mol dm⁻³ dimasukkan ke dalam sebuah cawan plastik dan suhu awal larutan dicatat. Serbuk zink berlebihan dicampurkan ke dalam cawan plastik yang sama. Campuran dikacau perlahan-lahan dan suhu tertinggi dicatatkan.

Initial temperature of copper(II) sulphate solution = 28.5 °C
Suhu awal larutan kuprum(II) sulfat

Highest temperature of mixture = 33.5 °C
Suhu tertinggi campuran

[Relative atomic mass : Cu=64; S=32; O=16; Zn= 65;
Specific heat of the solution: 4.2 J g⁻¹ °C⁻¹]
[Jisim atom relatif : Cu= 64; S= 32; O= 16; Zn=65;
Muatan haba tentu larutan: 4.2 J g⁻¹ °C⁻¹]

- (a) What is the meaning of heat of displacement in this experiment?
Apakah maksud haba penyesaran bagi eksperimen ini?

.....
.....

[1 mark]

- (b) Why does zinc in the form of powder is used in this experiment?
Mengapakah zink dalam bentuk serbuk digunakan dalam eksperimen ini?

.....

[1 mark]

- (c) Write the ionic equation for the reaction in this experiment.
Tuliskan persamaan ion bagi tindak balas yang berlaku dalam eksperimen itu.

.....

[2 marks]

- (iii) State the process that occurs at electrode Q.
Nyatakan proses yang berlaku pada elektrod Q.

.....

[1 mark]

- (iv) Name another chemical substance that can be used to replace acidified potassium dichromate(VI) solution.

Namakan bahan kimia lain yang boleh digunakan bagi menggantikan larutan kalium dikromat (VI) berasid.

.....

[1 mark]

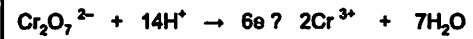
- (d) Write the half equation for the reaction occurred at electrode P.
Tulis setengah persamaan bagi tindak balas yang berlaku pada elektrod P.

.....
[1 mark]

- (e) After 10 minutes, a few drops of starch solution are added to the solution at electrode P. What is the colour change of the solution?
Selepas 10 minit, beberapa titis larutan kanji ditambahkan ke dalam larutan pada elektrod P. Apakah perubahan warna larutan itu?

.....
[1 mark]

- (f) The half equation for the reaction at electrode Q is as below.
Persamaan setengah bagi tindak balas pada elektrod Q adalah seperti di bawah.



- (i) Calculate the oxidation number of chromium in $\text{Cr}_2\text{O}_7^{2-}$ ion.
Hitungkan nombor pengoksidaan bagi kromium dalam ion $\text{Cr}_2\text{O}_7^{2-}$.

[2 marks]

- (ii) State the change in oxidation number of chromium in the reaction.
Nyatakan perubahan nombor pengoksidaan bagi kromium dalam tindak balas tersebut.

.....
[2 marks]

- (d) Based on the experiment, calculate:
Berdasarkan eksperimen tersebut, hitungkan:

- (i) heat released
haba yang dibebaskan

- (ii) number of mole of copper(II) sulphate that has reacted
bilangan mol kuprum (II) sulfat yang bertindak balas

[1 mark]

[1 mark]

(iii) heat of displacement in this reaction
haba penyesaran dalam tindak balas ini

(e) Draw an energy level diagram for the reaction.
Lukiskan gambarajah aras tenaga bagi tindak balas ini.

[2 marks]

(f) Why plastic cup is used in this experiment?
Mengapakah cawan plastik digunakan dalam eksperimen itu?

.....

[1 mark]

6. Diagram 6 shows the set-up of apparatus to study the transfer of electrons at a distance. Carbon electrode P is dipped into potassium iodide solution whereas carbon electrode Q is dipped into acidified potassium dichromate(VI) solution.

Rajah 6 menunjukkan susunan radas untuk mengkaji pemindahan elektron pada satu jarak. Elektrod karbon P dicitup ke dalam larutan kalium iodida manakala elektrod karbon Q dicitup ke dalam larutan kalium dikromat(VI) berasid.

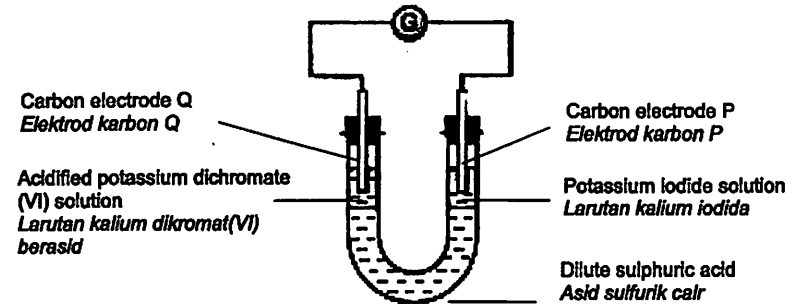


Diagram 6 / Rajah 6

(a) The transfer of electrons at a distance is an example of redox reaction. What is meant by redox reaction?
Pemindahan elektron pada satu jarak merupakan satu contoh tindak balas redoks. Apakah maksud tindak balas redoks?

.....

[1 mark]

(b) What is the function of sulphuric acid in this experiment?
Apakah fungsi asid sulfurik dalam eksperimen ini?

.....

[1 mark]

(c) Draw an arrow to show the direction of electrons flow in Diagram 4.
Lukiskan anak panah untuk menunjukkan arah pengaliran elektron dalam Rajah 4.

[1 mark]

4541/3
Chemistry / Trial
Kertas 3
September 2011
1 ¼ JAM

NAME :	
CLASS :	

CHEMISTRY

Tingkatan 5

Paper 3

1 jam 30 minit

**JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU.
DO NOT OPEN THIS QUESTION PAPER UNTIL YOU ARE TOLD TO DO SO**

1. Tuliskan nama dan kelas anda pada ruangan yang disediakan.
2. Kertas soalan ini adalah dalam dwibahasa.
3. Soalan di bahagian atas adalah dalam Bahasa Inggeris. Soalan di dalam tulisan condong adalah dalam Bahasa Melayu yang sepadan.
4. Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam Bahasa Melayu atau Bahasa Inggeris.
5. Calon dikehendaki membaca maklumat di halaman 2.

