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Kimia  
Kertas 1  
Sept  
2011  
1 ¼ jam



JABATAN PELAJARAN NEGERI JOHOR

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PEPERIKSAAN PERCUBAAN SPM 2011

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KIMIA

Kertas 1

Satu jam lima belas minit

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**JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU**

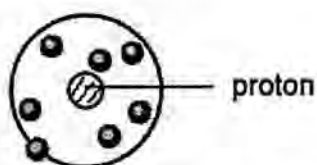
1. *Kertas soalan ini adalah dalam dwibahasa.*
2. *Soalan dalam bahasa Inggeris mendahului soalan yang sepadan dalam bahasa Melayu.*
3. *Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini.*

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Kertas soalan ini mengandungi 34 halaman bercetak

- 1 Which of the following releases heat to the surrounding?  
*Antara yang berikut, yang manakah membebaskan haba ke persekitaran?*
- A Add acid to alkali  
*Tambah asid kepada alkali*
  - B Heat a carbonate salt  
*Panaskan satu garam karbonat*
  - C Dissolve some ammonium salt in water  
*Larutkan sedikit garam ammonium di dalam air*
  - D Add dilute acid to sodium hydrogen carbonate  
*Tambah asid cair kepada natrium hydrogen karbonat*
- 2 Name the process of soap preparation.  
*Namakan proses penyediaan sabun.*
- A Dehydration  
*Pendehidratan*
  - B Sulphonation  
*Pengulfonan*
  - C Saponification  
*Saponifikasi*
  - D Polymerisation  
*Pempolimeran*

3



Who proposed the above model?  
*Siapakah yang mencadangkan model di atas?*

- A Ernest Rutherford
- B James Chadwick
- C J.J Thomson
- D Neils Bohr

- 4 The following equation represents a reaction.  
*Persamaan berikut mewakili satu tindak balas.*



What is the relative molecular mass of the product?

[Relative atomic mass :  $H=1$ ;  $N=14$  ]

*Apakah jisim molekul relatif bagi hasil tersebut?*

*[Jisim atom relative :  $H=1$ ;  $N=14$  ]*

- A 2
- B 17
- C 28
- D 34

- 5 Which of the following are the special characteristics of transition elements?  
*Antara yang berikut, yang manakah merupakan ciri istimewa bagi logam peralihan?*

- I Form coloured compounds  
*Membentuk sebatian berwarna*
- II Can be used as catalyst  
*Boleh digunakan sebagai mangkin*
- III Have low melting point  
*Mempunyai takat lebur yang rendah*
- IV Have only one oxidation number  
*Mempunyai satu nombor pengoksidaan sahaja*

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

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Diagram 1  
Rajah 1

Diagram 1 shows the number of atoms in a molecule. Which of the following could be the molecule?

Rajah 1 menunjukkan bilangan atom dalam satu molekul. Antara yang berikut, yang manakah mungkin molekul itu?

- A Carbon dioxide  
*Karbon dioksida*
  - B Ammonia  
*Ammonia*
  - C Chlorine  
*Klorin*
  - D Water  
*Air*
- 7 Which of the following is an electrolyte?  
*Antara yang berikut, yang manakah merupakan elektrolit?*
- A Copper (II) sulphate solution  
*Larutan kuprum (II) sulfat*
  - B Molten naphthalene  
*Leburan naftalena*
  - C Glucose solution  
*Larutan glukosa*
  - D Zinc metal  
*Logam zink*

- 8 Diagram 2 shows the pH values for solution P, Q, R and S with the same concentration.  
Rajah 2 menunjukkan nilai pH bagi larutan P, Q, R, dan S dengan kepekatan yang sama.

