

SULIT

4541/1



**JABATAN PELAJARAN NEGERI TERENGGANU**

**PEPERIKSAAN PERCUBAAN  
SIJIL PELAJARAN MALAYSIA 2010**

**CHEMISTRY**

**Kertas 1**

**Ogos 2010**

**1 ¼ jam**



**4541/1**

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**CHEMISTRY**

**Kertas 1**

**Satu jam lima belas minit**

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**JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU**

1. *Kertas ini mengandungi 50 soalan.*
2. *Jawab semua soalan.*
3. *Tiap-tiap soalan diikuti oleh empat 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 dilukis mengikut skala kecuali dinyatakan.*
6. *Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.*

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*Disediakan Oleh:*

**AKRAM NEGERI TERENGGANU**

*Dibiayai Oleh:*

**KERAJAAN NEGERI TERENGGANU**

**TERENGGANU ANJUNG ILMU**

*Dicetak Oleh:*

*Percetakan Yayasan Islam Terengganu Sdn. Bhd.*

*Tel: 609-666 8611/6652/8601 Faks: 609-666 0611/0063*

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**Kertas soalan ini mengandungi 23 halaman bercetak**



- 4 Table 1 shows the electron arrangement of atoms of elements P, Q, R and S.  
*Jadual 1 menunjukkan susunan elektron bagi atom unsur P, Q, R dan S.*

Element <i>Unsur</i>	Electron arrangement <i>Susunan elektron</i>
P	2.4
Q	2.7
R	2.8.7
S	2.8.8.2

Table 1  
*Jadual 1*

- Which of the following pairs will form an ionic compound?  
*Antara berikut, yang manakah akan membentuk sebatian ion?*
- A Q and R  
 B Q and S  
 C R and P  
 D P and Q
- 5 Which of the following substances is **non** electrolyte?  
*Antara bahan berikut, yang manakah bukan elektrolit?*
- A Vinegar  
*Cuka*  
 B Ethanol  
*Etanol*  
 C Copper (II) sulphate solution  
*Larutan kuprum (II) sulfat*  
 D Sodium chloride molten  
*Leburan natrium klorida*
- 6 Which of the following substances ionizes partially in water?  
*Antara bahan berikut, yang manakah mengion separa di dalam air?*
- A HCl  
 B NaOH  
 C CH<sub>3</sub>OH  
 D CH<sub>3</sub>COOH

- 7 Which of the following salts is prepared using double decomposition method?  
*Antara yang berikut, garam manakah yang disediakan dengan menggunakan kaedah penguraian ganda dua?*
- A Copper (II) sulphate  
*Kuprum (II) sulfat*
  - B Lead (II) chloride  
*Plumbum (II) klorida*
  - C Iron (II) nitrate  
*Ferum (II) nitrat*
  - D Potassium carbonate  
*Kalium karbonat*
- 8 The body of an aeroplane is made up of duralumin. What is the main metal in duralumin?  
*Badan kapal terbang dibuat daripada duralumin. Apakah logam utama dalam duralumin?*
- A Iron  
*Besi*
  - B Copper  
*Kuprum*
  - C Aluminium  
*Aluminium*
  - D Magnesium  
*magnesium*
- 9 Which factor does **not** affect the rate of reaction?  
*Faktor manakah yang tidak mempengaruhi kadar tindak balas?*
- A Volume of reactant  
*Isipadu bahan tindak balas*
  - B Concentration of reactant  
*Kepekatan bahan tindak balas*
  - C Temperature of reactant  
*Suhu bahan tindak balas*
  - D Size of solid reactant  
*Saiz pepejal bahan tindak balas*
- 10 Which of the following substances can coagulate the latex?  
*Antara bahan berikut, yang manakah boleh menggumpalkan lateks?*
- A Sulphur  
*Sulfur*
  - B Ethanol  
*Etanol*
  - C Ethanoic acid  
*Asid etanoik*
  - D Ammonia solution  
*Larutan ammonia*

- 11 What is the oxidation number of chromium in the  $\text{Cr}_2\text{O}_7^{2+}$  ion?  
*Apakah nombor pengoksidaan kromium dalam ion  $\text{Cr}_2\text{O}_7^{2+}$ ?*

A -2  
B +2  
C +6  
D +7

- 12 Which of the following is an endothermic reaction?  
*Antara yang berikut, yang manakah tindak balas endotermik?*

A  $\text{HCl} + \text{NaOH} \longrightarrow \text{NaCl} + \text{H}_2\text{O}$   
B  $\text{HCl} + \text{NaHCO}_3 \longrightarrow \text{NaCl} + \text{CO}_2 + \text{H}_2\text{O}$   
C  $\text{NaCl} + \text{AgNO}_3 \longrightarrow \text{AgCl} + \text{NaNO}_3$   
D  $\text{Zn} + \text{CuSO}_4 \longrightarrow \text{ZnSO}_4 + \text{Cu}$

- 13 Which one of the following medicines is an analgesic?  
*Antara ubat berikut, yang manakah suatu analgesik ?*

A Insulin  
*Insulin*  
B Penicillin  
*Penisilin*  
C Streptomycin  
*Streptomisin*  
D Paracetamol  
*Parasetamol*

- 14 The diagram 3 shows the change of state of matter.  
Rajah 3 menunjukkan perubahan keadaan jirim.

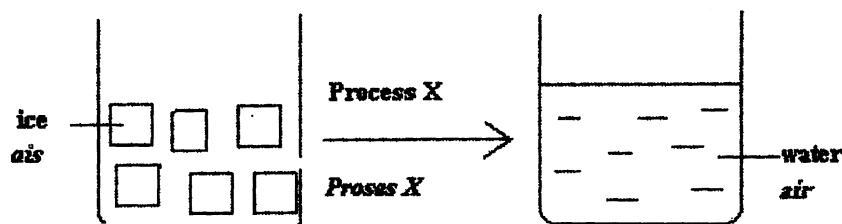


Diagram 3  
Rajah 3

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

- A Melting  
Peleburan
  - B Boiling  
Pendidihan
  - C Freezing  
Pembekuan
  - D Condensation  
Kondensasi
- 15 Which of the following equations shows the reaction between zinc and chlorine gas?  
Antara persamaan berikut, yang manakah menunjukkan tindak balas antara zink dengan gas klorin?
- A  $\text{Zn} + \text{Cl} \rightarrow \text{ZnCl}$
  - B  $\text{Zn} + \text{Cl}_2 \rightarrow \text{ZnCl}_2$
  - C  $2\text{Zn} + \text{Cl} \rightarrow \text{Zn}_2\text{Cl}$
  - D  $2\text{Zn} + \text{Cl}_2 \rightarrow 2\text{ZnCl}$
- 16 Element G is placed in Group 14 and Period 2.  
What is the proton number for atom G?  
Unsur G terletak dalam Kumpulan 14 dan Kala 2.  
Apakah nombor proton bagi atom G?
- A 2
  - B 6
  - C 14
  - D 18

- 17 Element X react with oxygen to form a covalent compound.  
Which of the following elements could be X?

*Unsur X bertindak balas dengan oksigen menghasilkan sebatian kovalen.  
Antara unsur berikut, yang manakah mungkin X?*

- A Carbon  
*Karbon*
- B Sodium  
*Natrium*
- C Aluminium  
*Aluminium*
- D Magnesium  
*Magnesium*

- 18 Diagram 4 shows the apparatus set up for the electrolysis of copper (II) sulphate solution.  
*Rajah 4 menunjukkan susunan radas bagi elektrolisis larutan kuprum (II) sulfat.*

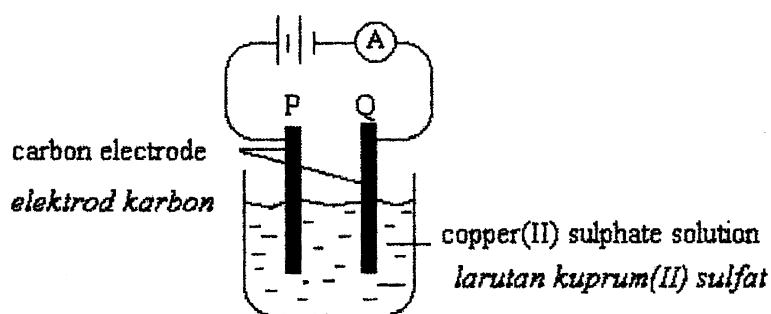


Diagram 4  
*Rajah 4*

Which of the following is observed when the current is passed on for 10 minutes?  
*Antara berikut manakah yang diperhatikan apabila arus dialirkan selama 10 minit?*

- A Brown deposit at electrode P  
*Enapan perang pada elektrod P*
- B Electrode Q become smaller  
*Elektrod Q semakin kecil*
- C Bubbles of gas evolve at P  
*Gelembung gas terbebas di P*
- D The intensity of blue colour is decreasing  
*Keamatan warna biru berkurang*

- 19 Which of the following substances produce hydrogen gas when react with nitric acid?  
*Antara bahan berikut, yang manakah membebaskan gas hidrogen apabila bertindak balas dengan asid nitrik?*

I Mg  
II Cu  
III Zn  
IV FeO

- 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

- 20 Which of the following is suitable method to prepare copper (II) chloride?  
*Antara tindak balas berikut yang manakah kaedah yang sesuai untuk menyediakan kuprum (II) klorida?*

- A Copper (II) nitrate and hydrochloric acid  
*Kuprum (II) nitrat dan asid hidroklorik*  
B Copper and hydrochloric acid  
*Kuprum dan asid hidroklorik*  
C Copper (II) oxide and hydrochloric acid  
*Kuprum (II) oksida dan asid hidroklorik*  
D Copper (II) carbonate and sodium chloride  
*Kuprum (II) karbonat dan natrium klorida*

- 21 Diagram 5 shows the reaction involved in the manufacturing of sulphuric acid.  
*Rajah 5 menunjukkan tindak balas yang terlibat dalam pembuatan asid sulfurik.*

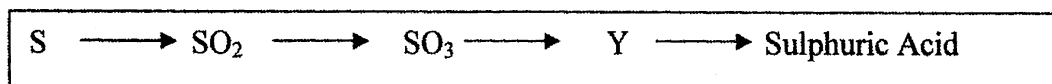


Diagram 5

*Rajah 5*

- Which of the following is the chemical formula for Y?  
*Antara berikut, manakah formula kimia untuk Y?*

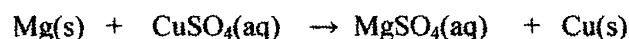
- A  $\text{H}_2\text{SO}_3$   
B  $\text{H}_2\text{S}_2\text{O}_7$   
C  $\text{H}_2\text{SO}_4$   
D  $\text{H}_2\text{S}_2\text{O}_8$



- 22 Which of the following explain the meaning of effective collision?  
*Antara pernyataan berikut, yang manakah menjelaskan maksud perlanggaran berkesan?*

- A The collision where its energy is less than activation energy  
*Tindak balas yang tenaganya kurang daripada tenaga pengaktifan*
- B The collision that has low energy  
*Perlanggaran yang mempunyai tenaga yang rendah*
- C The collision that produce the product  
*Perlanggaran yang menghasilkan hasil tindak balas*
- D The collision which take place before a reaction  
*Perlanggaran yang berlaku sebelum sesuatu tindak balas*

- 23 The following equation shows the reaction between magnesium and copper (II) sulphate.  
*Persamaan berikut menunjukkan tindak balas magnesium dengan kuprum (II) sulfat.*



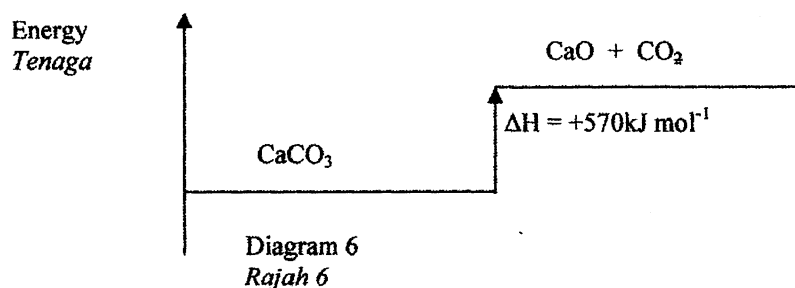
Which of the following statements is true?  
*Antara pernyataan berikut, yang manakah benar?*

- I Magnesium act as the reducing agent  
*Magnesium berfungsi sebagai bahan penurun*
  - II Oxidation number of copper changes from +2 to 0  
*Nombor pengoksidaan kuprum berubah daripada +2 kepada 0*
  - III Copper (II) ion is reduced  
*Ion kuprum (II) diturunkan*
  - IV Blue colour solution unchanged  
*Warna biru larutan tidak berubah*
- A I and II  
*I dan II*
  - B III and IV  
*III dan IV*
  - C II and III  
*II dan III*
  - D I, II and III  
*I, II dan III*

- 24 Which of the following process will produce ethanol from ethene?  
 Antara proses berikut, yang manakah akan menghasilkan etanol daripada etena?

- A Hydration  
Penghidratan
- B Precipitation  
Pemendakan
- C Hydrogenation  
Penghidrogenan
- D Polymerisation  
Pempolimeran

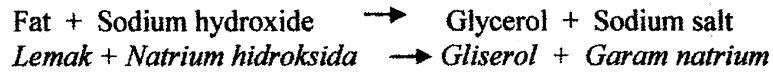
- 25 Diagram 6 is the energy level diagram for the decomposition of calcium carbonate.  
 Rajah 6 adalah gambar rajah aras tenaga bagi penguraian kalsium karbonat.



- Which statement can be deduced from the diagram 6?  
 Pernyataan manakah yang boleh dirumuskan daripada rajah 6?