<i>Kod Pemeriksa</i>		
Soalan	Markah Penuh	Markah Diperoleh
1	12	
2	21	
3	17	
JUMLAH		

Kertas soalan ini mengandungi 11 halaman bercetak dan 1 halaman tidak bercetak

MAKLUMAT UNTUK CALON

1. Jawab semua soalan.
2. Jawapan kepada Soalan 1 dan 2 hendaklah ditulis dalam ruangan yang disediakan dalam kertas soalan.
3. Jawapan kepada Soalan 3 hendaklah ditulis pada helaian tambahan. Anda boleh menggunakan persamaan, gambar rajah, jadual, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda.
4. Tunjukkan kerja mengira, ini membantu anda mendapatkan markah.
5. Sekiranya anda hendak membatalkan sesuatu jawapan, buat garisan di atas jawapan itu.
6. Rajah yang mengiringi tidak dilukiskan mengikut skala kecuali dinyatakan.
7. Markah yang diperuntukkan bagi setiap soalan atau ceraihan soalan ditunjukkan di dalam kurungan.
8. Masa yang dicadangkan menjawab Soalan 1 dan Soalan 2 ialah 45 minit dan Soalan 3 ialah 45 minit.
9. Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.
10. Kertas soalan ini hendaklah diserahkan di akhir peperiksaan.

Pemberian markah:

Markah	Penerangan
3	Cemerlang : Respons yang paling baik
2	Memuaskan: Respons yang sederhana
1	Lemah: Respons yang kurang tepat
0	Tiada respons atau respons salah

- (d) List of materials and apparatus
Senarai bahan dan alat radas
- (e) Procedure
Prosedur
- (f) Tabulation of data
Penjadualan data

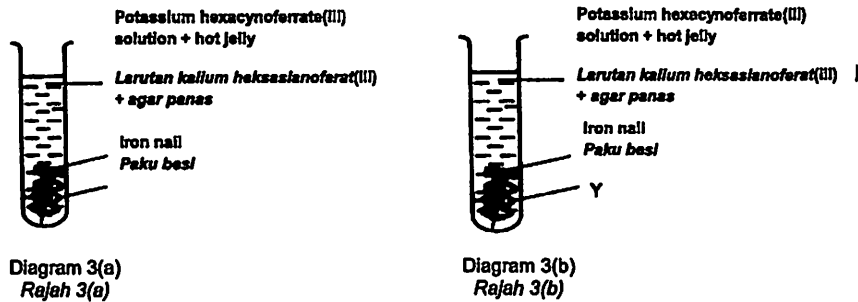
[17 marks]

**END OF QUESTION PAPER
KERTAS SOALAN TAMAT**

- (g) Using the plotted graph, predict the heat of combustion of propanol.
Dengan menggunakan graf yang telah diplot, ramalkan haba pembakaran bagi propanol.

[3 marks]

3. Diagram 3(a) and 3(b) below shows the apparatus set up to study the effects of metals X and metal Y on the rusting of iron.
Rajah 3 menunjukkan susunan alat radas untuk mengkaji kesan logam X dan logam Y ke atas pengurangan besi



Referring to the information in the diagram above, plan an experiment to investigate the effect of a named X and Y metals on the rusting of iron. Your planning should include the following aspects:

Merujuk kepada maklumat dari gambarajah di atas, rancangkan satu eksperimen untuk mengkaji kesan logam X dan logam Y yang dinamakan ke atas pengurangan besi. Perancangan anda hendaklah mengandungi aspek-aspek berikut:

- (a) Aim of the experiment
Tujuan eksperimen
- (b) All the variables
Semua pemboleh ubah
- (c) Hypothesis
Hipotesis

Answer all questions
Jawab semua soalan

1. Table 1 shows Experiments I, Experiment II and Experiment III which are conducted to study the solubility of salts in water.
Jadual 1 menunjukkan Eksperimen I, Eksperimen II dan Eksperimen III yang dijalankan untuk mengkaji keterlarutan garam dalam air.

- (a) Write the observation for Experiment I, II and III in Table 1.
Tulis pemerhatian bagi Eksperimen I, II dan III dalam Jadual 1.

[3 marks]

Experiment Eksperimen	Reaction Tindak balas	Observation Pemerhatian
I	<p>Lead(II) nitrate Plumbum(II) nitrat</p> <p>Colourless solution Larutan tak berwarna</p>	
II	<p>Calcium carbonate Kalsium karbonat</p>	

Based on Table 2, state the mass of the alcohols used in space provided into two decimal places.
Berdasarkan Jadual 2, nyatakan jisim alkohol yang digunakan dalam ruangan yang disediakan kepada dua tempat perpuluhan.

[3 marks]

- (e) Calculate the heat of combustion of methanol.
Hitungkan haba pembakaran bagi metanol.
 [Heat capacity of water / Muatan haba tentu air = $4.2 \text{ J g}^{-1} \text{ }^\circ\text{C}^{-1}$]
 [Molar mass of methanol / Jisim molar metanol = 32 g mol^{-1}]

[3 marks]

- (f) Given the heat of combustion of ethanol and butanol are $-1175 \text{ kJ mol}^{-1}$ and $-2475 \text{ kJ mol}^{-1}$ respectively. By using the answer obtained in 2(e), plot a graph of heat of combustion against number of carbon atoms per molecule.
Diberi haba pembakaran bagi etanol dan butanol adalah $-1175 \text{ kJ mol}^{-1}$ and $-2475 \text{ kJ mol}^{-1}$ masing-masing. Dengan menggunakan jawapan yang diperolehi dalam 2(e), plotkan graf bagi haba pembakaran melawan bilangan atom karbon per molekul.