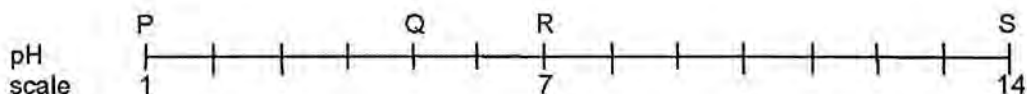


Diagram 2  
Rajah 2

What are the possible solutions of P, Q, R and S?  
Apakah larutan yang mungkin bagi P, Q, R dan S?

|   | Ethanoic acid<br><i>Asid etanoik</i> | Sulphuric acid<br><i>Asid sulfurik</i> | Sodium hydroxide<br><i>Natrium hidroksida</i> | Sodium chloride<br><i>Natrium klorida</i> |
|---|--------------------------------------|--|---|---|
| A | P                                    | Q                                      | R   | S   |
| B | P                                    | Q                                      | S   | R   |
| C | Q                                    | P                                      | R   | S   |
| D | Q                                    | P                                      | S   | R   |

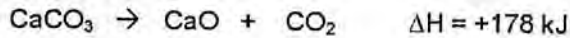
- 9 Which of the following salts can be prepared by precipitation reaction?  
Antara garam yang berikut, yang manakah boleh disediakan melalui tindak balas pemendakan?
- A Barium sulphate  
*Barium sulfat*
  - B Sodium chloride  
*Natrium klorida*
  - C Aluminium nitrate  
*Aluminium nitrat*
  - D Potassium carbonate  
*Kalium karbonat*

- 10 Alloy X is made by mixing iron with carbon, chromium and nickel. What is X?  
*Aloi X diperbuat dengan mencampurkan besi dengan karbon, kromium dan nikel. Apakah X?*
- A Steel  
*Keluli*
  - B Pewter  
*Piuter*
  - C Bronze  
*Gangsa*
  - D Stainless steel  
*Keluli tahan karat*
- 11 Which of the following does not affect rate of reaction ?  
*Antara yang berikut, yang manakah tidak mempengaruhi kadar tindak balas ?*
- A Total surface area of reactant  
*Jumlah luas permukaan bahan tindak balas*
  - B Concentration of solution  
*Kepekatan larutan*
  - C Presence of catalyst  
*Kehadiran mangkin*
  - D Volume of solution  
*Isipadu larutan*
- 12 Which of the following organic compound will undergo hydrogenation reaction?  
*Antara yang berikut, yang manakah sebatian organik yang akan mengalami tindak balas penghidrogenan?*
- A Propene  
*Propena*
  - B Propane  
*Propana*
  - C Propanol  
*Propanol*
  - D Propanoic acid  
*Asid propanoik*

- 13 Which of the following explains an oxidation process?  
*Antara yang berikut, yang manakah menerangkan proses pengoksidaan?*
- A Loss of oxygen  
*Kehilangan oksigen*
  - B Gain of electrons  
*Penerimaan electron*
  - C Loss of hydrogen  
*Kehilangan hidrogen*
  - D Decrease in oxidation number  
*Nombor pengoksidaan berkurang*
- 14 *Pickled mango is prepared by soaking mango in vinegar. What type of food additive is vinegar?*  
*Jeruk mangga disediakan dengan merendam buah mangga di dalam cuka. Apakah jenis bahan tambah makanan bagi cuka?*
- A Dyes  
*Pewarna*
  - B Thickener  
*Pemekat*
  - C Antioxidant  
*Pengantioksida*
  - D Preservative  
*Pengawet*