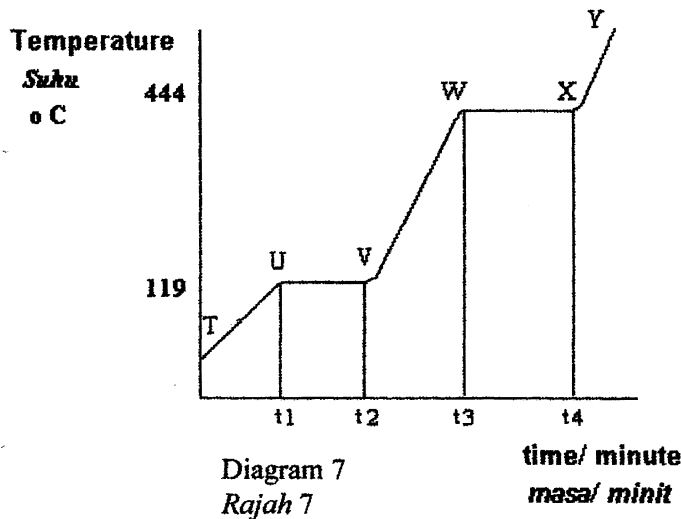
- A Heat is absorbed in the reaction  
Haba diserap dalam tindak balas tersebut
- B The reaction is exothermic  
Tindak balas tersebut adalah eksotermik
- C Total energy of the reactant and the products is 570 kJ  
Jumlah tenaga bagi bahan tindak balas dan hasil tindak balas adalah 570 kJ
- D The reactant has more energy than the products  
Bahan tindak balas mempunyai lebih tenaga daripada hasil tindak balas

- 26 The following equation shows a chemical reaction.  
*Persamaan berikut menunjukkan satu tindak balas kimia.*



What is the name of reaction ?  
*Apakah nama tindak balas ini?*

- A Neutralisation  
*Peneutralan*  
 B Esterification  
*Pengesteran*  
 C Saponification  
*Saponifikasi*  
 D Fermentation  
*Penapaian*
- 27 The graph in diagram 7 shows the heating curve of substance X. The melting point of substance X is 119°C.  
*Graf dalam rajah 7 menunjukkan lengkungan pemanasan bagi bahan X. Takat lebur bagi bahan X adalah 119 °C.*



Which part of graph labeled T, U, V, W, X and Y, the substance X exist as solid and liquid?  
*Bahagian manakah pada graf T, U, V, W, X dan Y, bahan X wujud dalam keadaan pepejal dan cecair?*

- A Between T and U  
*Di antara T dan U*  
 B Between U and V  
*Di antara U dan V*  
 C Between V and W  
*Di antara V dan W*  
 D Between W and X  
*Di antara W dan X*

- 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

- [illegible]

**A** Number of shell containing electrons is not same  
*Bilangan petala mengandungi elektron tidak sama*

**B** Atomic size of atom Q is bigger than atom R  
*Saiz atom bagi atom Q lebih besar daripada atom R*

**C** Atom Q is more electronegative than atom R  
*Atom Q lebih elektronegatif daripada atom R*

**D** Atom R is more easy to release valence electron  
*Atom R lebih senang membuang elektron valens*

- 30 Which statement is true about the reaction of a magnesium atom with fluorine molecule to form magnesium fluoride?

[ Proton number : F = 9, Mg = 12 ]

*Pernyataan manakah yang benar tentang tindak balas atom magnesium dengan molekul florin untuk membentuk magnesium florida?*

[ Nombor proton: F=9, Mg = 12 ]

- A One magnesium atom donates one electron to one fluorine atom  
*Satu atom magnesium menderma satu electron kepada satu atom florin*
- B One magnesium atom donates two electron to two fluorine atoms  
*Satu atom magnesium menderma dua electron kepada dua atom florin*
- C One magnesium atom shares one electron with one fluorine atom  
*Satu atom magnesium berkongsi satu electron dengan satu atom florin*
- D One magnesium atom shares two electrons with two fluorine atoms  
*Satu atom magnesium berkongsi dua electron dengan dua atom florin*
- 31 Concentrated solution of potassium chloride is electrolyzed using carbon electrodes. Which of the following is the half equation for the reaction at anode and cathode?

*Satu larutan akueus kalium klorida pekat dielektrolisiskan menggunakan elektrod carbon. Antara berikut, yang manakah setengah persamaan bagi tindak balas yang berlaku di anod dan katod ?*

	Cathode katod	Anode anod
A	$K^+ + e \rightarrow K$	$2Cl^- \rightarrow Cl_2 + 2e$
B	$2H^+ + 2e \rightarrow H_2$	$2Cl^- \rightarrow Cl_2 + 2e$
C	$2H^+ + 2e \rightarrow H_2$	$4OH^- \rightarrow 2H_2O + O_2 + 4e$
D	$K^+ + e \rightarrow K$	$4OH^- \rightarrow 2H_2O + O_2 + 4e$

- 32 Salt X is decomposed by strong heating. The residue is brown when hot and yellow when cold. What is X?

*Garam X terurai apabila dipanaskan dengan kuat. Bakinya berwarna perang ketika panas dan kuning ketika sejuk*  
*Apakah X?*

- A Copper (II) nitrate  
*Kuprum (II) nitrat*
- B Zinc carbonate  
*Zink karbonat*
- C Zinc nitrate  
*Zink nitrat*
- D Lead (II) nitrate  
*Plumbum (II) nitrat*

- 33 Table 2 shows the information of alkali X and Y.  
*Jadual 2 menunjukkan maklumat tentang alkali X dan Y.*

Alkali <i>Alkali</i>	X	Y
Concentration (mol dm <sup>-3</sup> ) <i>Kepekatan (mol dm<sup>-3</sup>)</i>	0.1	0.1
Ionization in water <i>Pengionan di dalam air</i>	completely	partially

Table 2  
*Jadual 2*

Which of the following statements is true of the alkali?  
*Antara pernyataan berikut, yang manakah benar tentang alkali itu?*

- A pH values of X is higher than Y  
*Nilai pH bagi X lebih tinggi daripada Y*
- B pH values of X is lower than Y  
*Nilai pH bagi X lebih rendah daripada Y*
- C Number of moles hydrogen ions of X is higher than Y  
*Bilangan mol ion hydrogen X lebih tinggi daripada Y*
- D Number of moles hydroxide ions of X is lower than Y  
*Bilangan mol ion hidroksida X lebih rendah daripada Y*
- 34 Which of the following is a composite material?  
*Antara yang berikut, manakah bahan komposit?*
- A Polythene  
*Politena*
- B Fiber optic  
*Gentian optik*
- C Stainless steel  
*Keluli*
- D Ceramic  
*Seramik*

- 35 Diagram 9 shows the apparatus set up for an experiment to determine the rate of reaction between sodium thiosulphate and sulphuric acid.

*Rajah 9 menunjukkan susunan radas bagi eksperimen untuk menentukan kadar tindak balas antara natrium tiosulfat dan asid sulfurik.*

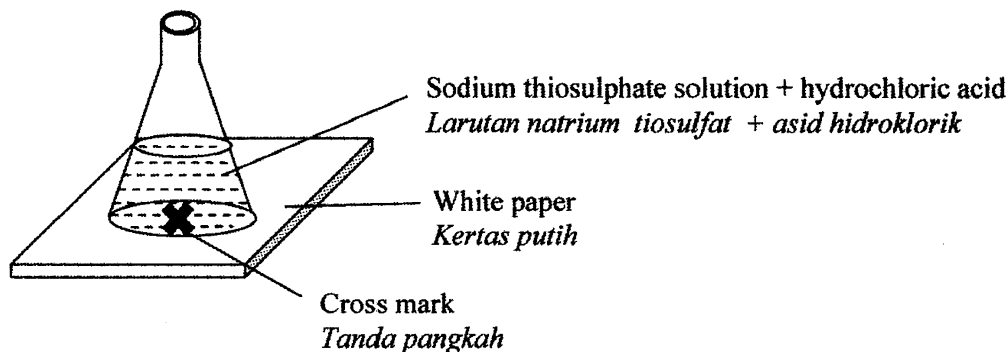


Diagram 9  
*Rajah 9*

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

- A Record the time as soon as precipitate is formed  
*Mencatat masa sebaik sahaja mendakan mula terbentuk*
- B Record the time taken to obtain the maximum temperature  
*Mencatat masa untuk mendapatkan suhu maksimum*
- C Record the time as soon as the cross mark cannot be seen  
*Mencatat masa sebaik-sahaja tanda pangkah tidak kelihatan*
- D Record the time taken for the change the pressure  
*Mencatat masa bagi perubahan tekanan*

- 36 Diagram 10 shows the structural formula of an ester.  
Rajah 10 menunjukkan formula struktur suatu ester.

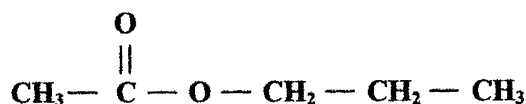


Diagram 10

Rajah 10

Which of the following acid and alcohol will react to produce the ester ?

Antara asid dan alkohol berikut, yang manakah akan bertindak balas untuk menghasilkan ester itu?

	Acid Asid	Alcohol Alkohol
A	Ethanoic Etanoik	Propanol propanol
B	Propanoic Propanoik	Ethanol Etanol
C	Pentanoic Pentanoik	Methanol Metanol
D	Methanoic Metanoik	Pentanol Pentanol

- 37 The complete combustion of 1 mole propanol  $\text{C}_3\text{H}_7\text{OH}$ , produces 2010 kJ of heat. Calculate the mass of propanol,  $\text{C}_3\text{H}_7\text{OH}$  needed to burn completely in oxygen in order to raise the temperature of  $250 \text{ cm}^3$  of water by  $31^\circ\text{C}$ .

[Specific heat capacity of a solution =  $4.2 \text{ J g}^{-1} ^\circ\text{C}^{-1}$ ; Molar mass of  $\text{C}_3\text{H}_7\text{OH}$  =  $60 \text{ g mol}^{-1}$ ]

Pembakaran sempurna bagi 1 mol propanol,  $\text{C}_3\text{H}_7\text{OH}$ , menghasilkan 2010 kJ haba. Kira jisim propanol,  $\text{C}_3\text{H}_7\text{OH}$  yang diperlukan untuk membakar lengkap dalam oksigen bagi meningkatkan suhu  $250 \text{ cm}^3$  air sebanyak  $31^\circ\text{C}$ .

[Muatan haba tentu larutan =  $4.2 \text{ J g}^{-1} ^\circ\text{C}^{-1}$ ; Jisim Molar  $\text{C}_3\text{H}_7\text{OH}$  =  $60 \text{ g mol}^{-1}$ ]

- A 0.74 g
- B 0.78 g
- C 0.97 g
- D 1.95 g



- 38 Diagram 11 shows the set up of apparatus to investigate electrochemical corrosion of an iron.  
*Rajah 11 menunjukkan susunan radas bagi mengkaji pengaratan besi secara elektrokimia.*

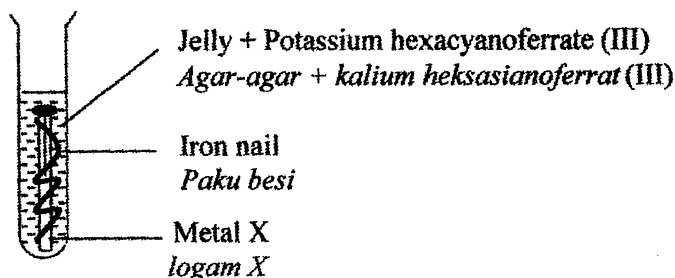


Diagram 11  
*Rajah 11*

- Which of the following metals is suitable X to speed up the corrosion process of the iron nail?  
*Antara logam berikut yang manakah paling sesuai bagi X untuk mempercepatkan proses pengaratan paku besi?*
- A Silver  
*Argentum*
  - B Magnesium  
*magnesium*
  - C Copper  
*Kuprum*
  - D Zinc  
*Zink*
- 39 The sting of an ant contains methanoic acid. Which of the following substances is the most suitable to be applied to treat ant sting?  
*Sengat semut mengandungi asid metanoik. Antara bahan berikut, yang manakah paling sesuai untuk merawat gigitan semut?*
- A Vinegar  
*Cuka*
  - B Tooth paste  
*Ubat gigi*
  - C Ethanol  
*Etanol*
  - D Cooking oil  
*Minyak masak*

40 Which of the following particle contains 10 electrons?

[ Proton number: Al=13, Na=11, Ne=10]

*Antara zarah berikut, yang manakah mengandungi 10 elektron?*

*[Nombor proton: Al=13, Na=11, Ne=10]*

I Ne

II  $\text{Na}^+$

III  $\text{Al}^{3+}$

IV Al

A I, II and III

I, II dan III

B I, II and IV

I, II dan IV

C I, III and IV

I, III dan IV

D II, III and IV

II, III dan IV

41 A sample of oxide of metal X contains 2.07g of X metal and 0.32 g of oxygen.

What is the empirical formula of the compound?

[Relative atomic mass: X=207, O=16]

*Satu contoh oksida logam X mengandungi 2.07g logam X dan 0.32g oksigen.*

*Apakah formula empirik bagi sebatian itu?*

*[Jisim atom relatif: X=207, O=16]*

A XO

B  $\text{XO}_2$

C  $\text{X}_2\text{O}$

D  $\text{X}_2\text{O}_3$

- 42 Diagram 12 shows the electron arrangement of ion  $J^{2+}$   
*Rajah 12 menunjukkan susunan elektron bagi ion  $J^{2+}$*

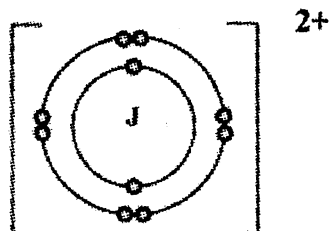


Diagram 12  
*Rajah 12*

What is the Period and Group of element J in the Periodic Table?  
*Apakah Kala dan Kumpulan bagi unsur J dalam Jadual Berkala?*

	Period <i>Kala</i>	Group <i>Kumpulan</i>
A	2	2
B	2	18
C	3	18
D	3	2

- 43 Compound X has the following properties.  
*Sebatian X mempunyai sifat-sifat berikut.*

- Melting point  $800^{\circ}\text{C}$   
*Takat lebur pada  $800^{\circ}\text{C}$*
- Soluble in water  
*Larut dalam air*
- Conduct electricity in aqueous solution  
*Mengkonduksi arus elektrik dalam larutan akueus*

What is X?  
*Apakah X?*

- A Glucose  
*Glukosa*
- B Naphthalene  
*Naftalena*
- C Lead (II) bromide  
*Plumbum (II) bromida*
- D Sodium chloride  
*Natrium klorida*

- 44 Diagram 13 shows the set-up of apparatus for an experiment to construct the Electrochemical Series by measuring the potential difference of a few pairs of copper and metal M in a simple voltaic cell using  $1.0 \text{ mol dm}^{-3}$  copper (II) sulphate solution as an electrolyte.

Rajah 13 menunjukkan radas bagi eksperimen untuk membina siri elektrokimia dengan menentukan beza upaya pasangan kuprum dan logam M dalam sel voltan ringkas menggunakan kuprum (II) sulfat  $1.0 \text{ mol dm}^{-3}$  sebagai elektrolit.

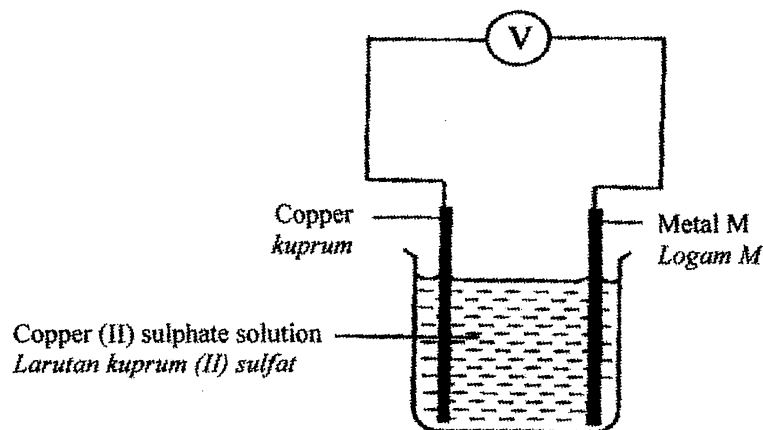


Diagram 13  
Rajah 13

The result gained is shown in the table 3  
Keputusan eksperimen ditunjukkan dalam jadual 3

Cell Sel	Metal pairs Pasangan logam Cu / M	Voltage cell / V Voltan / V	Negative terminal Terminal negatif
P	Cu / Fe	0.8	Iron, Fe Besi, Fe
Q	Cu / Al	2.1	Aluminium, Al Aluminium, Al
R	Cu / Mg	2.7	Magnesium, Mg Magnesium, Mg
S	Cu / Zn	1.1	Zinc, Zn Zink, Zn

Table 3  
Jadual 3

Which of the following is the electrochemical series in ascending order?  
Antara yang berikut, yang manakah siri elektrokimia dalam susunan menaik?