2. An experiment is carried out to determine the heat of combustion of four alcohols, methanol (CH_3OH), ethanol ($\text{C}_2\text{H}_5\text{OH}$), propanol ($\text{C}_3\text{H}_7\text{OH}$) and butanol ($\text{C}_4\text{H}_9\text{OH}$). The initial mass of spirit lamp containing alcohol is measured before burning the alcohol. Then, 200 cm^3 of water is heated with alcohol in the spirit lamp until the temperature of water rises by $30 \text{ }^\circ\text{C}$. The final mass of lamp containing alcohol is measured again after burning. Diagram 1 shows the set up of apparatus and thermometer reading of water for this experiment.

Satu eksperimen telah dijalankan untuk menentukan haba pembakaran empat jenis alkohol, metanol (CH_3OH), etanol ($\text{C}_2\text{H}_5\text{OH}$), propanol ($\text{C}_3\text{H}_7\text{OH}$) dan butanol ($\text{C}_4\text{H}_9\text{OH}$). Jisim awal pelita yang mengandungi alkohol diukur sebelum pembakaran alkohol. 200 cm^3 air kemudian dipanaskan dengan alkohol dalam pelita sehingga suhu air meningkat sebanyak $30 \text{ }^\circ\text{C}$. Jisim akhir pelita yang mengandungi alkohol diukur sekali lagi selepas pembakaran. Rajah 1 menunjukkan susunan radas dan bacaan termometer suhu air bagi eksperimen ini.

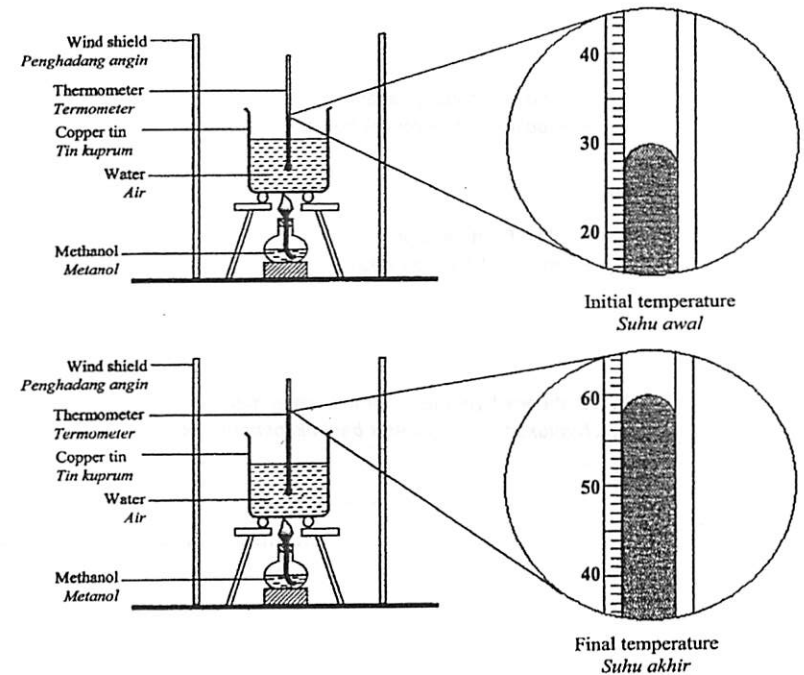


Diagram 1
 Rajah 1

- (a) Give one inference based on the observation in Diagram 1.
Berikan satu inferens berdasarkan pemerhatian dalam Rajah 1.

.....
.....

[3 marks]

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

(i) The manipulated variable
Pembolehubah dimanipulas

.....

(ii) The responding variable
Pembolehubah bergerak balas

.....

(iii) The fixed variable
Pembolehubah dimalarkan

.....

[3 marks]

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

.....
.....
.....

[3 marks]

- (d) Table 2 shows the initial and final readings of the electronic balance for the mass of spirit lamp before burning and after burning of four types of alcohol.
Jadual 2 menunjukkan bacaan awal dan akhir penimbang elektronik bagi jisim pelita sebelum pembakaran dan selepas pembakaran bagi empat jenis alkohol.

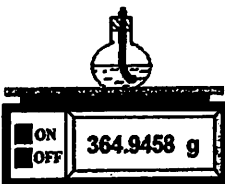
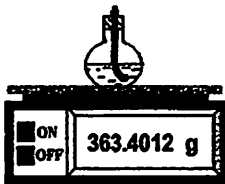
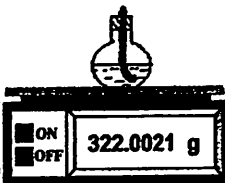
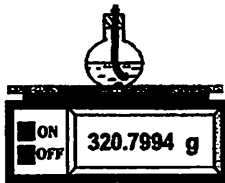
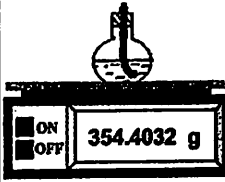
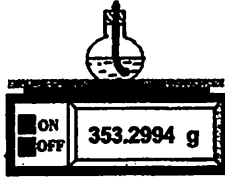
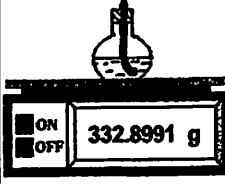
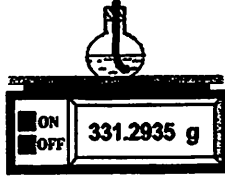
Alcohol Alkohol	Initial reading (g) Bacaan awal	Final reading (g) Bacaan akhir	Mass of alcohol used (g) Jisim alkohol digunakan
Methanol Metanol			
Ethanol Etanol			
Propanol Propanol			
Butanol Butanol			

Table 2
Jadual 2

SULIT

4541/1(PP)

**4541/1
Chemistry
Kertas 1
Sept 2011
Peraturan
Pemarkahan**



**MAJLIS PENGETUA SEKOLAH MENENGAH MALAYSIA
CAWANGAN NEGERI PAHANG**

**PEPERIKSAAN PERCUBAAN
SIJIL PELAJARAN MALAYSIA 2011**

CHEMISTRY

Kertas 1

PERATURAN PEMARKAHAN

UNTUK KEGUNAAN PEMERIKSA SAHAJA

Peraturan pemarkahan ini mengandungi 2 halaman bercetak

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

END OF MARKING SCHEME
PERATURAN PEMARKAHAN TAMAT

SULIT

4541/2(PP)