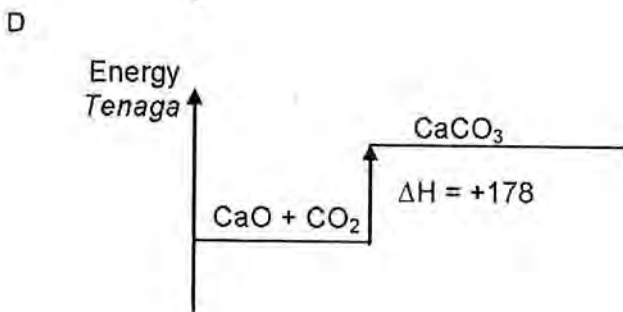
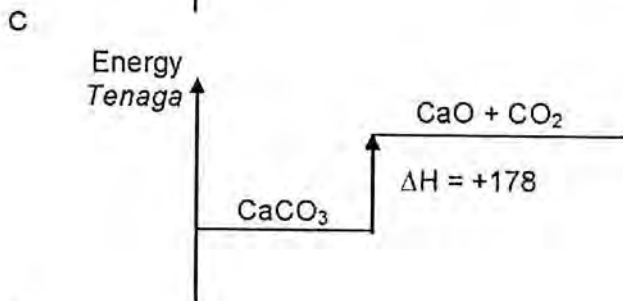
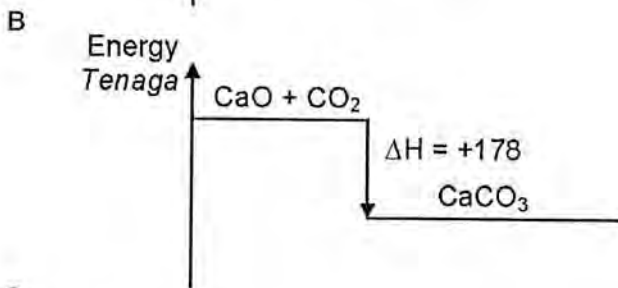
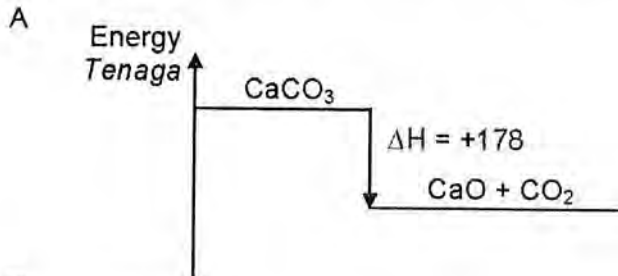
- 15 The thermochemical equation for the decomposition of calcium carbonate,  $\text{CaCO}_3$  is as follows:

*Persamaan termokimia bagi penguraian kalsium karbonat,  $\text{CaCO}_3$  adalah seperti berikut:*



Which of the following energy level diagram represents the equation?

*Antara yang berikut, yang manakah gambarajah aras tenaga mewakili persamaan itu ?*



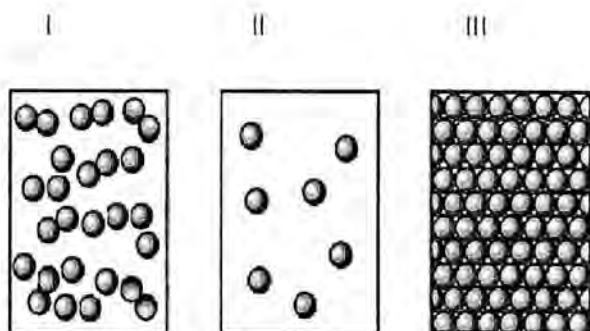


Diagram 3  
Rajah 3

What are the three states of matter?  
Apakah keadaan fizikal jirim di atas?

|   | I                | II               | III              |
|---|------------------|------------------|------------------|
| A | Gas<br>Gas       | Liquid<br>Cecair | Solid<br>Pepejal |
| B | Solid<br>Pepejal | Liquid<br>Cecair | Gas<br>Gas       |
| C | Liquid<br>Cecair | Solid<br>Pepejal | Gas<br>Gas       |
| D | Liquid<br>Cecair | Gas<br>Gas       | Solid<br>Pepejal |

17 Which of the substance below contains the same number of atoms as in one mole of chlorine gas?

Antara bahan yang berikut, yang manakah mengandungi bilangan atom yang sama dengan satu mol gas klorin ?

- A 1 mol neon  
1 mol neon
- B  $\frac{1}{2}$  mol sodium  
 $\frac{1}{2}$  mol natrium
- C  $\frac{2}{3}$  mol carbon dioxide  
 $\frac{2}{3}$  mol karbon dioksida
- D 1 mol nitrogen dioxide  
1 mol nitrogen dioksida

18

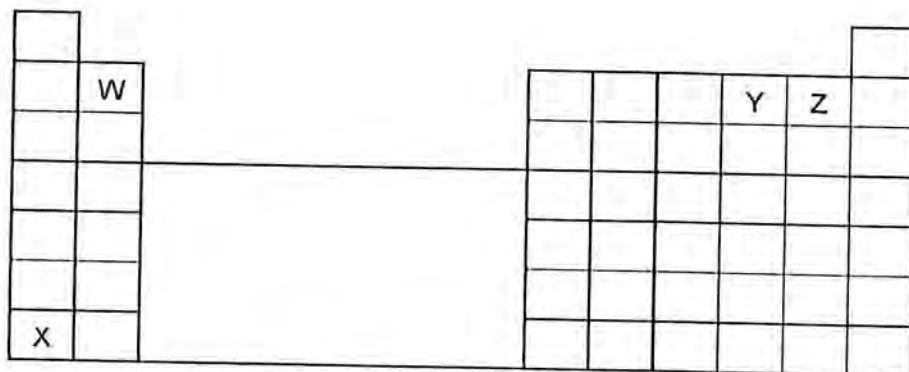


Diagram 4  
Rajah 4

Diagram 4 shows parts of the Periodic Table of Elements. The symbols W, X, Y and Z are not the actual symbols of the elements. Which of the following shows the correct arrangement of elements W, X, Y and Z in order of increasing atomic size?