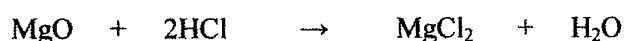
- A Al, Mg, Zn, Cu, Fe
- B Mg, Al, Zn, Fe, Cu
- C Cu, Zn, Fe, Al, Mg
- D Cu, Fe, Zn, Al, Mg

- 45 40 cm<sup>3</sup> of 1.0 mol dm<sup>-3</sup> hydrochloric acid is neutralized by 25cm<sup>3</sup> of barium hydroxide solution  
What is the molarity of barium hydroxide?

40 cm<sup>3</sup> asid hidroklorik 1.0 mol dm<sup>-3</sup> dineutralkan oleh 25cm<sup>3</sup> larutan barium hidroksida.  
Berapakah kemolaran larutan barium hidroksida?

- A 0.625 mol dm<sup>-3</sup>  
B 0.800 mol dm<sup>-3</sup>  
C 1.600 mol dm<sup>-3</sup>  
D 3.500 mol dm<sup>-3</sup>

- 46 The following equation shows the reaction between magnesium oxide and hydrochloric acid.  
*Persamaan berikut menunjukkan tindak balas magnesium oksida dengan asid hidroklorik.*



What is the mass of magnesium chloride produced when excess magnesium oxide react with 100 cm<sup>3</sup> of 0.5 mol dm<sup>-3</sup> hydrochloric acid.

[Relative atomic mass : Mg = 24, Cl = 35.5]

*Berapakah jisim magnesium klorida yang terhasil apabila magnesium oksida berlebihan bertindak balas dengan 100 cm<sup>3</sup> of 0.5 mol dm<sup>-3</sup> asid hidroklorik?*

[Jisim atom relatif : Mg = 24, Cl = 35.5]

- A 0.050 g  
B 2.375 g  
C 4.750 g  
D 9.500 g

- 47 The following information is about a reaction.  
*Maklumat berikut adalah tentang suatu tindak balas.*

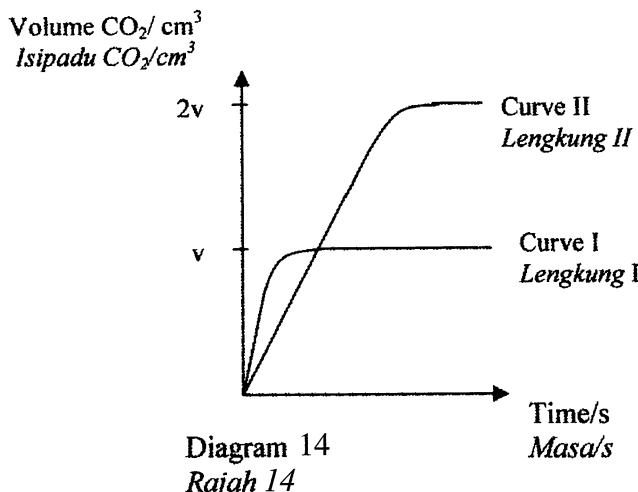
- It uses vanadium (V) oxide as catalyst  
*Menggunakan vanadium (V) oksida sebagai mangkin*
- The product of the reaction is acidic when dissolved in water  
*Hasil tindak balas bersifat asid apabila larut dalam air*

Based on this information what is the equation for the reaction?

*Berdasarkan maklumat ini, apakah persamaan tindak balas ini?*

- A  $\text{S} + \text{O}_2 \rightarrow \text{SO}_2$   
B  $\text{N}_2 + 3\text{H}_2 \rightleftharpoons 2\text{NH}_3$   
C  $2\text{H}_2\text{O}_2 \rightarrow \text{O}_2 + 2\text{H}_2\text{O}$   
D  $2\text{SO}_2 + \text{O}_2 \rightleftharpoons 2\text{SO}_3$

- 48 The curve II in diagram 14 is produced from a reaction between 5 g of powdered marble with 100 cm<sup>3</sup> of hydrochloric acid 0.5 mol dm<sup>-3</sup>.  
*Lengkung II dalam rajah 14 diperolehi daripada tindak balas antara 5 g serbuk marmar dengan 100 cm<sup>3</sup> asid hidroklorik 0.5 mol dm<sup>-3</sup>.*



Which of the following reaction will produced Curve I?

*Antara tindak balas berikut, yang manakah akan menghasilkan Lengkung I?*

- A 5 g marble chip is added to 100 cm<sup>3</sup> hydrochloric acid 1 mol dm<sup>-3</sup>.  
 5 g ketulan marmar ditambah 100 cm<sup>3</sup> hidroklorik asid 1 mol dm<sup>-3</sup>.
- B 5 g powdered marble is added to 100 cm<sup>3</sup> hydrochloric acid 1 mol dm<sup>-3</sup>.  
 5 g serbuk marmar ditambah 100 cm<sup>3</sup> hidroklorik asid 1 mol dm<sup>-3</sup>.
- C 5 g marble chip is added to 50 cm<sup>3</sup> hydrochloric acid 2 mol dm<sup>-3</sup>.  
 5 g ketulan marmar ditambah 50 cm<sup>3</sup> hidroklorik asid 2 mol dm<sup>-3</sup>.
- D 5 g powdered marble is added to 25 cm<sup>3</sup> hydrochloric acid 1 mol dm<sup>-3</sup>.  
 5 g serbuk marmar ditambah 25 cm<sup>3</sup> hidroklorik asid 1 mol dm<sup>-3</sup>.
- 49 The following chemical equation shows the combustion of ethene gas.  
*Persamaan kimia berikut menunjukkan pembakaran bagi gas etena.*



2.8 g ethene is burnt completely in excess oxygen.

What is the volume of carbon dioxide produced at room temperature ?

[ Molar mass of C<sub>2</sub>H<sub>4</sub> = 28 g mol<sup>-1</sup>; Molar volume of gas at room temperature = 24 dm<sup>3</sup> mol<sup>-1</sup> ]

*2.8g etena terbakar lengkap di dalam oksigen berlebihan.*

*Berapakah isipadu gas karbon dioksida yang dihasilkan pada suhu bilik?*

[ Jisim molar C<sub>2</sub>H<sub>4</sub> = 28 g mol<sup>-1</sup>; Isipadu molar gas pada suhu bilik = 24 dm<sup>3</sup> mol<sup>-1</sup> ]

- A 0.24 dm<sup>3</sup>
- B 0.48 dm<sup>3</sup>
- C 2.40 dm<sup>3</sup>
- D 4.80 dm<sup>3</sup>

- 50 Diagram 15 shows the set-up of apparatus to investigate the redox reaction involving transfer of electron at a distance.

Rajah 15 menunjukkan susunan radas untuk mengkaji tindak balas redoks yang melibatkan pemindahan elektron pada satu jarak.

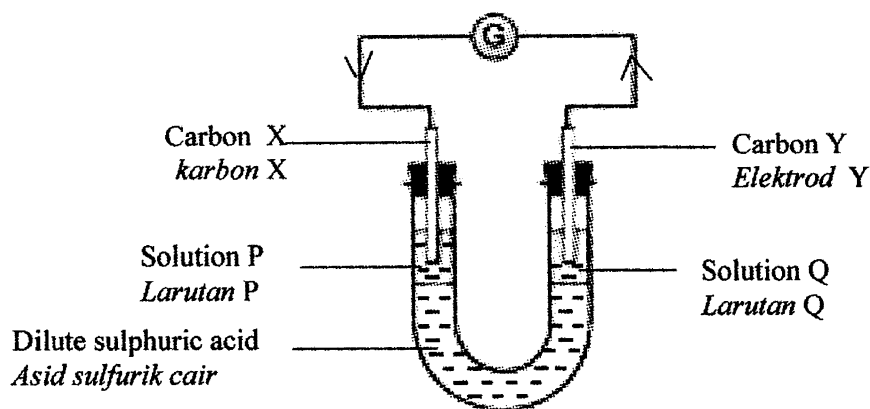


Diagram 15

Rajah 15

What are the solutions of P and Q, which will produce electron flow from carbon Y to carbon X through the external circuit?

Apakah larutan P dan Q yang akan menghasilkan elektron mengalir dari karbon Y ke karbon X melalui litar luar?

	<b>Solution P</b> <i>Larutan P</i>	<b>Solution Q</b> <i>Larutan Q</i>
<b>A</b>	Iron (II) sulphate solution <i>Larutan ferum (II) sulfat</i>	Potassium iodide solution <i>Larutan kalium iodida</i>
<b>B</b>	Acidified potassium manganate(VII) solution <i>Larutan kalium manganat (VII) berasid</i>	Bromine water <i>Air bromin</i>
<b>C</b>	Bromine water <i>Air bromin</i>	Potassium iodide solution <i>Larutan kalium iodida</i>
<b>D</b>	Iron (II) sulphate solution <i>Larutan ferum (II) sulfat</i>	Acidified potassium dichromate (VI) solution <i>Larutan kalium dikromat (VI) berasid</i>

**END OF QUESTION PAPER**  
**KERTAS SOALAN TAMAT**

NAMA : .....

TINGKATAN : .....



**JABATAN PELAJARAN NEGERI TERENGGANU**

**Peperiksaan Percubaan**

**4541/2**

**SIJIL PELAJARAN MALAYSIA 2010**



**CHEMISTRY**

**Kertas 2**

**Ogos 2010**

**2 ½ jam**

**Dua jam tiga puluh minit**

**JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU**

1. Tulis **nama** dan **tingkatan** anda pada ruangan yang disediakan di atas.
2. Kertas soalan ini adalah dalam **dwibahasa**.
3. Soalan dalam Bahasa Inggeris mendahului soalan yang sepadan dalam Bahasa Melayu.
4. Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam **Bahasa Inggeris** atau **Bahasa Melayu**.
5. Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini

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

Disediakan Oleh:  
**AKRAM NEGERI TERENGGANU**

Dibiayai Oleh:  
**KERAJAAN NEGERI TERENGGANU**

**TERENGGANU ANJUNG ILMU**

Dicetak Oleh:  
Percetakan Yayasan Islam Terengganu Sdn. Bhd.  
Tel: 609-666 8611/6652/8601 Faks: 609-666 0611/0063

Kertas soalan ini mengandungi **21** halaman bercetak.



**Section A****[60 marks]**

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

- 1** Table 1 shows the proton number, number of electron and number of neutron of particles of elements X, Y and Z.

X, Y and Z do not represent the actual symbol of the elements.

*Jadual 1 menunjukkan nombor proton, bilangan elektron dan bilangan neutron bagi zarah unsur X, Y dan Z.*

*X, Y dan Z bukanlah mewakili simbol unsur sebenar.*

Particle Zarah	Proton number Nombor proton	Number of electron Bilangan elektron	Number of neutron Bilangan neutron
X	6	6	8
Y	7	7	7
Z	11	10	12

Table / Jadual 1

- (a) What is meant by proton number?

*Apakah yang dimaksudkan dengan nombor proton?*

.....  
[1 mark]

- (b) State which subatomic particle that is the lightest.

*Nyatakan zarah subatom yang paling ringan.*

.....  
[1 mark]

- (c) W is an isotope of X.

*W ialah isotop bagi X.*

- (i) State the number of proton of W.

*Nyatakan bilangan proton bagi W.*

.....  
[1 mark]

- (ii) Does W have the same chemical properties with X? Give a reason.

*Adakah W mempunyai sifat kimia yang sama dengan X? Beri satu sebab.*

.....  
[2 marks]

- (d) (i) What is the nucleon number of Y?  
*Apakah nombor nukleon bagi Y?*

.....  
[1 mark]

- (ii) Draw the atomic structure of Y.  
*Lukiskan struktur atom bagi Y.*

[1 mark]

- (e) (i) Write the electron arrangement of particle Z.  
*Tuliskan susunan elektron bagi zarah Z.*

.....  
[1 mark]

- (ii) State the charge of particle Z.  
*Nyatakan cas bagi zarah Z.*

.....  
[1 mark]

- 2 (a) The reaction between metal Q and acid X can be represented by chemical equation below.  
Tindak balas antara logam Q dan asid X boleh diwakili oleh persamaan kimia di bawah.



- (i) Suggest an acid of X and ionic compound of  $\text{QX}_2$ .  
Cadangkan satu asid X dan sebatian ionik  $\text{QX}_2$ .

Acid X :

Asid X : .....

Ionic compound  $\text{QX}_2$  :

Sebatian ionik  $\text{QX}_2$  : .....

[2 marks]

- (ii) Based on the equation, complete the statement below :

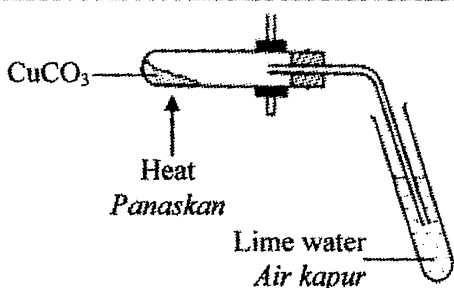
..... mol of Q react with ..... mol of HX to produce  
..... mol of  $\text{QX}_2$  and ..... mol of  $\text{H}_2$ .

Berdasarkan persamaan, lengkapkan pernyataan di bawah :

..... mol Q bertindak balas dengan ..... mol HX  
menghasilkan ..... mol  $\text{QX}_2$  dan ..... mol  $\text{H}_2$ .

[1 mark]

- (b) Table below shows an experiment to investigate the effect of heat on copper(II) carbonate.  
Jadual di bawah menunjukkan satu eksperimen untuk mengkaji kesan haba ke atas kuprum (II) karbonat.