4541/2(PP)
Chemistry
Kertas 2
Sept 2011
Peraturan
Pemarkahan



**MAJLIS PENGETUA SEKOLAH MENENGAH MALAYSIA
CAWANGAN NEGERI PAHANG**

**PEPERIKSAAN PERCUBAAN
SIJIL PELAJARAN MALAYSIA 2011**

CHEMISTRY

Kertas 2

PERATURAN PEMARKAHAN

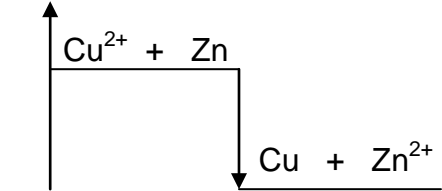
UNTUK KEGUNAAN PEMERIKSA SAHAJA

Peraturan pemarkahan ini mengandungi 9 halaman bercetak

SECTION A [60 MARKS]

Question		Marking Criteria		Marks
1	(a)	(i)	Nucleon number is the total number of proton and number of neutron	1
		(ii)	X and Y	1
			Atoms have same proton number but different nucleon number	1
		(iii)	4	1
		(iv)	8	1
	(v)	Group 16 Period 2	1	
	(b)		$(\text{CH}_2\text{O})_n = 180 // n[12 + 2(1) + 16] = 180$	1
			$n = 6$	1
			$\text{C}_6\text{H}_{12}\text{O}_6$	1
TOTAL				9
2	(a)		Answer : Group 16 Period 2	1
	(b)		Answer: Q	1
	(c)	(i)	DG_2	1
		(ii)	<ul style="list-style-type: none"> § Low melting and boiling points § Insoluble in water § Soluble in organic solvents § Cannot conduct electricity in any states § High volatility. <p style="text-align: right;">(choose either one)</p>	1
	(d)	(i)	J	1
		(ii)	<ul style="list-style-type: none"> § Atomic size of J is larger // Distance between nucleus and valence electron is further § Attractive force between nucleus and valence electron is weaker // Atom J is easier to donate electron 	1 1
	(e)	(i)	H	1
		(ii)	Atom H has achieved stable/octet electron arrangement	1
TOTAL				9
3	(a)		Copper(II) ion , hydrogen ion // Cu^{2+} , H^+	1
	(b)	Experiment I	Cathode: Brown solid deposited	1
Experiment II		Cathode: Brown solid deposited	1	
	(c)	(i)	Oxygen	1
		(ii)	Insert a glowing splinter into the test tube. The glowing splinter relights	1
	(d)	(i)	Chloride ion // Cl^- ion	1
			Concentration of Cl^- ion is higher than OH^- ion	1
	(ii)		Correct formulae of reactant and products	1
			Balanced equation	1
			$2 \text{Cl}^- \rightarrow \text{Cl}_2 + 2\text{e}$	

		(iii) Chlorine // Cl ₂	1
TOTAL			10
4	(a)	<p><i>Able to plot the graph of total volume of gas against time correctly</i></p> <p>Answer :</p> <p>§ Axis, label and unit 1</p> <p>§ Transfer all the points correctly 1</p> <p>§ Consistent scale with smooth curve 1</p>	
	(b)	<p><i>Able to calculate the rate of reaction at 20 s</i></p> <p>Answer :</p> <p>Correct tangent at t = 20 s is shown in the graph 1</p> <p>Calculation // Correct answer with unit 1</p> $\frac{(40 - 16) \text{ cm}^3}{(40 - 6) \text{ s}}$ <p>// 0.735 cm³ s⁻¹</p> <p>[Reject answer with no / wrong unit]</p>	
	(c)	<p><i>Able to give the reason why the decomposition of hydrogen peroxide decreases with time</i></p> <p>Answer :</p> <p>Concentration of hydrogen peroxide decreases 1</p>	
	(d) (i)	<p><i>Able to suggest a name of catalyst used in the reaction</i></p> <p>Answer:</p> <p>Manganese(IV) oxide // MnO₂</p> <p>[Reject: Manganese oxide]</p>	1

		(ii)	<i>Able to related the affect of catalyst in the rate of reaction with reference to the collision theory</i>	
			Answer :	
			§ Catalyst provides an alternative path which requires lower activation energy // Catalyst reduces the activation energy	1
			§ More hydrogen peroxide molecules achieve/overcome the energy	1
			§ Frequency of effective collision between molecules increases	1
			§ The rate of decomposition / reaction increases	1
			[Any 3]	[max 3]
TOTAL				10
5	(a)		Heat changed / released when 1 mol of copper is displaced by zinc	1
	(b)		Higher rate of reaction // Reaction is faster	1
	(c)		Correct formulae of reactants Correct formulae of products	1 1
			Answer: $\text{Cu}^{2+} + \text{Zn} \rightarrow \text{Cu} + \text{Zn}^{2+}$	
	(d)	(i)	$Q = 50 \times 4.2 \times 5 // 1050 \text{ J} // 1.05 \text{ kJ}$ [Reject answer without unit]	1
		(ii)	$n = \frac{0.5 \times 50}{1000} // 0.025$	1
		(iii)	Correct calculation $DH = \frac{1050}{0.025} // \frac{1.05}{0.025}$	1
			Answer with correct unit $-42000 \text{ J mol}^{-1} // -42 \text{ kJ mol}^{-1}$ [Reject answer without unit]	1
	(e)		Arrow upward with label energy and two levels Correct position of reactants and products	1 1
			Answer: Energy 	