Rajah 4 menunjukkan sebahagian Jadual Berkala Unsur. Simbol-simbol W, X, Y dan Z tidak mewakili simbol sebenar unsur. Antara yang berikut, yang manakah mewakili susunan yang betul pertambahan saiz atom bagi unsur-unsur W, X, Y dan Z?

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

19

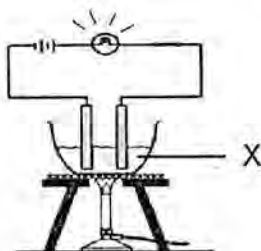


Diagram 5  
Rajah 5

In Diagram 5, substance X lights up the bulb in the molten state. Which statement best explains the observation?

*Dalam Rajah 5, bahan X menyalakan mentol dalam keadaan leburan. Pernyataan yang manakah paling baik menerangkan pemerhatian tersebut?*

- A X consists of ions  
*X terdiri daripada ion-ion.*
- B X consists of molecules  
*X terdiri daripada molekul-molekul*
- C X has freely moving ions  
*X mempunyai ion-ion bebas bergerak*
- D X has ions in fixed position  
*X mempunyai ion-ion dalam kedudukan tetap*
- 20 A student constructed a chemical cell using a copper rod, a zinc rod, copper (II) sulphate solution and connecting wires. Which of the following will act as the positive terminal?  
*Seorang pelajar membina satu sel kimia menggunakan rod kuprum, rod zink, larutan kuprum (II) sulfat dan wayar penyambung. Antara yang berikut, yang manakah akan menjadi terminal positif?*
- A Copper rod  
*Rod kuprum*
- B Zinc rod  
*Rod zink*
- C Connecting wires  
*Wayar penyambung*
- D Copper(II) sulphate solution  
*Larutan kuprum (II) sulfat*

21 Diagram 6 shows the set-up of apparatus for the titration of  $25 \text{ cm}^3$   $1.0 \text{ mol dm}^{-3}$  sodium hydroxide solution with  $0.5 \text{ mol dm}^{-3}$  of sulphuric acid.

Rajah 6 menunjukkan susunan radas bagi titratan  $25 \text{ cm}^3$  larutan natrium hidroksida  $1.0 \text{ mol dm}^{-3}$  dengan asid sulfurik  $0.5 \text{ mol dm}^{-3}$ .

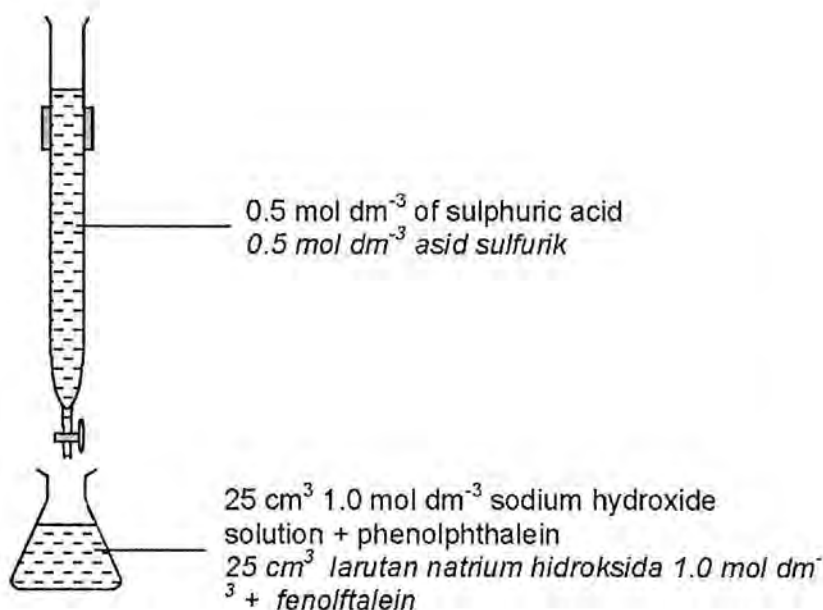


Diagram 6  
Rajah 6

What is the volume of  $0.5 \text{ mol dm}^{-3}$  of sulphuric acid solution required to completely neutralize  $25 \text{ cm}^3$   $1.0 \text{ mol dm}^{-3}$  sodium hydroxide solutions?