Diagram Gambar rajah	Procedure Prosedur	Observation Pemerhatian
	<p>Copper(II) carbonate is heated and the gas produced is passed through lime water.</p> <p>Kuprum (II) karbonat dipanaskan dan gas yang terhasil dialirkan melalui air kapur.</p>	<p>Green solid turns black. The lime water turns milky.</p> <p>Pepejal hijau menjadi hitam. Air kapur menjadi keruh.</p>

Based on the experiment :

Berdasarkan eksperimen tersebut :

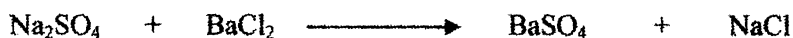
- (i) state the name of the products formed.  
*nyatakan nama bagi hasil tindak balas yang terbentuk.*

[1 mark]

- (ii) write a chemical equation for the reaction.  
*tuliskan satu persamaan kimia bagi tindak balas tersebut.*

[1 mark]

- (c) The following equation is not balanced.  
*Persamaan di bawah adalah tidak seimbang.*



- (i) Write the balanced equation for the reaction.  
*tuliskan persamaan yang seimbang bagi tindak balas tersebut.*

[1 mark]

- (ii) Calculate the mass of barium sulphate formed when 500 cm<sup>3</sup> of 1 mol dm<sup>-3</sup> sodium sulphate solution is reacted completely with barium chloride solution.  
*Hitungkan jisim barium sulfat yang terbentuk apabila 500 cm<sup>3</sup> larutan natrium sulfat 1 mol dm<sup>-3</sup> bertindak balas lengkap dengan larutan barium klorida.*  
[ Relative atomic mass / Jisim atom relatif : O = 16 ; S = 32 ; Ba = 137 ]

[3 marks]

- 3 Diagram 3.1 shows a chemical cell.  
Rajah 3.1 menunjukkan satu sel kimia.

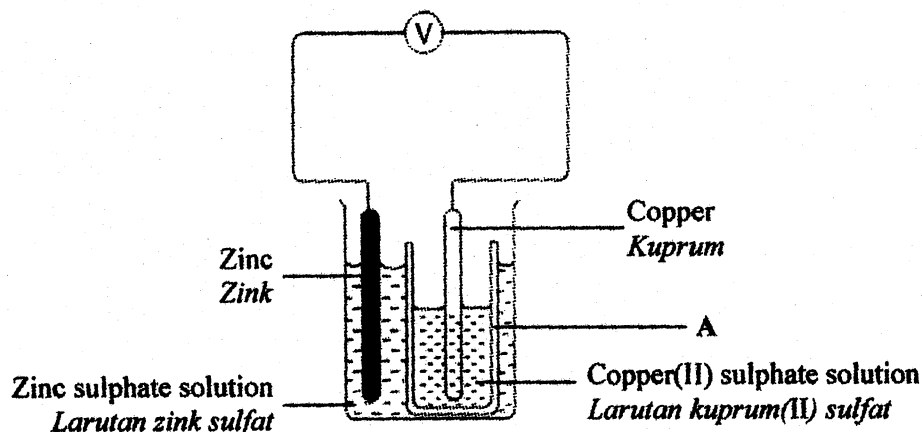


Diagram / Rajah 3.1

- (a) (i) State the name of apparatus A.  
Nyatakan nama bagi radas A.
- ..... [1 mark]
- (ii) What is the function of apparatus in (a) (i).  
Apakah fungsi radas dalam (a) (i).
- ..... [1 mark]
- (b) (i) State one observation at the zinc plate.  
Nyatakan satu pemerhatian pada kepingan zink.
- ..... [1 mark]
- (ii) Write the half equation for the reaction that occurs at the zinc plate.  
Tuliskan setengah persamaan bagi tindak balas yang berlaku pada kepingan zink.
- ..... [1 mark]
- (c) What is the type of reaction occur at copper plate.  
Apakah jenis tindak balas yang berlaku pada kepingan kuprum.
- ..... [1 mark]
- (d) Draw the flow of electron in Diagram 3.1.  
Lukiskan arah pengaliran elektron pada Rajah 3.1.
- ..... [1 mark]

- (e) The copper plate in the chemical cell above is replaced by magnesium metal and copper (II) sulphate solution is replaced by magnesium sulphate solution.  
*Kepingan kuprum dalam sel kimia di atas ditukar dengan logam magnesium dan larutan kuprum (II) sulfat ditukar dengan larutan magnesium sulfat.*

- (i) What will happen to the direction of electron flow?  
*Apakah yang akan berlaku kepada arah pengaliran elektron?*

[1 mark]

- (ii) Give a reason for your answer.  
*Berikan satu sebab untuk jawapan anda.*

[1 mark]

- (f) Another experiment is carried out by replacing the zinc plate with metal P and Q.  
 Table 3.2 shows the results.  
*Satu eksperimen lain dijalankan dengan menggantikan kepingan zink dengan logam P dan Q.  
 Jadual 3.2 menunjukkan keputusan yang telah diperolehi.*

Pair of metal <i>Pasangan logam</i>	Voltage / V <i>Voltan / V</i>	Negative terminal <i>Terminal negatif</i>
P and Cu	2.0	P
Q and Cu	0.5	Q

Table / Jadual 3.2

- (i) Arrange metals P, Q and Cu in ascending order of electropositivity.  
*Susunkan logam P, Q dan Cu mengikut tertib menaik keelektropositifan.*

[1 mark]

- (ii) Predict the voltage for chemical cell using pair of metal P and Q.  
*Ramalkan voltan bagi sel kimia yang menggunakan pasangan logam P dan Q.*

[1 mark]

- 4 Table 4 shows concentration and pH value of three solutions.  
*Jadual 4 menunjukkan kepekatan dan nilai pH bagi tiga larutan.*

Solution <i>Larutan</i>	Sulphuric acid <i>Asid sulfurik</i>	Ethanoic acid <i>Etanoik asid</i>	Sodium hydroxide <i>Natrium hidroksida</i>
Concentration <i>Kepekatan</i>	0.5 mol dm <sup>-3</sup>	0.5 mol dm <sup>-3</sup>	X mol dm <sup>-3</sup>
pH value <i>Nilai pH</i>	1	5	13

Table / *Jadual* 4

- (a) Sodium hydroxide is a strong alkali. What is the meaning of strong alkali?  
*Natrium hidroksida ialah alkali kuat. Apakah yang dimaksudkan dengan alkali kuat?*

[1 mark]

- (b) (i) Which of the solution in Table 4 has the highest concentration of hydrogen ions?  
*Larutan manakah dalam Jadual 4 mempunyai kepekatan ion hidrogen yang paling tinggi?*

[1 mark]

- (ii) Explain your answer.  
*Terangkan jawapan anda.*

[1 mark]

- (c) A student carried out an experiment to determine the X value. In the experiment, 20 cm<sup>3</sup> of sulphuric acid in Table 4 is used to neutralize 25 cm<sup>3</sup> of sodium hydroxide solution using titration method.  
*Seorang pelajar telah menjalankan eksperimen untuk menentukan nilai X. Dalam eksperimen tersebut, 20 cm<sup>3</sup> asid sulfurik dalam Jadual 4 telah digunakan untuk meneutralkan 25 cm<sup>3</sup> larutan natrium hidroksida menggunakan kaedah pentitratan.*

- (i) State an indicator that can be used in the experiment.  
*Nyatakan satu penunjuk yang boleh digunakan dalam eksperimen itu.*

[1 mark]

- (ii) State the observation in the experiment.  
*Nyatakan pemerhatian dalam eksperimen itu.*

[1 mark]

- (iii) Write the chemical equation involved.  
*Tuliskan persamaan kimia yang terlibat.*

.....  
[2 marks]

- (iv) Calculate the value of X.  
*Hitungkan nilai X.*

[3 marks]



- 5 (a) Diagram 5.1 shows the set-up of apparatus to study the effect of metals P and Q on the rusting of iron nail. The results are recorded after one day.  
*Rajah 5.1 menunjukkan susunan radas untuk mengkaji kesan logam P dan Q ke atas pengurangan paku besi. Keputusan dicatatkan selepas satu hari.*

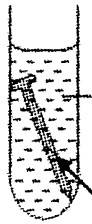





	Experiment <i>Eksperimen</i>	Observation after 1 day <i>Pemerhatian selepas 1 hari</i>
A	 <p>Agar-agar solution with potassium hexacyanoferrate (III) and phenolphthalein solution.  <i>Larutan agar-agar dengan larutan kalium heksianoferat (III) dan fenolftalein</i></p> <p>Iron nail  <i>Paku besi</i></p>	 <p>Some dark blue precipitate.  <i>Sedikit mendakan biru.</i></p>
B	 <p>Agar-agar solution with potassium hexacyanoferrate (III) and phenolphthalein solution.  <i>Larutan agar-agar dengan larutan kalium heksianoferat (III) dan fenolftalein</i></p> <p>Iron nail wrapped with metal P  <i>Paku besi dililit dengan logam P</i></p>	 <p>Large amount of dark blue precipitate  <i>Banyak mendakan biru.</i></p>
C	 <p>Agar-agar solution with potassium hexacyanoferrate (III) and phenolphthalein solution.  <i>Larutan agar-agar dengan larutan kalium heksianoferat (III) dan fenolftalein</i></p> <p>Iron nail wrapped with metal Q  <i>Paku besi dililit dengan logam Q</i></p>	 <p>No dark blue precipitate. Solution turns pink.  <i>Tiada mendakan biru. Larutan bertukar merah jambu.</i></p>

Diagram / Rajah 6.1

- (i) State the function of potassium hexacyanoferrate (III) solution in this experiment.  
*Nyatakan fungsi larutan kalium heksasianoferat (III) dalam eksperimen ini.*

[1 mark]

- (ii) Write the half equation for the formation of iron (II) ion from iron.  
*Tuliskan setengah persamaan bagi pembentukan ion ferum (II) daripada ferum.*

[1 mark]

- (iii) In which test tube, iron rust the fastest? Explain your answer.  
*Dalam tabung uji manakah menunjukkan pengurangan besi yang paling cepat.  
 Terangkan jawapan anda.*

[2 marks]

- (iv) Arrange the metal Fe, P and Q in decreasing order of electropositivity.  
*Susun logam Fe, P dan Q mengikut urutan menurun keelektropositifan.*

[1 mark]

- (b) Diagram 5.2 shows the set-up of apparatus to investigate the reaction between potassium manganate (VII) solution and iron (II) chloride solution through the transfer of electrons at a distance.  
*Rajah 5.2 menunjukkan susunan radas untuk menyiasat tindak balas di antara larutan kalium manganat (VII) dan larutan ferum (II) klorida melalui pemindahan elektron pada satu jarak.*

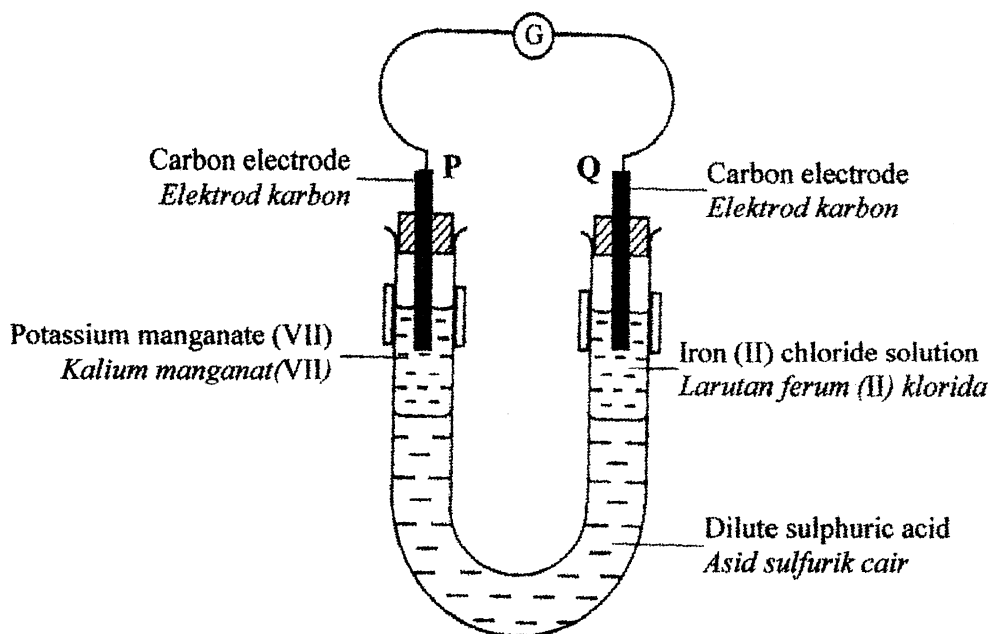
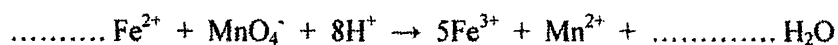


Diagram / Rajah 5.2

The incomplete ionic equation for the reaction is :  
*Persamaan ion yang tidak lengkap bagi tindak balas tersebut ialah :*



- (i) Complete the above equation.  
*Lengkapkan persamaan di atas.*

[1 mark]

- (ii) What is the change in colour at electrode P?  
*Apakah perubahan warna dalam larutan pada elektrod P?*

.....  
[1 mark]

- (iii) What is the substance that undergoes oxidation in this experiment? Explain why.  
*Apakah bahan yang mengalami pengoksidaan dalam eksperimen ini? Terangkan mengapa.*

.....  
[2 marks]

- (iii) Describe a chemical test to determine the product formed at electrode Q.  
*Huraikan satu ujian kimia untuk menentukan hasil yang terbentuk di elektrod Q.*

.....  
[2 marks]

- 6 Diagram 6 shows the energy level diagram when propanol is reacted with excess oxygen.  
*Rajah 6 menunjukkan gambarajah aras tenaga bila propanol ditindakbalaskan dengan oksigen berlebihan.*

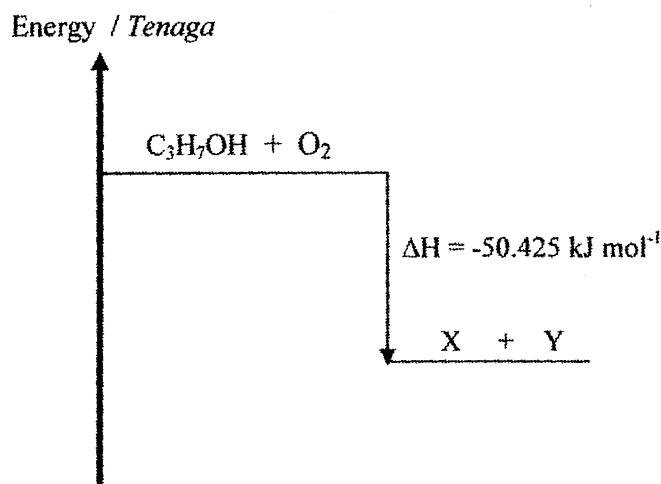


Diagram / Rajah 6

Based on Diagram 6 ;

- (a) What is meant by  $\Delta H = -50.425 \text{ kJ mol}^{-1}$  ?  
*Apakah yang dimaksudkan dengan  $\Delta H = -50.425 \text{ kJ mol}^{-1}$  ?*

[1 mark]

- (b) State the type of reaction.  
*Nyatakan jenis tindak balas.*

[1 mark]

- (c) (i) Write a chemical equations for the reaction.  
*Tulis persamaan kimia bagi tindak balas.*

[2 marks]

- (ii) State the name of X and Y.  
*Nyatakan nama X dan Y.*

[2 marks]

- (d) Compare the energy content between reactant and product  
*Bandingkan kandungan tenaga antara bahan tindak balas dan hasil tindak balas.*

[1 mark]

- (e) (i) 3.0 g propanol is reacted completely in excess oxygen.  
Calculate the heat released in this experiment.  
*3.0 g propanol telah ditindakbalaskan dengan lengkap dalam oksigen berlebihan.  
Hitung haba yang dibebaskan dalam eksperimen.*  
[ Relative atomic mass / Jisim atom relatif : C =12 , H = 1 , O =16 ]

[2 marks]

- (ii) Draw the set up of apparatus in this experiment.  
*Lukiskan susunan radas yang digunakan untuk menjalankan eksperimen ini.*

[3 marks]

**Section B**

[20 marks]

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

- 7 Table 7.1 shows the electron arrangement of elements U, V and W.  
Jadual 7.1 menunjukkan susunan elektron bagi unsur U, V dan W.