	(f)		Reduce heat loss to surrounding.	1
TOTAL				11
6	(a)		The reaction that involves oxidation and reduction that occur simultaneously	1
	(b)		To allow the flow of ions in order to complete the electric circuit	1
	(c)		From P to Q through connecting wire	1
	(d)		$2I^- \rightarrow I_2 + 2e^-$	1
	(e)		Brown // Orange // Yellow turns dark blue	1
	(f)	(i)	$2x + 7(-2) // 2x - 14 = -2 // 2x = -2 + 14$ $x = +6$ [Reject answer without unit]	1 1
		(ii)	Cr: $+6 \rightarrow +3$ Oxidation number decreases	1 1
		(iii)	Reduction	1
		(iv)	Acidified potassium manganate(VII) solution // chlorine water // Bromine water	1
TOTAL				11

SECTION B [20 MARKS]

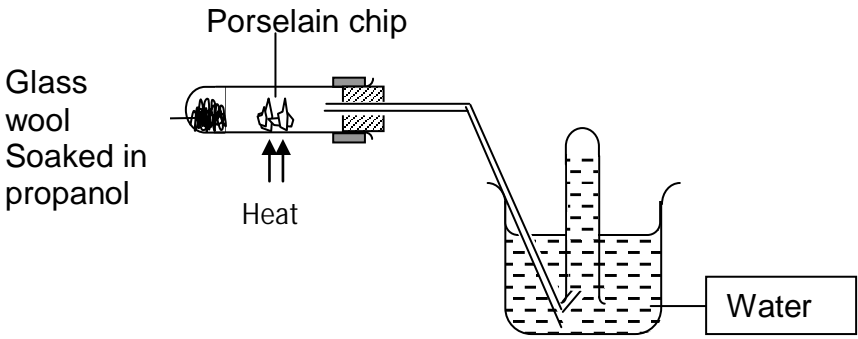
Question		Marking Criteria		Marks
7	(a)	(i)	§ <i>Label of axes with units</i> § <i>All points are transferred correctly</i> § <i>Correct shape of the graph and constant scale</i>	1 1 1 [3 m]
		(ii)	2.5 cm^3 [Reject answer without unit] Moles of Pb^{2+} ions = $\frac{1.0 \times 2.5}{1000} // 0.0025$ Moles of I^- ions = $\frac{1.0 \times 5}{1000} // 0.005$ $Pb^{2+} : I^-$ $0.0025 : 0.005$ $1 : 2$ Correct formulae of reactants and product Balanced equation $Pb^{2+} + 2I^- \rightarrow PbI_2$	1 1 1 1 1 1 1 [7 m]
	(b)	(i)	Salt J : Lead (II) nitrate // $Pb(NO_3)_2$ X oxide : Lead (II) oxide // PbO Gas Y : Nitrogen dioxide // NO_2 Gas Z : Oxygen // O_2	1 1 1 1

[Lihat halaman sebelah]

			Yellow precipitate : Lead (II) iodide // PbI_2	1 [5 m]
		(ii)	§ Nitrate ion § Add sulphuric acid § Add iron(II) sulphate solution § Slowly and carefully add concentrated sulphuric acid § Brown ring formed	1 1 1 1 1 [5 m]
TOTAL				20
8	(a)	(i)	§ Synthetic polymer does not biodegradable/degrade easily/ not easily degraded by bacteria/microorganism § Synthetic polymer product are disposed into drainage system cause blockage § Release carbon dioxide / sulphur dioxide / toxic gas / acidic gas when burns § Gas released / carbon dioxide gas causes greenhouse effect/increase global temperature § Sulphur dioxide/carbon dioxide / acidic gas causes acid rain § Acid rain corrodes buildings / increase acidity of soil / water	1 1 1 1 1 1 [6 m]
		(ii)	§ Recycle § Reduce usage § Reuse § Produce biodegradable synthetic polymer product § Burn in special incinerators § Sort / separate garbage <div style="text-align: right;">[Any 4]</div>	1 1 1 1 1 1 [4m]
	(b)		§ Made of silica, sodium carbonate and calcium carbonate § Good heat insulator § Electric insulator § Manufacturing special outfit for astronauts/fireman	1 1 1 1 [4 m]
	(c)	(i)	Main component of glass is silica/silicon dioxide Ceramic cannot be recycle but glass can	1 1 [2m]
		(ii)	Construction: Manufacture of construction products / bricks / cement / tiles / underground piping Electronic field: Manufactured of computer / microchips Medical field: Manufacture of dentures / porcelain enamels Astronomy field: Manufactured of space shuttle	1 1 1 1 [4 m]
TOTAL				20

SECTION C [20 MARKS]

Question		Marking Criteria	Marks	
9	(a)	$ \begin{array}{c} \text{H} \quad \text{H} \quad \text{H} \\ \quad \quad \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{H} \\ \quad \quad \\ \text{OH} \quad \text{H} \quad \text{H} \end{array} $	$ \begin{array}{c} \text{H} \quad \text{H} \quad \text{H} \\ \quad \quad \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{H} \\ \quad \quad \\ \text{H} \quad \text{OH} \quad \text{H} \end{array} $	1+1
			[2 m]	
	(b)	<p>Propyl methanoate</p> $ \begin{array}{c} \text{O} \quad \text{H} \quad \text{H} \quad \text{H} \\ \quad \quad \quad \\ \text{H}-\text{C}-\text{O}-\text{C}-\text{C}-\text{C}-\text{H} \\ \quad \quad \quad \quad \\ \quad \quad \text{H} \quad \text{H} \quad \text{H} \end{array} $ <p>OR</p> <p>Propyl ethanoate</p> $ \begin{array}{c} \text{H} \quad \text{O} \quad \text{H} \quad \text{H} \quad \text{H} \\ \quad \quad \quad \quad \\ \text{H}-\text{C}-\text{O}-\text{C}-\text{C}-\text{C}-\text{H} \\ \quad \quad \quad \quad \\ \text{H} \quad \quad \text{H} \quad \text{H} \quad \text{H} \end{array} $ <p>OR</p> <p>Propyl propanoate</p> $ \begin{array}{c} \text{H} \quad \text{H} \quad \text{O} \quad \quad \text{H} \quad \text{H} \quad \text{H} \\ \quad \quad \quad \quad \quad \quad \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{O}-\text{C}-\text{C}-\text{C}-\text{H} \\ \quad \quad \quad \quad \quad \quad \\ \text{H} \quad \text{H} \quad \quad \quad \text{H} \quad \text{H} \quad \text{H} \end{array} $	1+1	
		[Any one]	[2 m]	
	(c)	(i)		
		1. Put glass wool into a combustion/boiling tube // Soak glass wool in propanol	1	
		2. Add propanol to the glass wool // Put soaked glass wool into combustion / boiling tube	1	
		3. Put porcelain chips into the boiling tube	1	
		4. Heat <u>strongly</u> the porcelain chips	1	
		5. Heat / warm the propanol	1	
		6. Functional apparatus	1	
		7. Label	1	