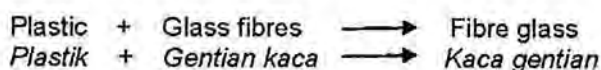
Berapakah isi padu  $0.5 \text{ mol dm}^{-3}$  asid sulfurik diperlukan untuk meneutralkan lengkap  $25 \text{ cm}^3$  larutan natrium hidroksida  $1.0 \text{ mol dm}^{-3}$ ?

- A 12.50  $\text{cm}^3$
- B 25.00  $\text{cm}^3$
- C 50.00  $\text{cm}^3$
- D 75.50  $\text{cm}^3$

- 22 Which of the following ions form white precipitate that dissolves in excess ammonia solution?  
*Antara ion-ion berikut, yang manakah menghasilkan mendakan putih yang larut dalam larutan ammonia berlebihan?*

- A  $Mg^{2+}$   
 B  $Al^{3+}$   
 C  $Zn^{2+}$   
 D  $Pb^{2+}$

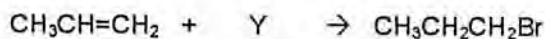
- 23 The equation below shows the formation of a composite material from its original component.  
*Persamaan di bawah menunjukkan pembentukan satu bahan komposit daripada komponen asalnya.*



Why is fibre glass better than common plastic?  
*Kenapakah kaca gentian lebih baik daripada plastik biasa?*

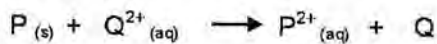
- A High tensile strength  
*Kekuatan regangan tinggi*
- B Resistant to corrosion  
*Tahan kakisan*
- C Able to withstand heat  
*Tahan haba*
- D Good conductor of electricity  
*Konduktor elektrik yang baik*
- 24 Which of the following will make meat last longer?  
*Antara yang berikut, yang manakah boleh menyebabkan daging tahan lebih lama?*
- A Boil the meat for an hour.  
*Mendidihkan daging untuk satu jam.*
- B Dry the meat under the sun  
*Mengeringkan daging di bawah matahari*
- C Keep the meat in a refrigerator.  
*Menyimpan daging di dalam peti sejuk.*
- D Fry the meat and keep into a container.  
*Menggorengkan daging dan menyimpan di dalam bekas .*

- 25 The equation below shows a reaction of alkene.  
*Persamaan di bawah menunjukkan tindak balas alkena.*



Which of the following is Y?  
*Antara yang berikut, yang manakah Y?*

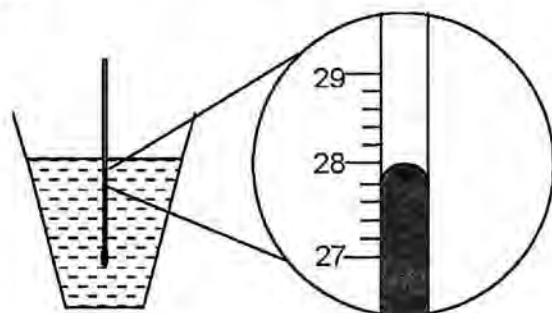
- A Bromine,  $\text{Br}_2$   
*Bromin,  $\text{Br}_2$*
  - B Hydrogen bromide,  $\text{HBr}$   
*Hidrogen bromida,  $\text{HBr}$*
  - C Sodium bromide,  $\text{NaBr}$   
*Natrium bromida,  $\text{NaBr}$*
  - D Magnesium bromide,  $\text{MgBr}_2$   
*Magnesium bromida,  $\text{MgBr}_2$*
- 26 The following shows an ionic equation.  
*Yang berikut menunjukkan suatu persamaan ion.*