Element Unsur	Electron arrangement Susunan elektron
U	2.1
V	2.7
W	2.8.7

Table / Jadual 7.1

- (a) State the group and the period of element U in the Periodic Table of Elements.  
Explain your answer.

Nyatakan kumpulan dan kala bagi unsur U dalam Jadual Berkala Unsur.  
Terangkan jawapan anda.

[4 marks]

- (b) Table 7.2 shows the observation of element V and W when react with hot iron.  
Jadual 7.2 menunjukkan pemerhatian bagi unsur V dan W apabila bertindak balas dengan besi panas.

Experiment Eksperimen	Observation Pemerhatian
V + hot iron V + besi panas	Hot iron burns brightly. Besi panas terbakar dengan terang.
W + hot iron W + besi panas	Hot iron burn slowly. Besi panas terbakar dengan perlahan.

Table / Jadual 7.2

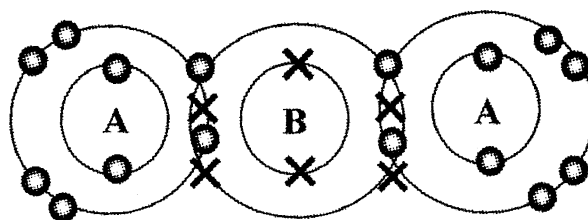
- (i) Write the chemical equation when element V reacts with hot iron.  
Tuliskan persamaan kimia bagi tindak balas apabila unsur V bertindak balas dengan besi panas.

[2 marks]

- (ii) Compare the reactivity of element V and W.  
Explain your answer.  
Bandingkan kereaktifan unsur V dan W.  
Terangkan jawapan anda.

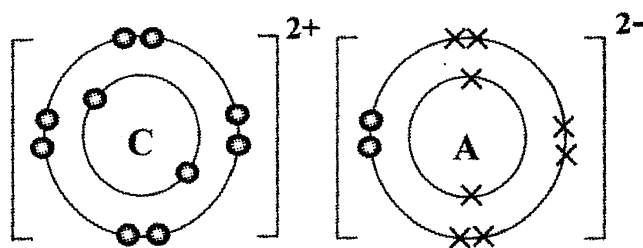
[4 marks]

- (c) Diagram 7.3 and 7.4 shows the electron arrangement of compound X and Y.  
*Rajah 7.3 dan 7.4 menunjukkan susunan elektron bagi sebatian X dan Y.*



Compound X  
*Sebatian X*

Diagram / *Rajah 7.3*



Compound Y  
*Sebatian Y*

Diagram / *Rajah 7.4*

- (i) Which compound is the covalent compound? Give a reason.  
*Sebatian manakah merupakan sebatian kovalen? Berikan satu sebab.*

[2 marks]

- (ii) Compare the physical properties of compound X and Y.  
 Explain your answer.  
*Bandingkan sifat fizik bagi sebatian X dan Y.*  
*Terangkan jawapan anda.*

[8 marks]

- 8 (a) Diagram 8.1 shows the structural formula of two of hydrocarbons.  
Rajah 8.1 menunjukkan formula struktur bagi dua hidrokarbon.

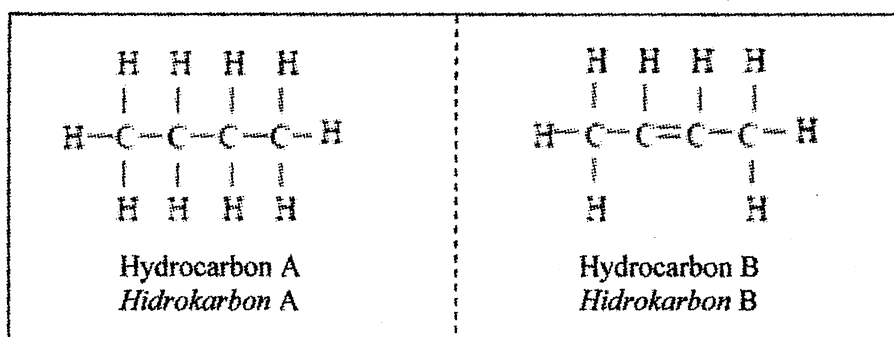


Diagram / Rajah 8.1

- (i) State the type of bond, homologous series and general formula of hydrocarbon A and hydrocarbon B.  
Nyatakan jenis ikatan, siri homolog dan formula am bagi hidrokarbon A dan hidrokarbon B. [6 marks]
- (ii) Complete combustion of hydrocarbon A produces gas C and water.  
State the name of gas C and write the chemical equation for the reaction.  
Pembakaran lengkap hidrokarbon A menghasilkan gas C dan air.  
Nyatakan nama bagi gas C dan tuliskan persamaan kimia bagi tindak balas itu. [3 marks]
- (iii) Which hydrocarbon change the colour of bromine water from brown to colourless.  
Explain your answer.  
Hidrokarbon yang manakah menukarkan warna air bromin daripada perang kepada tanpa warna. Terangkan jawapan anda. [3 marks]
- (iv) Diagram 8.2 shows the burning of hydrocarbon A and hydrocarbon B in air.  
Rajah 8.2 menunjukkan pembakaran hidrokarbon A dan hidrokarbon B dalam udara.

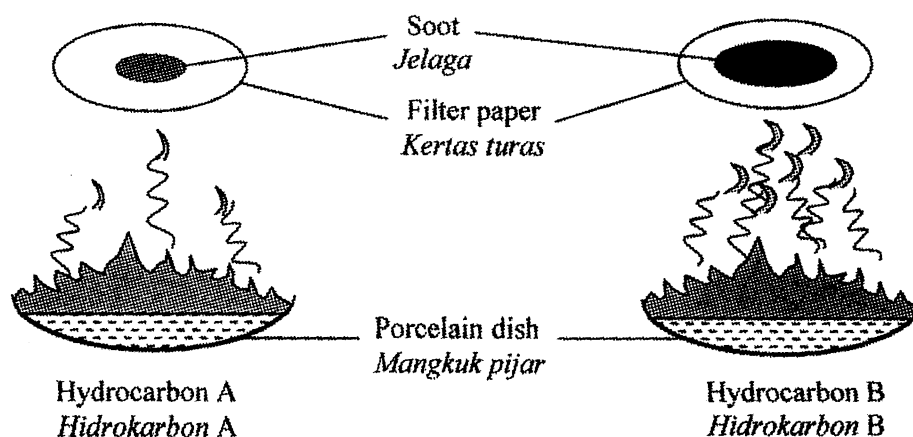


Diagram / Rajah 8.2



Compare the sootiness of hydrocarbon A and hydrocarbon B.

Explain your answer.

[Given that the relative atomic mass of H = 1, C = 12]

*Bandingkan kejelagaan bagi hidrokarbon A dan hidrokarbon B.*

*Terangkan jawapan anda.*

*[Diberi jisim atom relatif bagi H = 1, C = 12]*

[4 marks]

(b) Diagram 8.3 shows the reaction between carboxylic acid X and alcohol Y.

*Rajah 8.3 menunjukkan tindak balas antara asid karboksilik X dan alkohol Y.*

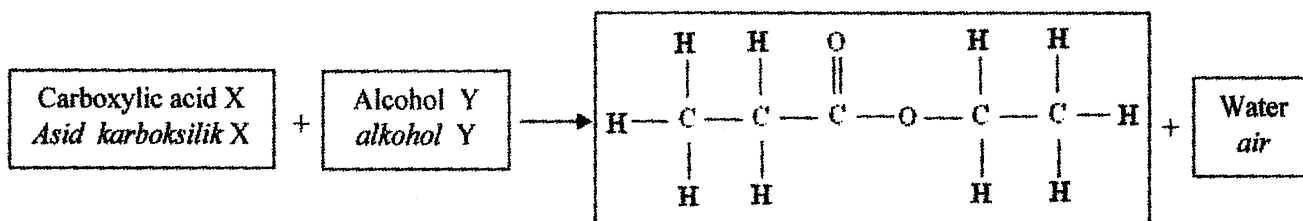


Diagram / Rajah 8.3

Draw the structural formula and state the name of carboxylic acid X and alcohol Y.

*Lukiskan formula struktur dan nyatakan nama bagi asid karboksilik X dan alkohol Y.*

[4 marks]

**Section C**

[20 marks]

Answer any **one** question from this section.

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

- 9 Diagram 9 shows a series of reaction starting from lead (II) carbonate,  $\text{PbCO}_3$ .  
Rajah 9 menunjukkan satu siri tindak balas bermula daripada plumbum (II) karbonat,  $\text{PbCO}_3$ .

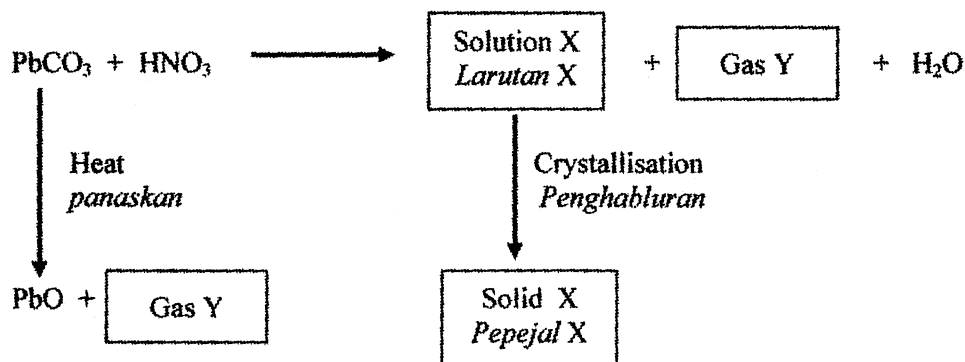


Diagram / Rajah 9

- (a) Based on Diagram 9 :
- Identify gas Y. Describe a chemical test to verify gas Y.
  - Describe a chemical test to determine the presence of anion in the solution X.
  - Compare and contrast the observation when solid X and lead (II) carbonate,  $\text{PbCO}_3$  are heated.

Berdasarkan Rajah 9 :

- Kenal pasti gas Y. Huraikan ujian kimia untuk menentusahkan gas Y.
  - Huraikan ujian kimia untuk menentukan kehadiran anion dalam larutan X.
  - Banding dan bezakan pemerhatian apabila pepejal X dan plumbum karbonat dipanaskan.
- [8 marks]

- (b) Lead (II) carbonate can be converted from solution X by using a substance. Suggest the substance. Describe the preparation of lead(II) carbonate by using these substances. In your description, include the chemical equation involved.

Plumbum (II) karbonat boleh ditukar kembali daripada larutan X dengan menggunakan satu bahan.

Cadangkan bahan itu.

Huraikan penyediaan plumbum (II) karbonat dengan menggunakan bahan-bahan itu.

Dalam huraian, sertakan persamaan kimia yang terlibat.

[10 marks]

- (c) A house wife's discovered that the cake she bake did not rise. Suggest how she can overcome this problem. Give a reason.

Seorang suri rumah mendapati kek yang dibakarnya tidak naik.

Cadangkan bagaimana dia boleh mengatasi masalah itu. Beri satu sebab.

[2 marks]

- 10 (a) A group of students carried out experiments to investigate the factor affecting the rate of reaction between metal P and an acid Q.  
*Sekumpulan pelajar telah menjalankan eksperimen untuk mengkaji kesan faktor yang mempengaruhi kadar tindak balas antara logam P dan asid Q.*

Table 10 shows the information about the reactants and the time taken to collect 30 cm<sup>3</sup> of hydrogen gas.

*Jadual 10 menunjukkan maklumat tentang bahan tindak balas dan masa diambil untuk mengumpul 30 cm<sup>3</sup> gas hidrogen.*

Experiment <i>Eksperimen</i>	Reactants <i>Bahan tindak balas</i>	Time taken (s) <i>Masa diambil (s)</i>
I	Powdered metal P and 50 cm <sup>3</sup> of 1.0 mol dm <sup>-3</sup> acid Q <i>Serbuk logam P dan 50 cm<sup>3</sup> asid Q 1.0 mol dm<sup>-3</sup></i>	10
II	Powdered metal P and 100 cm <sup>3</sup> of 0.5 mol dm <sup>-3</sup> acid Q <i>Serbuk logam P dan 100 cm<sup>3</sup> asid Q 0.5 mol dm<sup>-3</sup></i>	20

Table / *Jadual* 10

- (i) Suggest the name of metal P and acid Q.  
*Cadangkan nama logam P dan asid Q.*  
 By using the named metal P and acid Q, write the chemical equation.  
*Menggunakan logam P dan asid Q yang dinamakan, tulis persamaan kimia.* [4 marks]
- (ii) Calculate the average rate of reaction for Experiment I and Experiment II.  
*Hitung kadar tindak balas purata bagi Eksperimen I dan Eksperimen II.* [2 marks]
- (iii) Explain the difference in the rate of reaction between Experiment I and Experiment II.  
*Terangkan perbezaan kadar tindakbalas antara Eksperimen I dan Eksperimen II.*  
 Use the collision theory in your explanation.  
*Gunakan teori perlanggaran dalam penerangan anda.* [4 marks]
- (b) By using either size of reactant or temperature, describe an experiment how this factor affecting the rate of reaction.  
*Dengan menggunakan faktor saiz bahan tindak balas atau suhu, huraikan satu eksperimen bagaimana faktor berkenaan mempengaruhi kadar tindak balas.* [10 marks]

END OF QUESTION  
 KERTAS SOALAN TAMAT

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

**INFORMATION FOR CANDIDATES**  
**MAKLUMAT UNTUK CALON**

1. This question paper consists of three sections: **Section A, Section B and Section C.**  
*Kertas soalan ini mengandungi tiga bahagian: Bahagian A, Bahagian B dan Bahagian C.*
2. Answer **all** questions in Section A. Write your answers for **Section A** in the spaces provided in the question paper.  
*Jawab semua soalan dalam Bahagian A. Tuliskan jawapan bagi Bahagian A dalam ruang yang disediakan dalam kertas soalan*
3. Answer **one** question from **Section B** and **one** question from **Section C.**  
Write your answers for **Section B** and **Section C** on the 'answer sheet' provided by the invigilators. Answer questions in **Section B** and **Section C** in detail.  
You may use equations, diagrams, tables, graphs and other suitable methods to explain your answer.  
*Jawab satu soalan daripada Bahagian B dan satu soalan daripada Bahagian C. Tuliskan jawapan bagi Bahagian B dan Bahagian C pada kertas tulis yang dibekalkan oleh pengawas peperiksaan. Jawab Bahagian B dan Bahagian C dengan terperinci. Anda boleh menggunakan persamaan, gambar rajah, jadual, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda.*
4. The diagrams in the questions are not drawn to scale unless stated.  
*Rajah yang mengiringi soalan tidak dilukiskan mengikut skala kecuali dinyatakan*
5. Marks allocated for each question or sub-part of the question are shown in brackets.  
*Markah yang diperuntukkan bagi setiap soalan atau ceraihan soalan ditunjukkan dalam kurungan.*
6. Show your working. It may help you to get marks.  
*Tunjukkan kerja mengira. Ini membantu anda mendapatkan markah.*
7. If you wish to change your answer, neatly cross out the answer that you have done. Then write down the new answer.  
*Sekiranya anda hendak membatalkan sesuatu jawapan, buat garisan di atas jawapan itu.*
8. You may use a non-programmable scientific calculator.  
*Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogramkan.*
9. You are advised to spend 90 minutes to answer questions in **Section A**, 30 minutes for **Section B** and 30 minutes for **Section C.**  
*Anda dicadangkan mengambil masa 90 minit untuk menjawab soalan dalam Bahagian A, 30 minit untuk Bahagian B dan 30 minit untuk Bahagian C.*
10. Tie together your answer sheets at the end of the examination.  
*Ikat semua kertas jawapan anda di akhir peperiksaan.*

NAMA : .....