			 <p>8. Chemical equation</p> $\text{C}_3\text{H}_7\text{OH} \rightarrow \text{C}_3\text{H}_6 + \text{H}_2\text{O}$	1 [8 m]
		(ii)	Propanoic acid Carboxyl group // – COOH	1 1 [2 m]
		(iii)	<p>Test for alkene</p> <ol style="list-style-type: none"> Add bromine water into propene and compound R respectively Brown colour of bromine change to colourless in propene No change in compound R. (If bromine water is replaced by acidified potassium manganate(VII) solution, purple turns colourless) <p>Test for carboxylic acid</p> <ol style="list-style-type: none"> Add zinc / magnesium / aluminium / any metal carbonate powder into propene and compound R respectively. No change in propene. Gas bubbles are released/Effervescence in compound R. 	1 1 1 [6 m]
TOTAL				20
10	(a)	(i)	<p><i>Able to name solvent X and Y</i></p> <p>Solvent X: tetrachloromethane // methylbenzene // (name any organic solvent)</p> <p>Solvent Y: water</p>	1 1 [2 m]
		(ii)	<i>Able to describe an experiment to differentiate HCl in solvent X and Y</i>	

		<p>Procedure</p> <ol style="list-style-type: none"> 1. Add 1 spatula of zinc/magnesium/aluminium. (solid metal carbonate can be used to replace metals above) 2. into the beakers containing hydrogen chloride in solvent X and solvent Y 3. No changes in beaker A 4. Gas bubbles formed in beaker B 5. Hydrogen chloride in solvent X / tetrachloromethane / methylbenzene does not show acidic property/H^+ is absent. 6. Hydrogen chloride in water shows acidic property/H^+ is present. 	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>[6m]</p>
(b)	(i)	<p><i>Able to identify the correct solution and give reason</i></p> <p>§ Hydrogen chloride in solvent Y/ water</p> <p>§ Dissociate / ionised into ions</p>	<p>1</p> <p>1</p> <p>[2 m]</p>
	(ii)	<p><i>Able to describe an experiment to prepare soluble salt from hydrogen chloride solution and a suitable compound</i></p> <p>Procedure:</p> <ol style="list-style-type: none"> 1. Pour (50 – 250) cm^3 of hydrochloric acid in a beaker 2. Heat hydrochloric acid. 3. Add zinc oxide / zinc carbonate / zinc 4. Until in excess 5. Stir the mixture // labeled diagram 6. Filter the mixture // labeled diagram 7. The filtrate is heated until saturated / 1/3 of the initial volume 8. The saturated solution is cooled at room temperature 9. Filter the crystals formed 10. Dry the crystals with filter paper <p>Note: If zinc is used but P2 not mentioned, 2 marks given to P3</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>[10 m]</p>
TOTAL			20

END OF MARKING SCHEME
PERATURAN PEMARKAHAN TAMAT

SULIT

4541/3(PP)

4541/3(PP)
Chemistry
Kertas 3
Sept 2011
Peraturan
Pemarkahan



**MAJLIS PENGETUA SEKOLAH MENENGAH MALAYSIA
CAWANGAN NEGERI PAHANG**

**PEPERIKSAAN PERCUBAAN
SIJIL PELAJARAN MALAYSIA 2011**

CHEMISTRY

Kertas 3

PERATURAN PEMARKAHAN

UNTUK KEGUNAAN PEMERIKSA SAHAJA

Peraturan pemarkahan ini mengandungi 12 halaman bercetak

Question 1(a)

Rubric		Score
<i>Able to state all observation correctly</i>		3
Sample answer:		
Experiment	Observation	
I	Lead(II) nitrate dissolves // Colourless solution is formed.	
II	Calcium carbonate does not dissolve // Remains unchanged // No changes	
III	Copper(II) sulphate dissolves // Blue solution is formed	
<i>Able to state any 2 observations correctly.</i>		2
<i>Able to state any 1 observation correctly.</i>		1
No response or wrong response		0

Question 1(b)

Rubric		Score
<i>Able to state the operational definition of soluble salt correctly</i>		3
Sample answer:		
1. When a salt is added into water and dissolves to form a solution, it is a soluble salt		
2. When a salt dissolves in water to form a solution, it is a soluble salt.		
<i>Able to state the operational definition of soluble salt less correctly</i>		2
Sample answer:		
1. When a salt is added into water and forms a solution, it is a soluble salt.		
2. When a salt dissolves to form a solution, it is a soluble salt.		
3. Salt dissolves in water to form a solution.		
<i>Able to state any idea of operational definition of soluble salt</i>		1
1. Salt dissolves // Salt dissolves in water.		
2. Solution forms		
No response or wrong response		0

Question 1(c)

Rubric	Score
<p><i>Able to explain correctly</i></p> <p>Sample answer:</p> <p>Potassium carbonate solution contains free moving carbonate ions as in sodium carbonate solution.</p>	3
<p><i>Able to explain less correctly</i></p> <p>Sample answer:</p> <p>§ Potassium carbonate solution contains carbonate ions § Calcium ion combines with carbonate ion.</p>	2
<p><i>Able to give any idea about formation of insoluble salt</i></p> <p>Sample answer:</p> <p>§ Calcium carbonate salt is formed § Double decomposition reaction occurs.</p>	1
No response or wrong response	0

Question 1(d)