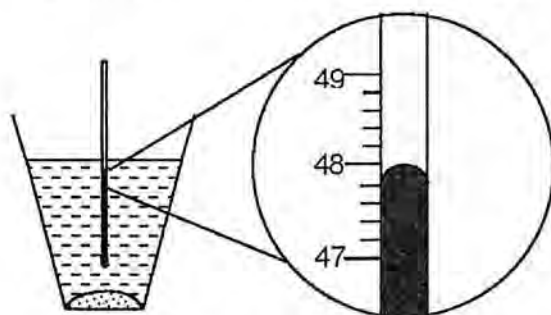
Based on the equation, which of the following is true?  
*Berdasarkan persamaan tersebut, yang manakah benar?*

- A P is oxidised.  
*P dioksidakan.*
- B  $\text{P}^{2+}$  is oxidised.  
 *$\text{P}^{2+}$  dioksidakan.*
- C  $\text{Q}^{2+}$  is a reducing agent.  
 *$\text{Q}^{2+}$  adalah agen peneurunan.*
- D  $\text{Q}^{2+}$  donates electrons.  
 *$\text{Q}^{2+}$  menderma elektron.*

- 27 Diagram 7 shows the results obtained when metal X is added into solution A.  
*Rajah 7 menunjukkan keputusan yang diperolehi apabila logam X ditambah ke dalam larutan A.*



Solution A before adding metal X  
*Larutan A sebelum ditambahkan logam X*



Solution A after adding metal X  
*Larutan A selepas ditambahkan logam*

Diagram 7  
*Rajah 7*

Which of the following explains the reaction?  
*Antara yang berikut, yang manakah menjelaskan tindak balas tersebut?*

- A Displacement and endothermic  
*Penyesaran dan endotermik*
- B Displacement and exothermic  
*Penyesaran dan eksotermik*
- C Precipitation and endothermic  
*Pemendakan dan endotermik*
- D Precipitation and exothermic  
*Pemendakan dan eksotermik*

28

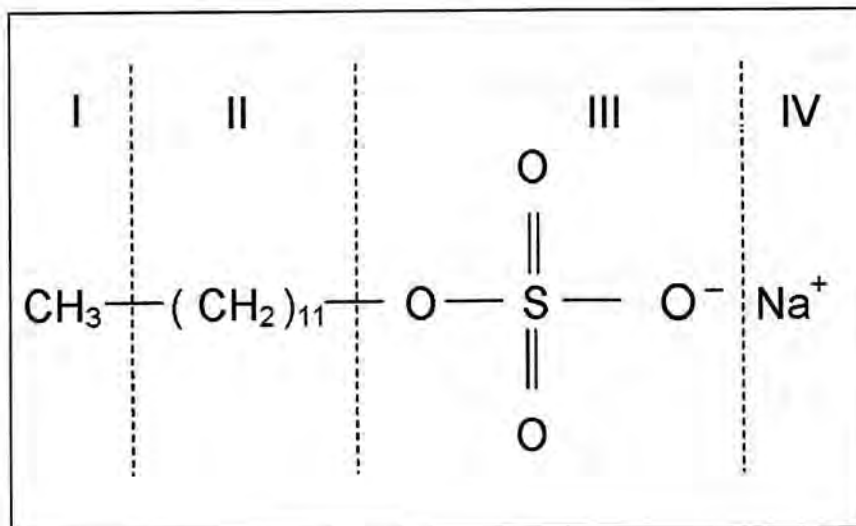


Diagram 8  
Rajah 8

Based on Diagram 8 , which is the hydrophilic part in sodium dodecyl sulphate?  
*Berdasarkan Rajah 8, yang manakah bahagian hidrofilik dalam natrium dodekil sulfat?*

- A I
- B II
- C III
- D IV

- 29 Chlorine-35 and chlorine-37 are two isotopes of chlorine. What are the differences in these isotopes?  
*Klorin-35 dan klorin-37 adalah dua isotop klorin. Apakah perbezaan di antara isotop-isotop ini?*
- I Proton number  
*Nombor proton*
  - II Nucleon number  
*Nombor nucleon*
  - III Physical properties  
*Sifat-sifat fizikal*
  - IV Chemical properties  
*Sifat-sifat kimia*
- A I and II  
*I dan II*
  - B II and III  
*II dan III*
  - C I and III  
*I dan III*
  - D II and IV  
*II dan IV*

- 30 Diagram 9 shows the set-up of apparatus to determine the empirical formula of metal oxide.