TINGKATAN : .....



**JABATAN PELAJARAN NEGERI TERENGGANU**

**Peperiksaan Percubaan**

**4541/3**

**SIJIL PELAJARAN MALAYSIA 2010**

**CHEMISTRY**

**Kertas 3**

**Ogos**

**1 ½ jam**

**Satu jam tiga puluh minit**

**JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU**

1. *Tulis **nama** dan **tingkatan** anda pada ruangan yang disediakan di atas.*
2. *Kertas soalan ini adalah dalam **dwibahasa**.*
3. *Soalan dalam Bahasa Inggeris mendahului soalan yang sepadan dalam Bahasa Melayu.*
4. *Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam **Bahasa Inggeris** atau **Bahasa Melayu**.*
5. *Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini*

Untuk Kegunaan Pemeriksa		
Soalan	Markah Penuh	Markah Diperoleh
1	18	
2	15	
3	17	
Jumlah	50	

Disediakan Oleh:  
**AKRAM NEGERI TERENGGANU**

Dibiayai Oleh:  
**KERAJAAN NEGERI TERENGGANU**

**TERENGGANU ANJUNG ILMU**

Dicetak Oleh:  
Percetakan Yayasan Islam Terengganu Sdn. Bhd.  
Tel: 609-666 8611/6652/8601 Faks: 609-666 0611/0063

Kertas soalan ini mengandungi **11** halaman bercetak.



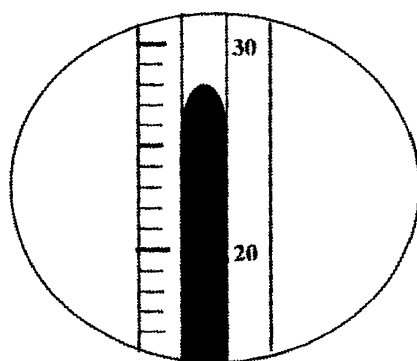
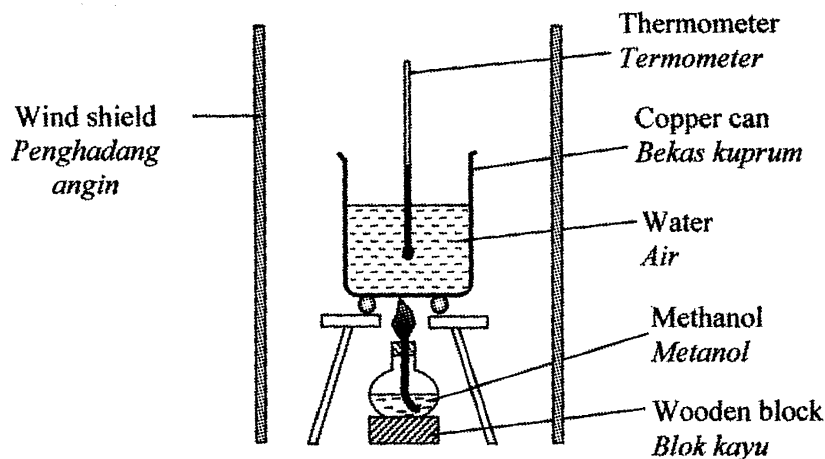
Answer all questions  
Jawab semua soalan

- 1 Diagram 1.1, 1.2 and 1.3 shows three set of experiments to determine the heat of combustion of methanol, ethanol and propanol.

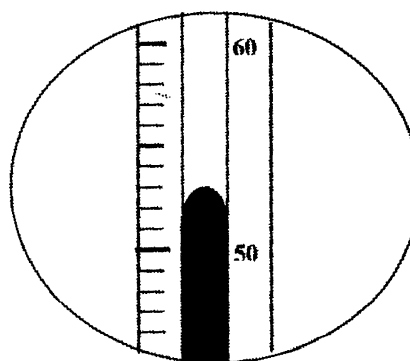
Rajah 1.1 menunjukkan tiga eksperimen untuk menentukan haba pembakaran metanol, etanol dan propanol.

Set I :

Set I



Initial  
Awal



Highest  
Tertinggi

Diagram 1.1  
Rajah 1.1

Initial temperature of the water  
Suhu awal air

: \_\_\_\_\_

Highest temperature of the water  
Suhu tertinggi air

: \_\_\_\_\_

Temperature rise of the water  
Kenaikan suhu air

: \_\_\_\_\_

Set II:  
Set II

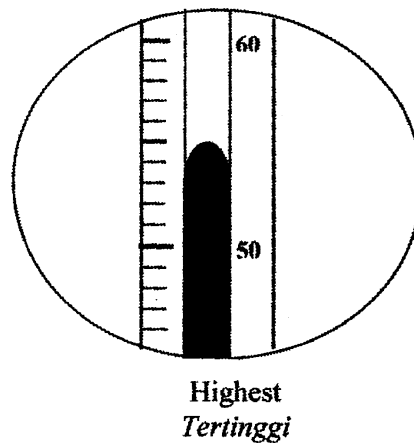
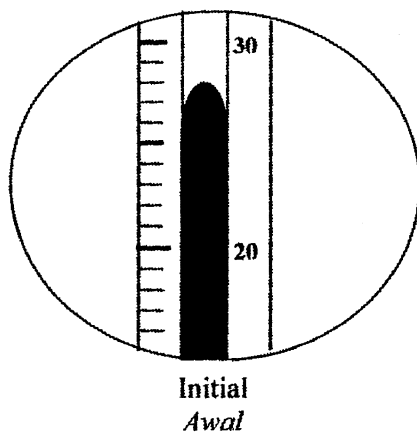
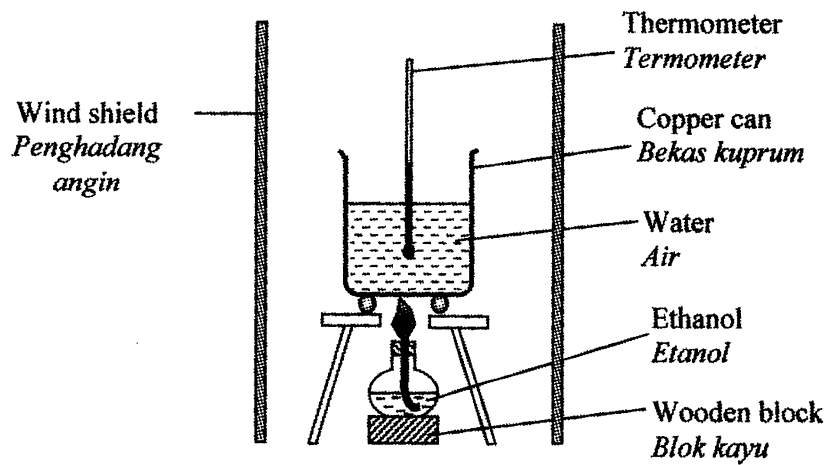


Diagram 1.2  
Rajah 1.2

Initial temperature of the water  
*Suhu awal air*

: \_\_\_\_\_

Highest temperature of the water  
*Suhu tertinggi air*

: \_\_\_\_\_

Temperature rise of the water  
*Kenaikan suhu air*

: \_\_\_\_\_



Set III :  
Set III

For  
examiner's  
use

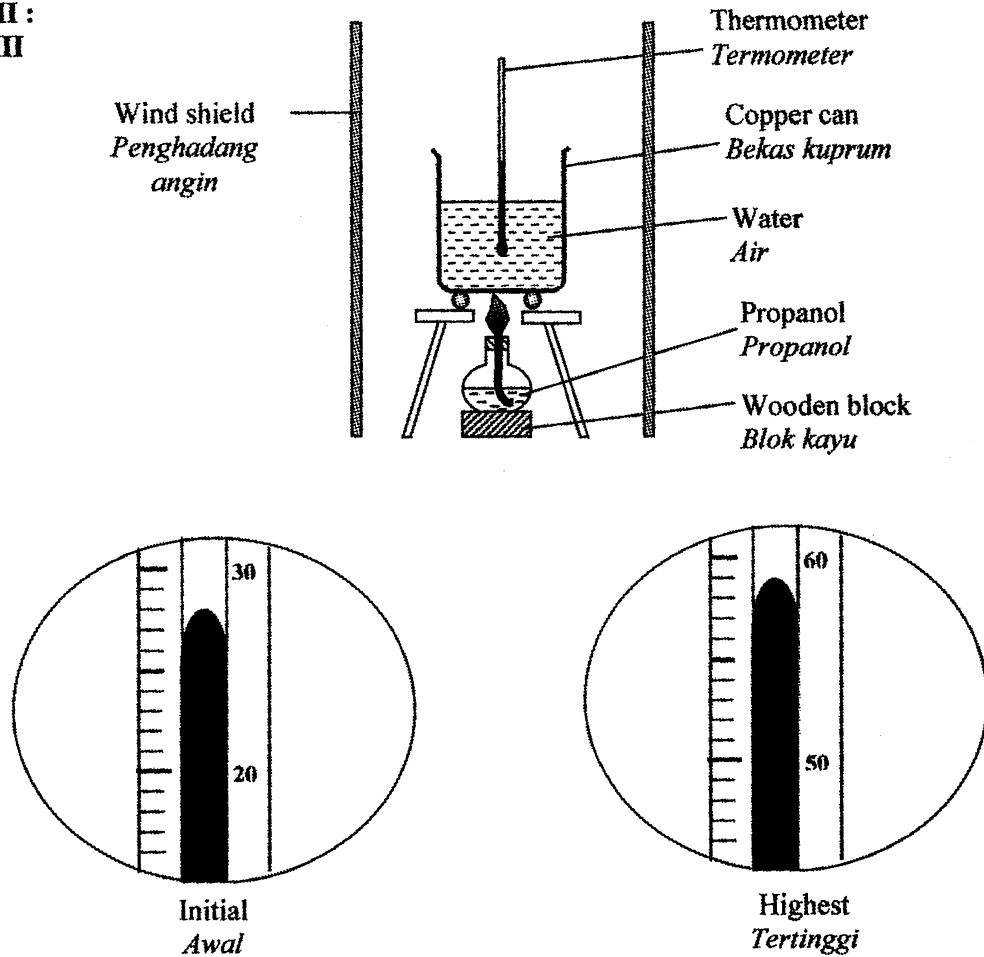


Diagram 1.3  
Rajah 1.3

Initial temperature of the water  
Suhu awal air

: \_\_\_\_\_

Highest temperature of the water  
Suhu tertinggi air

: \_\_\_\_\_

Temperature rise of the water  
Kenaikan suhu air

: \_\_\_\_\_

- (a) Write the initial, highest temperature and temperature rise of the water for Set I, Set II and Set III in the space provided.  
Tuliskan suhu awal, suhu tertinggi dan kenaikan suhu bagi air untuk Set I, Set II dan Set III dalam ruangan yang disediakan

[3 marks]

1(a)

3
---

- (b) Construct a table that can be used to record the data from three sets of experiment.  
*Bina satu jadual yang boleh digunakan untuk merekod data dari ketiga-tiga set eksperimen.*

For examiner's use

[3 marks]

1(b)

	3

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

.....

.....

[3 marks]

1(c)

	3

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

- (i) The manipulated variable  
*Pembolehubah dimanipulasikan*

.....

- (ii) The responding variable  
*Pembolehubah bergerak balas*

.....

- (iii) The constant variable  
*Pembolehubah dimalarkan*

.....

[3 marks]

1(d)

	3

- (e) Based on the Set II, what is the meaning of heat of combustion?  
*Berdasarkan Set II, apakah maksud haba pembakaran?*

.....  
.....

[3 marks]

- (f) Write a chemical equation for the complete combustion of propanol with oxygen.  
*Tuliskan satu persamaan kimia untuk pembakaran lengkap propanol dengan oksigen.*

.....

[3 marks]

For  
examiner's  
use

1(e)

3

1(f)

3

Total 1

18

2. The experiment is carried out using a small piece of lithium and potassium to react with oxygen gas. The set-up of apparatus and observations of reaction are shown in Table 2.1  
*Eksperimen dijalankan menggunakan kepingan kecil litium dan kalium bertindak balas dengan gas oksigen. Susunan radas dan pemerhatian tindak balas ditunjukkan dalam Jadual 2.1.*

For  
examiner's  
use

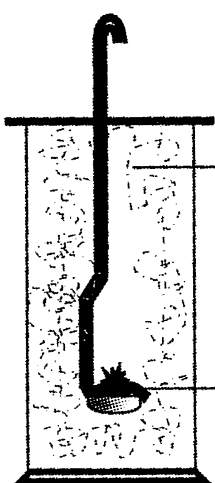
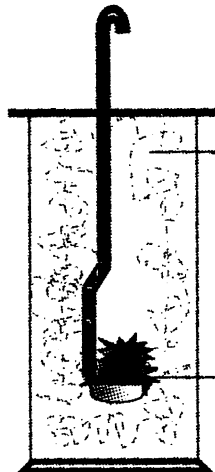
Set Set	Set-up of apparatus <i>Susunan radas</i>	Observation <i>Pemerhatian</i>
I	 <p>White fumes <i>Wasap putih</i></p> <p>Lithium <i>Litium</i></p>	<p>Burns slowly and produces white fumes.  <i>Terbakar perlahan-lahan dan menghasilkan wasap putih.</i></p>
II	 <p>White fumes <i>Wasap putih</i></p> <p>Potassium <i>Kalium</i></p>	

Table 2.1  
*Jadual 2.1*

- (a) Complete the Table 2.1 by stating the observation for reaction of potassium metal towards oxygen.  
*Lengkapkan Jadual 2.1 dengan menyatakan pemerhatian ke atas tindak balas logam kalium terhadap oksigen.*

[3 marks]

2(a)

3
---

- (b) Based on the Table 2.1, state the relationship between the position of element of Group 1 with the reactivity of the elements towards oxygen gas.