Rubric	Score						
<p><i>Able to classify all the solutions correctly</i></p> <p>Sample answer</p> <table border="1" style="width: 100%;"> <thead> <tr> <th style="width: 50%;">Soluble salt</th> <th style="width: 50%;">Insoluble salt</th> </tr> </thead> <tbody> <tr> <td>Potassium sulphate</td> <td>Lead(II) sulphate</td> </tr> <tr> <td>Zinc sulphate</td> <td>Barium sulphate</td> </tr> </tbody> </table> <p># Score 1 – if state in the reverse</p>	Soluble salt	Insoluble salt	Potassium sulphate	Lead(II) sulphate	Zinc sulphate	Barium sulphate	3
Soluble salt	Insoluble salt						
Potassium sulphate	Lead(II) sulphate						
Zinc sulphate	Barium sulphate						
<i>Able to classify at least 3 salts correctly</i>	2						
<i>Able to classify any 2 salts correctly</i>	1						
No response or wrong response	0						

Question 2(a)

Rubric	Score
<p><i>Able to state the inference correctly</i></p> <p>Sample answer:</p> <p>§ Water absorbed heat energy § Exothermic reaction</p>	3
<p><i>Able to state the inference less correctly</i></p> <p>Sample answer:</p> <p>§ Water temperature increases / rises § Methanol releases heat § Mercury expands</p>	2
<p><i>Able to state an idea of inference</i></p> <p>Sample answer:</p> <p>Water becomes hot.</p>	1
No response given or wrong response	0

Question 2(b)

Rubric	Score
<p><i>Able to state all variables correctly</i></p> <p>Sample answer:</p> <p>Manipulated variable: Types of alcohol Responding variable: Heat of combustion Fixed variable: Volume of water // copper can</p>	3
<i>Able to state any 2 variables correctly</i>	2
<i>Able to state any 1 variable correctly</i>	1
No response given or wrong response	0

Question 2(c)

Rubric	Score
<p><i>Able to state the relationship between the manipulated variable and the responding variable with direction correctly</i></p> <p>Sample answer:</p> <p>§ The higher the number of carbon atoms per molecule, the higher the heat of combustion</p> <p>§ When the number of carbon atoms per molecule increases, the heat of combustion increases</p> <p>Note: If MV and RV are wrongly stated – score 2</p>	3
<p><i>Able to state the relationship between the manipulated variable and the responding variable</i></p> <p>Sample answer:</p> <p>The higher the number of carbon atoms, the higher the heat of combustion.</p>	2
<p><i>Able to state an idea of hypothesis</i></p> <p>Sample answer:</p> <p>§ Different alcohols different heat of combustion</p> <p>§ Type of alcohol affects heat of combustion</p>	1
No response given or wrong response	0

Question 2(d)

Rubric	Score
<p><i>Able to state all the mass of alcohols and round off into two decimal places correctly</i></p> <p>Sample answer:</p> <p>Methanol = 1.54</p> <p>Ethanol = 1.20</p> <p>Propanol = 1.10</p> <p>Butanol = 1.61</p>	3
<p><i>Able to state any three the mass of alcohols and round off into two decimal places correctly</i></p> <p><i>Able to state all the mass of alcohols in four decimal places correctly</i></p>	2
<p><i>Able to state any two the mass of alcohols and round off into two decimal places correctly</i></p>	1
No response given or wrong response	0

Question 2(e)

Rubric	Score
<p><i>Able to calculate the heat of combustion of methanol by fulfill the following criteria</i></p> <p>(i) Heat absorbed by water (ii) Number of mole (iii) Heat of combustion</p> <p>Sample answer:</p> <p>Heat absorbed by water = $200 \times 4.2 \times 30 \text{ J} // 25200 \text{ J}$ Number of mole = $\frac{1.54}{32} // 0.048$ Heat of combustion = $-\frac{25200}{0.048} \text{ J mol}^{-1} // -525000 \text{ J mol}^{-1} // -525 \text{ kJ mol}^{-1}$</p> <p>Note: Answer without unit, score 2</p>	3
<p><i>Able to calculate the heat of combustion of methanol by fulfill any two criteria</i></p> <p>Sample answer:</p> <p>Heat absorbed by water = $100 \times 4.2 \times 30 \text{ J} // 12600 \text{ J} \text{ ___(X)}$ Number of mole = $\frac{1.54}{32} // 0.048 \text{ ___(Ö)}$ Heat of combustion = $-\frac{12600}{0.048} \text{ J mol}^{-1} // -262500 \text{ J mol}^{-1}$ $// -262.5 \text{ kJ mol}^{-1} \text{ ___(Ö)}$</p>	2
<p><i>Able to calculate the heat of combustion of methanol by fulfill any one criteria</i></p> <p>Sample answer:</p> <p>Heat absorbed by water = $100 \times 4.2 \times 30 \text{ J} // 12600 \text{ J} \text{ ___(X)}$ Number of mole = $\frac{1.04}{32} // 0.0325 \text{ ___(X)}$ Heat of combustion = $-\frac{12600}{0.0325} \text{ J mol}^{-1} // -387692 \text{ J mol}^{-1}$ $// -387.692 \text{ kJ mol}^{-1} \text{ ___(Ö)}$</p>	1
[No response given or wrong response]	0

Question 2(f)

Rubric	Score
<i>Able to plot graph accurately which fulfill five criteria below:</i> (i) Axis with correct label and unit. (ii) Consistent scale (iii) Size of graph: at least half of graph paper (iv) Transfer all points correctly (v) Straight line	3
<i>Able to plot graph less accurately which fulfill any four criteria</i>	2
<i>Able to show minimum requirement of plotting graph</i> Criteria: (i) Axis with correct label / unit (ii) Transfer all points (iii) Straight line	1
No response given or wrong response	0

Question 2(g)

Rubric	Score
<i>Able to predict the heat of combustion of propanol correctly</i> Criteria: (i) Dotted line is drawn on the graph (ii) Value based on graph (iii) Negative sign with correct unit	3
<i>Able to predict the heat of combustion of propanol incompletely which fulfill any two criteria</i>	2
<i>Able to give value of the heat of combustion of propanol which fulfill one criteria only</i>	1
No response given or wrong response	0