*Berdasarkan Jadual 2.1, nyatakan hubungan antara kedudukan unsur Kumpulan 1 dengan kereaktifan tindak balas terhadap oksigen.*

.....  
.....

[3 marks]

- (c) After the reaction in Set I stopped, the gas jar is filled with water and a few drops of phenolphthalein solution is added. The colourless solution formed change to pink.

Give one inference based on the observation above.

*Setelah tindak balas Set I selesai, balang gas tersebut diisi dengan air dan beberapa titis larutan fenoltalein ditambah. Larutan tanpa warna yang terhasil berubah kepada merah jambu.*

*Nyatakan satu inferens berdasarkan kepada pemerhatian di atas.*

.....  
.....

[3 marks]

For  
examiner's  
use

2(b)

3
---

2(c)

3
---

- (d) The experiment is repeated by using X metal to react with oxygen. The result of the experiment is shown in Table 2.2.

*Eksperimen diulang menggunakan logam X ditindak balas dengan oksigen.*

*Keputusan eksperimen ditunjukkan dalam Jadual 2.2.*

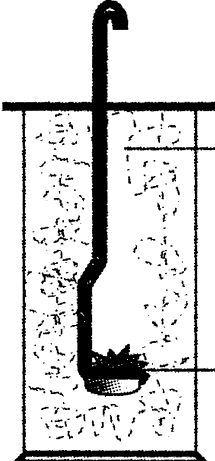
Set-up of apparatus <i>Susunan radas</i>	Observation on the metal <i>Pemerhatian ke atas logam</i>
 <p>White fumes <i>Wasap putih</i></p> <p>X metal <i>Logam X</i></p>	<p>Burns rapidly and produces white fumes. <i>Terbakar dengan cergas dan menghasilkan wasap putih.</i></p>

Table 2.2  
*Jadual 2.2*

Predict the position of X metal in the Periodic Table of elements.

*Ramalkan kedudukan logam X di dalam Jadual Berkala Unsur.*

.....

.....

[3 marks]

- (e) Lithium hydroxide solution is produced when lithium oxide reacts with water.

Classify the ions that exist in the solution into cation and anion.

*Larutan litium hidroksida terhasil apabila litium oksida bertindak balas dengan air.*

*Kelaskan ion-ion yang hadir dalam larutan ini kepada kation dan anion.*

Cation <i>Kation</i>	Anion <i>Anion</i>

[3 marks]

For  
examiner's  
use

2(d)

3
---

2(e)

3
---

Total 2

15
----

3

Hydrogen peroxide decomposes into oxygen and water at room temperature.

*Hidrogen peroksida mengurai kepada oksigen dan air pada suhu bilik.*

The rate of decomposition of hydrogen peroxide can be increased by adding manganese (IV) oxide powder.

*Kadar penguraian hidrogen peroksida boleh ditinggikan dengan menambahkan serbuk mangan (IV) oksida.*

Plan a laboratory experiment to investigate the effect of catalyst on the rate of decomposition of hydrogen peroxide.

*Rancang satu eksperimen makmal untuk mengkaji kesan mangkin ke atas kadar penguraian hidrogen peroksida.*

Your planning must include the following items:

*Perancangan anda hendaklah mengandungi perkara-perkara berikut:*

- (a) Aim of the experiment  
*Tujuan eksperimen*
- (b) All the variables  
*Semua pembolehubah*
- (c) Statement of the hypothesis  
*Pernyataan hipotesis*
- (d) List of materials and apparatus  
*Senarai bahan dan radas*
- (e) Procedure of the experiment  
*Prosedur eksperimen*
- (f) Tabulation of data  
*Penjadualan data*

[ 17 marks ]

**END OF QUESTION PAPER**  
**KERTAS SOALAN TAMAT**

**INFORMATION FOR CANDIDATES**  
**MAKLUMAT UNTUK CALON**

1. This question paper consists of three sections: **Question 1, Question 2 and Question 3.**  
*Kertas soalan ini mengandungi tiga soalan: Soalan 1, Soalan 2 dan Soalan 3.*
2. Answer **all** questions. Write your answers for **Question 1 and Question 2** in the spaces provided in the question paper.  
*Jawab semua soalan. Tuliskan jawapan bagi Soalan 1 dan Soalan 2 pada ruang yang disediakan dalam kertas soalan ini.*
3. Write your answers for **Question 3** on the 'helaian tambahan' provided by the invigilators..  
You may use equations, diagrams, tables, graphs and other suitable methods to explain your answer.  
*Tulis jawapan anda bagi Soalan 3 dalam helaian tambahan yang dibekalkan oleh pengawas peperiksaan. Anda boleh menggunakan persamaan, gambar rajah, jadual, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda.*
4. The diagrams in the questions are not drawn to scale unless stated.  
*Rajah yang mengiringi soalan tidak dilukiskan mengikut skala kecuali dinyatakan*
5. Marks allocated for each question or sub-part of the question are shown in brackets.  
*Markah yang diperuntukkan bagi setiap soalan atau ceraian soalan ditunjukkan dalam kurungan.*
6. Show your working. It may help you to get marks.  
*Tunjukkan kerja mengira. Ini membantu anda mendapatkan markah.*
7. If you wish to change your answer, cross out the answer that you have done. Then write down the new answer.  
*Sekiranya anda hendak menukar jawapan, batalkan jawapan yang telah dibuat, kemudian tulis jawapan yang baru.*
8. You may use a non-programmable scientific calculator.  
*Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogramkan.*
9. Tie together your answer sheets with this question paper at the end of the examination.  
*Ikat semua kertas jawapan anda bersama-sama soalan ini di akhir peperiksaan.*



**Mark Sheet Paper 1**  
**Peperiksaan Percubaan SPM**

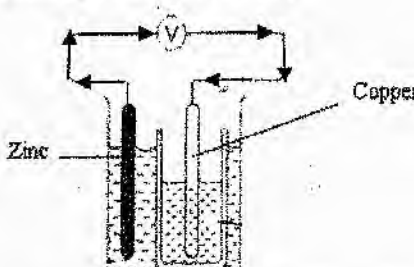
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3	(a) (i)	Porous pot		1
	(ii)	To allow the movement of ion		1
	(b) (i)	Zn dissolve // become thinner		1
	(ii)	$\text{Zn} \rightarrow \text{Zn}^{2+} + 2\text{e}^-$		1
	(c)	Reduction		1
	(d)	[Zn to Cu through external circuit]		1
				
	(e) (i)	Opposite // From Mg to Zn		1
		Mg is more electropositive than Zn		1
	(f) (i)	Cu, Q, P		1
	(ii)	1.5 V		1
TOTAL				10

4	(a)	Chemical substance which ionise completely in water to form hydroxide ion		1
	(b) (i)	Sulphuric acid		1
	(ii)	Lowest pH value		1
	(c) (i)	Phenolphthalein // Methyl orange		1
	(ii)	Pink to colourless // Yellow to orange		1
	(iii)	$\text{H}_2\text{SO}_4 + 2\text{NaOH} \rightarrow \text{Na}_2\text{SO}_4 + 2\text{H}_2\text{O}$ [Chemical formulae of reactants and products] [Balanced]	1 1	2
	(iv)	Number of mole of $\text{H}_2\text{SO}_4 = 0.5 \times 20 = 0.01 \text{ mol}$  mole $\text{H}_2\text{SO}_4$ : mole $\text{NaOH}$ $0.01 : 0.02 //$ $1 : 2$  $X = 0.8 \text{ mol dm}^{-3}$	1  1  1	3
	TOTAL			10

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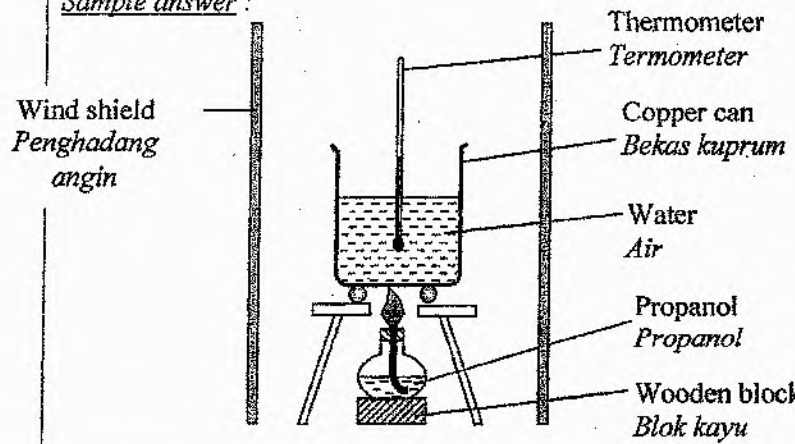
5	(a) (i)	To detect the presence of iron(II) ions / $\text{Fe}^{2+}$ .		1
	(ii)	$\text{Fe} \rightarrow \text{Fe}^{2+} + 2\text{e}^-$		1
	(iii)	Test tube B. Iron/Iron is more electropositive than P.	1 1	2
	(iv)	Q, Fe, P		1
	(b) (i)	$\dots 5 \dots \text{Fe}^{2+} + \text{MnO}_4^- + 8\text{H}^+ \rightarrow 5\text{Fe}^{3+} + \text{Mn}^{2+} + \dots 4 \dots \text{H}_2\text{O}$		1
	(ii)	purple to colourless		1
	(iii)	Iron(II) ion // $\text{Fe}^{2+}$ Oxidation number of iron increased // $\text{Fe}^{2+}$ donate electron	1 1	2
	(iv)	Add sodium hydroxide/ammonia solution. Brown precipitate formed.	1 1	2
		<b>Total</b>		<b>11</b>

6	(a)	Heat released when 1 mole propanol is burnt completely in excess oxygen.		1
	(b)	Exothermic		1
	(c) (i)	[Correct formula of reactants and products] [Balanced chemical equation]  <u>Sample answer :</u>  $2\text{C}_3\text{H}_7\text{OH} + 9\text{O}_2 \rightarrow 6\text{CO}_2 + 8\text{H}_2\text{O}$	1 1	2
	(c) (ii)	Carbon dioxide and water	1	1
	(d)	Energy content of reactant more than energy content of product		1
	(e) (i)	Mol propanol = $3 / 60$ = 0.05 mol  Heat released = $0.05 \times 50.425$ = 2.52125 kJ.	1  1	2

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6	(e) (ii)	<p>1. <b>Functional diagram</b> [ water in copper can, thermometer in water, propanol in spirit lamp, tripod stand ]</p> <p>2. <b>Label</b> [ water, thermometer ,propanol ]</p> <p>3. <b>Precaution</b> [ Windshield, the flame of burning propanol must touch the base of copper can ]</p> <p><u>Sample answer :</u></p>  <p>Wind shield Penghadang angin</p> <p>Thermometer Termometer</p> <p>Copper can Bekas kuprum</p> <p>Water Air</p> <p>Propanol Propanol</p> <p>Wooden block Blok kayu</p>	1 1 1	3
TOTAL				11

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Section B

7	(a)	Group 1 Valence electron 1 Period 2 2 shell occupied with electron	1 1 1 1	4										
	(b) (i)	$3V_2 + 2Fe \rightarrow 2FeV_3$ [Chemical formulae of reactants and product] [Balanced equation]	1 1	2										
	(ii)	V is more reactive Atomic size of V is smaller Attraction force between nucleus and the valence electron becomes stronger V is easier to gain electron	1 1 1 1	4										
	(c) (i)	Compound X Sharing of electron	1 1	2										
	(ii)	<table border="1"><thead><tr><th>Compound X</th><th>Compound Y</th></tr></thead><tbody><tr><td>Low melting/boiling point</td><td>High melting /boiling point</td></tr><tr><td>Intermolecular forces are weak</td><td>Electrostatic Forces between ions are strong</td></tr><tr><td>Do not conduct electricity</td><td>Conduct electricity in molten state/aqueous solution</td></tr><tr><td>Not have free moving ions</td><td>Have free moving ions</td></tr></tbody></table>	Compound X	Compound Y	Low melting/boiling point	High melting /boiling point	Intermolecular forces are weak	Electrostatic Forces between ions are strong	Do not conduct electricity	Conduct electricity in molten state/aqueous solution	Not have free moving ions	Have free moving ions	1 + 1 1 + 1 1 + 1 1 + 1	8
Compound X	Compound Y													
Low melting/boiling point	High melting /boiling point													
Intermolecular forces are weak	Electrostatic Forces between ions are strong													
Do not conduct electricity	Conduct electricity in molten state/aqueous solution													
Not have free moving ions	Have free moving ions													
		<b>TOTAL</b>		<b>20</b>										



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8	(a) (i)	<table><tr><th>Hydrocarbon</th><th>Type of bond</th><th>Homologous series</th><th>General formula</th></tr><tr><td>A</td><td>covalent</td><td>alkane</td><td><math>C_nH_{2n+2}</math></td></tr><tr><td>B</td><td>covalent</td><td>alkene</td><td><math>C_nH_{2n}</math></td></tr></table>	Hydrocarbon	Type of bond	Homologous series	General formula	A	covalent	alkane	$C_nH_{2n+2}$	B	covalent	alkene	$C_nH_{2n}$	3	
Hydrocarbon	Type of bond	Homologous series	General formula													
A	covalent	alkane	$C_nH_{2n+2}$													
B	covalent	alkene	$C_nH_{2n}$													
			3	6												
	(ii)	Carbon dioxide $2C_4H_{10} + 13O_2 \rightarrow 8CO_2 + 10H_2O$ [Chemical formulae of reactants and products] [Balanced]	1 1 1	3												
	(iii)	Hydrocarbon B. Hydrocarbon B is an unsaturated hydrocarbon which react with bromine. Hydrocarbon A is a saturated hydrocarbon which do not react with bromine.	1 1 1	3												
	(iv)	Hydrocarbon B more sootiness. B has higher percentage of carbon by mass.  % of carbon by mass ;  Hydrocarbon A : $\frac{4(12)}{4(12) + 10(1)} \times 100 // 82.76 \%$  Hydrocarbon B : $\frac{4(12)}{4(12) + 8(1)} \times 100 // 85.71 \%$	1 1  1  1	4												
	(b)	Carboxylic acid X : <div><math display="block">\begin{array}{c} H &amp; H &amp; O \\   &amp;   &amp;    \\ H - C - C - C - OH \\   &amp;   \\ H &amp; H \end{array}</math></div> <p>Propanoic acid</p> <p>Alcohol Y:</p> <div><math display="block">\begin{array}{c} H &amp; H \\   &amp;   \\ H - C - C - OH \\   &amp;   \\ H &amp; H \end{array}</math></div> <p>Ethanol</p>	1  1  1 1	4												
TOTAL				20												

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9	(a)	Carbon dioxide / $\text{CO}_2$ Bubble/flow the gas through lime water Lime water turns milky/chalky	1 1 1										
		Add dilute sulphuric acid followed by iron(II) sulphate solution.	1										
		Add concentrated sulphuric acid slowly/carefully. A brown ring is formed.	1 1										
		<table><thead><tr><th></th><th><math>\text{PbCO}_3</math></th><th>Solid X</th></tr></thead><tbody><tr><td>Colour of residue</td><td>Brown when hot Yellow when cold</td><td>Brown when hot Yellow when cold</td></tr><tr><td>Gas</td><td>Gas turns lime water milky</td><td>A brown gas released// The gas ignited the glowing wooden splinter</td></tr></tbody></table>		$\text{PbCO}_3$	Solid X	Colour of residue	Brown when hot Yellow when cold	Brown when hot Yellow when cold	Gas	Gas turns lime water milky	A brown gas released// The gas ignited the glowing wooden splinter	1+1  1+1	Max. 8
	$\text{PbCO}_3$	Solid X											
Colour of residue	Brown when hot Yellow when cold	Brown when hot Yellow when cold											
Gas	Gas turns lime water milky	A brown gas released// The gas ignited the glowing wooden splinter											
	(b)	1. [Material : Sodium / potassium carbonate] 2. [Apparatus : beaker, filter funnel, filter paper] 3. Pour [ 20-100 ] $\text{cm}^3$ of [ 0.1-2.0 ] $\text{mol dm}^{-3}$ solution X into a beaker. 4. Add [ 20-100 ] $\text{cm}^3$ of [ 0.1-2.0 ] $\text{mol dm}^{-3}$ sodium carbonate solution. 5. Stir the mixture. 6. Filter. 7. Rinse the residue.  $\text{Pb}(\text{NO}_3)_2 + \text{Na}_2\text{CO}_3 \rightarrow \text{PbCO}_3 + 2\text{NaNO}_3$ 8. [Formula of reactants] 9. [Formula of products] 10. [Balanced]	1 1 1 1 1 1 1  1 1 1	10									
	(c)	Add baking powder. Baking powder produce carbon dioxide /gas	1 1	2									
TOTAL			20										



10	(a) (i)	<p>P : [any metal situated above Cu in the ECS]  <u>Example</u> :                      Magnesium / Zinc / Aluminium                      [r : Potassium / sodium]</p> <p>Q : Any acid  <u>Example</u> :                      Hydrochloric acid / Sulphuric / Nitric acid                      [ a : weak acid]</p> <p>[Chemical equations]                      1. Correct formula of reactant and product                      2. Balance chemical equations</p> <p><u>Sample answer</u> : <math>\text{Mg} + 2\text{HCl} \rightarrow \text{MgCl}_2 + \text{H}_2</math></p>	1	
	(a) (ii)	<p>Experiment I : = <math>\frac{30}{10}</math> // <math>3 \text{ cm}^3 \text{ s}^{-1}</math></p> <p>Experiment II : = <math>\frac{30}{20}</math> // <math>1.5 \text{ cm}^3 \text{ s}^{-1}</math></p> <p>[ Unit must be correct ]</p>	1	
	(a) (iii)	<p>1. Rate of reaction in experiment I is higher than Experiment II.</p> <p>2. The concentration of acid in Experiment I more than in Experiment II // Number of hydrogen ions per unit volume in Experiment I more than in Experiment II.</p> <p>3. Frequency of collision between hydrogen ion and metal P in Experiment I is higher than in Experiment II.</p> <p>4. Frequency of effective collision between particles in Experiment I is higher than in Experiment II.</p>	1 1 1 1	2 4







PEPERIKSAAN PERCUBAAN SPM TAHUN 2010  
4541/3 CHEMISTRY  
Paper 3

Question	Rubric	Score
1(a)	Able to write all the thermometer readings accurately with correct unit and one decimal point.  <u>Answer:</u>  <b>Set I:</b> Initial temperature of the water : 28.0 °C Highest temperature of the water : 53.0 °C Temperature rise of the water : 25.0 °C  <b>Set II:</b> Initial temperature of the water : 28.0 °C Highest temperature of the water : 55.0 °C Temperature rise of the water : 27.0 °C  <b>Set III:</b> Initial temperature of the water : 28.0 °C Highest temperature of the water : 59.0 °C Temperature rise of the water : 31.0 °C	3
	Able to write any 6 readings accurately without unit or all readings correctly but without decimal point /without unit	2
	Able to write any 4 readings correctly	1
	No response or wrong response	0

Question	Rubric	Score																
1(b)	Able to construct a table to record the data that contain: 1. Correct titles 2. Readings  <u>Sample answer:</u> <table><tr><th>Alcohol // Set</th><th>Initial temperature, °C</th><th>Highest temperature, °C</th><th>Temperature rise, °C</th></tr><tr><td>Methanol // I</td><td>28.0</td><td>53.0</td><td>25.0</td></tr><tr><td>Ethanol // II</td><td>28.0</td><td>55.0</td><td>27.0</td></tr><tr><td>Propanol // III</td><td>28.0</td><td>59.0</td><td>31.0</td></tr></table>	Alcohol // Set	Initial temperature, °C	Highest temperature, °C	Temperature rise, °C	Methanol // I	28.0	53.0	25.0	Ethanol // II	28.0	55.0	27.0	Propanol // III	28.0	59.0	31.0	3
	Alcohol // Set	Initial temperature, °C	Highest temperature, °C	Temperature rise, °C														
	Methanol // I	28.0	53.0	25.0														
	Ethanol // II	28.0	55.0	27.0														
	Propanol // III	28.0	59.0	31.0														
Able to construct a less accurate table that contains: 1. Titles 2. Readings	2																	
Able to construct a table with at least one title / reading	1																	
No response or wrong response	0																	

Question	Rubric	Score
1(c)	Able to give the hypothesis accurately  <u>Sample answer:</u> The higher the number of carbon atom of alcohol per molecule, the higher the temperature rise/heat of combustion.	3
	Able to give the hypothesis almost accurately  <u>Sample answer:</u> The higher the temperature rise/heat of combustion, the higher the number of carbon atom of alcohol per molecule.	2
	Able to state an idea of hypothesis  <u>Sample answer:</u> Different type of alcohol gives different temperature rise.	1
	No response or wrong response	0

Question	Rubric	Score
1(d)	Able to state all the three variables correctly  <u>Sample answer:</u> <b>Manipulated variable:</b> Type of alcohol // Methanol, ethanol and Propanol// number of carbon atom of alcohol per molecule <b>Responding variable:</b> Temperature rise // Heat of combustion <b>Constant variable:</b> water // copper can // type of container	3
	Able to state any two variables correctly	2
	Able to state any one variable correctly	1
	No response or wrong response	0

Question	Rubric	Score
1(e)	Able to give the meaning of heat of combustion correctly.  <u>Sample answer:</u> Heat released/given off when 1 mol of ethanol is completely burnt in excess oxygen.	3
	Able to give the meaning of heat of combustion less accurately.  <u>Sample answer:</u> Heat released/given off when alcohol is completely burnt in excess oxygen.	2
	Able to give an idea of heat of combustion.  <u>Sample answer:</u> Heat released when alcohol is burnt.	1
	No response given / wrong response	0



Question	Rubric	Score
1(f)	Able to write the chemical equation correctly.  <u>Sample answer:</u> $\text{C}_3\text{H}_7\text{OH} + \frac{9}{2}\text{O}_2 \rightarrow 3\text{CO}_2 + 4\text{H}_2\text{O} // 2\text{C}_3\text{H}_7\text{OH} + 9\text{O}_2 \rightarrow 6\text{CO}_2 + 8\text{H}_2\text{O}$	3
	Able to write the chemical equation without balance.  <u>Sample answer:</u> $\text{C}_3\text{H}_7\text{OH} + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$	2
	Able to state an idea of writing chemical equation.  <u>Sample answer:</u> $\text{C}_3\text{H}_7\text{OH} + \text{O}_2 // \text{CO}_2 + \text{H}_2\text{O}$	1
	No response or wrong response	0

Question	Rubric	Score
2(a)	Able to state the two observation correctly  <u>Sample answer:</u> 1. Burns very rapidly// burns vigorously 2. Produces white fumes	3
	Able to state any one answer correctly	2
	Able to give an idea of the observation  <u>Sample answer:</u> Burns// white solid// produces solid// burns rapidly	1
	No response given / wrong response	0

Question	Rubric	Score
2(b)	Able to state the relationship correctly  <u>Sample answer:</u> Going down the Group 1 element, the reactivity towards oxygen increase.	3
	Able to state the relationship less accurately.  <u>Sample answer:</u> Different type of Group 1 element, different reactivity towards oxygen.	2
	Able to give an idea of relationship  <u>Sample answer:</u> Position of Group 1 element affected the reactivity.	1
	No response given / wrong response	0

Question	Rubric	Score
2(c)	Able to give the inference correctly <u>Sample answer:</u> Alkaline solution produced.	3
	Able to give the inference less accurately <u>Sample answer:</u> Litium hydroxide formed	2
	Able to give an idea of the inference. <u>Sample answer:</u> Alkali metal	1
	No response given / wrong response	0

Question	Rubric	Score
2(d)	Able to predict the position of X metal in the periodic table correctly <u>Sample answer:</u> Between potassium and lithium// below lithium and above potassium	3
	Able to predict the position of X metal in the periodic table less accurately <u>Sample answer:</u> below lithium// above potassium	2
	Able to state an idea of the position of X metal in the periodic table. <u>Sample answer:</u> Group 1 element	1
	No response given / wrong response	0

Question	Rubric	Score				
2(e)	Able to classify all the <b>ions</b> correctly <u>Sample answer:</u> <table><tr><th>Cation</th><th>Anion</th></tr><tr><td>Lithium ion // <math>\text{Li}^+</math> Hydrogen ion // <math>\text{H}^+</math></td><td>Hydroxide ion // <math>\text{OH}^-</math></td></tr></table>	Cation	Anion	Lithium ion // $\text{Li}^+$ Hydrogen ion // $\text{H}^+$	Hydroxide ion // $\text{OH}^-$	3
	Cation	Anion				
	Lithium ion // $\text{Li}^+$ Hydrogen ion // $\text{H}^+$	Hydroxide ion // $\text{OH}^-$				
	Able to classify any <b>two</b> ions correctly	2				
Able to classify any <b>one</b> ion correctly or give opposite heading <u>Sample answer:</u> <table><tr><th>Anion</th><th>Cation</th></tr><tr><td>Lithium ion // <math>\text{Li}^+</math> Hydrogen ion // <math>\text{H}^+</math></td><td>Hydroxide ion // <math>\text{OH}^-</math></td></tr></table>	Anion	Cation	Lithium ion // $\text{Li}^+$ Hydrogen ion // $\text{H}^+$	Hydroxide ion // $\text{OH}^-$	1	
Anion	Cation					
Lithium ion // $\text{Li}^+$ Hydrogen ion // $\text{H}^+$	Hydroxide ion // $\text{OH}^-$					
No response given / wrong response	0					

Question Number	Rubric	Score
3(a)	Able to give the aim of the experiment correctly. <u>Sample answer:</u> To investigate the effect of manganese (IV) oxide on the rate of decomposition of hydrogen peroxide.	3
	Able to give the aim of the experiment less accurately. <u>Sample answer:</u> To investigate the effect of catalyst on the rate of reaction // Does manganese (IV) oxide affect the rate of decomposition of hydrogen peroxide?	2
	Able to state an idea of aim of the experiment. <u>Sample answer:</u> Manganese(IV) oxide/ catalyst affects the rate of reaction.	1
	No response given / wrong response	0

Question Number	Rubric	Score
3(b)	Able to state the <b>three</b> variables correctly. <u>Sample answer:</u> <b>Manipulated variable</b> : Presence of manganese(IV) oxide/catalyst <b>Responding variable</b> : Rate of Reaction <b>Constant variable</b> : Temperature //concentration of hydrogen peroxide solution	3
	Able to state any <b>two</b> variables correctly	2
	Able to state any <b>one</b> variables correctly	1
	No response given / wrong response	0

Question Number	Rubric	Score
3(c)	Able to state the relationship correctly between the manipulated variable and the responding variable with direction. <u>Sample answer:</u> Manganese (IV) oxide/ catalyst increases the rate of reaction // Manganese (IV) oxide/ catalyst increases the rate of decomposition of hydrogen peroxide.	3
	Able to state the relationship between the manipulated variable and the responding variable. <u>Sample answer:</u> The rate of reaction increases when catalyst is used.	2
	Able to state the idea of hypothesis. <u>Sample answer:</u> Catalyst / Manganese (IV) oxide changes the rate of reaction // Catalyst affects the rate of reaction.	1
	No response given / wrong response	0



Question Number	Rubric	Score
3(d)	Able to state complete list of substances and apparatus.	3
	<u>Sample answer:</u> List of apparatus and materials Hydrogen peroxide solution, manganese (IV) oxide powder. Test tube, wooden splinter, 10cm <sup>3</sup> measuring cylinder.	
	Able to give all substances and at least two apparatus	2
	Able to give at least one substance and at least one apparatus	1
	No response given / wrong response	0

Question Number	Rubric	Score
3(e)	Able to state all procedures correctly	3
	<u>Sample answer:</u> 1. Pour 5 cm <sup>3</sup> of hydrogen peroxide into test tube. 2. Add 2 g/ one spatula of manganese (IV) oxide powder into the test tube. 3. Shake the test tube. 4. Place a glowing wooden splinter at the mouth of the test tube. 5. Record the observation. 6. Repeat step 1 to 5 without adding manganese (IV) oxide.	
	Able to state 4 steps of procedures correctly	2
	Steps 1,2,4,6	1
	Able to state 2 steps of procedures correctly	
	Steps 1,2	0
	No response given / wrong response	

Question Number	Rubric	Score						
3(f)	Able to exhibit the tabulation of data correctly Tabulation of data has the following elements : 1. 2 columns and 3 rows	2						
	Sample answer:							
	<table><tr><th>Test tube</th><th>Observation</th></tr><tr><td>Hydrogen peroxide + manganese(IV) oxide/ catalyst // With catalyst</td><td></td></tr><tr><td>Hydrogen peroxide // Without catalyst</td><td></td></tr></table>		Test tube	Observation	Hydrogen peroxide + manganese(IV) oxide/ catalyst // With catalyst		Hydrogen peroxide // Without catalyst	
	Test tube		Observation					
Hydrogen peroxide + manganese(IV) oxide/ catalyst // With catalyst								
Hydrogen peroxide // Without catalyst								
	Able to exhibit the tabulation of data less accurately Tabulation of data has the following elements :	1						
	Sample answer:							
	<table><tr><th>Test tube</th><th>Observation</th></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr></table>		Test tube	Observation				
Test tube	Observation							
	No response given / wrong response	0						

END OF MARK SCHEME