Question 2(h)

Rubric	Score
<i>Able to predict the heat of combustion of propanol correctly</i> Criteria: (i) Dotted line is drawn on the graph (ii) Value based on graph (iii) Negative sign with correct unit	3
<i>Able to predict the heat of combustion of propanol incompletely which fulfill any two criteria</i>	2
<i>Able to give value of the heat of combustion of propanol which fulfill one criteria only</i>	1
No response given or wrong response	0

Question 3(a)

Rubric	Score
<i>Able to give the aim of the experiment correctly</i> Sample answer: To investigate the effect of X and Y metals in contact with iron on the rusting of iron. Note: If problem statement is written – score 1	2
<i>Able to state the aim of the experiment less correctly</i> Sample answer: § To investigate the effect of metals X and Y on rusting of iron. § To investigate the effect of metals X and Y.	1
No response or wrong response	0

Question 3(b)

Rubric	Score
<i>Able to state all the three variables correctly</i>	3
<p>Manipulated variable: Metal X and metal Y // Two different metals (one metals is less electropositive and one is more electropositive than iron) // Pairs of metal X / iron and Y / iron</p> <p>Responding variable: Rusting of iron // Iron rust // The formation of brown solid // Formation of blue spot</p> <p>Constant variables: Iron nail // Jelly solution // Temperature</p>	
<i>Able to state any two variables correctly</i>	2
<i>Able to state any one variable correctly</i>	1
No response or wrong response	0

Question 3(c)

Rubric	Score
<p><i>Able to state the relationship between the manipulated variable and the responding variable with direction correctly</i></p> <p>Sample answer:</p> <p>When a more electropositive metal is in contact with iron, the metal inhibits rusting When a less electropositive metal is in contact with iron, the metal speeds up rusting.</p> <p>Note: If MV and RV is wrongly stated – score 2</p>	3
<p><i>Able to state the relationship between the manipulated variable and the responding variable and direction less correctly (no direction)</i></p> <p>Sample answer:</p> <p>A more electropositive metal will prevent iron from rusting. // A less electropositive metal will cause iron to rust.</p>	2
<p><i>Able to state an idea of hypothesis</i></p> <p>Sample answer:</p> <p>Metal Y / metal X affects rusting (of iron)</p>	1
No response or wrong response	0

Question 3(d)

Rubric	Score
<p><i>Able to list completely the material/substances and apparatus</i></p> <p>Sample answer:</p> <p>Materials / substances and apparatus: Two Iron nails, Magnesium / zinc / aluminium strip, tin / copper / lead / silver strip, Potassium hexacyanoferrate(III) solution + phenolphthalein (Any suitable electrolyte or water), Test tube / boiling tube, Sandpaper</p> <p>Refer to the labelled diagram if not stated in the list: 4 from the list and 4 from the labelled diagram</p>	3
<p><i>Able to list basic materials and apparatus</i></p> <p>Sample answer:</p> <p>Materials: Metal above iron, Metal below iron, Iron nail, (Any suitable electrolyte)</p> <p>Apparatus: (Any suitable container)</p>	2
<p><i>Able to give an idea of the materials and apparatus</i></p> <p>Sample answer:</p> <p>Materials: Iron, (any electrolyte)</p> <p>Apparatus: (Any suitable container)</p>	1
No response or wrong response	0

Question 3(e)

Rubric	Score
<i>Able to state all the steps correctly</i> Sample answer: 1. Clean the iron nails and metals strip with sand paper. 2. Coil iron nails with magnesium ribbon and copper strips. 3. Put / place the coiled iron nail into different test tube. 4. Pour / add / fill the hot jelly solution containing potassium hexacyanoferrate (III) solution and phenolphthalein into the test tube. 5. Leave the test tube in a test tube rack for few days. 6. Record the observation. 7. Steps 1 to 6 are repeated using different metal/Y with iron(if steps 2 does not mention two different test tube).	3
<i>Able to state the steps 2,4 and 6 correctly</i>	2
<i>Able to state steps 2 and 4 correctly // The idea combining iron and any metals and any substances</i>	1
No response or wrong response	0

Question 3(f)

Rubric	Score						
<p><i>Able to present / exhibit a table to record the following items / information correctly</i></p> <p>§ Heading for the manipulated variables (pair of metals//two different pair of metals)</p> <p>§ Heading for responding variables</p> <p>§ 3 x 2 or 2 x 3 table</p> <p>Sample answer:</p> <table border="1"> <thead> <tr> <th>Pairs of metals</th> <th>Observation</th> </tr> </thead> <tbody> <tr> <td>Mg / Fe</td> <td></td> </tr> <tr> <td>Cu / Fe</td> <td></td> </tr> </tbody> </table>	Pairs of metals	Observation	Mg / Fe		Cu / Fe		3
Pairs of metals	Observation						
Mg / Fe							
Cu / Fe							
<p><i>Able to present / exhibit a table to record the following items / information correctly</i></p> <p>§ Heading for the manipulated variables</p> <p>§ Heading for responding variables</p> <p>§ 2 x 2 table</p> <p>§ At least one pair of metal</p> <p>Sample answer:</p> <table border="1"> <thead> <tr> <th>Set</th> <th>Observation</th> </tr> </thead> <tbody> <tr> <td>Mg / Fe</td> <td></td> </tr> </tbody> </table>	Set	Observation	Mg / Fe		2		
Set	Observation						
Mg / Fe							
<p>Able to give an idea on tabulation of data, at least one information stated in the table</p> <p>§ At least one heading</p> <p>§ 2 x 2 table</p> <p>Sample answer:</p> <table border="1"> <thead> <tr> <th>Set</th> <th></th> </tr> </thead> <tbody> <tr> <td></td> <td></td> </tr> </tbody> </table>	Set				1		
Set							
No response or wrong response	0						

END OF MARKING SCHEME
PERATURAN PEMARKAHAN TAMAT