Rajah 9 menunjukkan susunan radas untuk menentukan formula empirik bagi oksida logam.

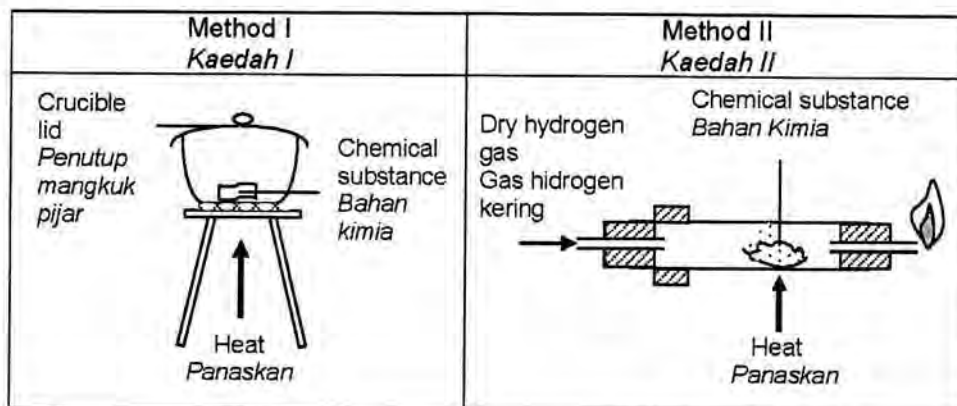


Diagram 9  
*Rajah 9*

Which of the following is the correct match for Method I and Method II?  
*Antara padanan berikut, yang manakah betul untuk Kaedah I dan II?*

- |   | Method I<br><i>Kaedah I</i>                    | Method II<br><i>Kaedah II</i>                  |
|---|--|--|
| A | Copper (II) oxide<br><i>Kuprum (II) oksida</i> | Lead (II) oxide<br><i>Plumbum (II) oksida</i>  |
| B | Lead (II) oxide<br><i>Plumbum (II) oksida</i>  | Copper (II) oxide<br><i>Kuprum (II) oksida</i> |
| C | Magnesium oxide<br><i>Magnesium oksida</i>     | Lead (II) oxide<br><i>Plumbum (II) oksida</i>  |
| D | Copper (II) oxide<br><i>Kuprum (II) oksida</i> | Magnesium oxide<br><i>Magnesium oksida</i>     |

31

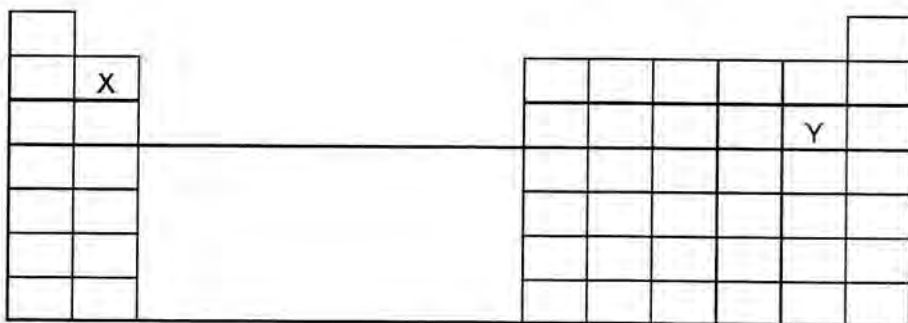


Diagram 10  
Rajah 10

An atom of element X reacts with element Y to form a compound. What is the formula of the compound formed?

*Satu atom unsur X bertindak balas dengan unsur Y menghasilkan satu sebatian. Apakah formula bagi sebatian yang terbentuk?*

- A XY
- B  $X_2Y$
- C  $XY_2$
- D  $X_2Y_2$

32 Many covalent compounds are used as solvents. Which of the following is not a solvent for paint?

*Kebanyakan sebatian kovalen digunakan sebagai pelarut. Antara yang berikut, yang manakah bukan pelarut untuk cat?*

- A Ether  
*Eter*
- B Water  
*Air*
- C Ethanol  
*Etanol*
- D Turpentine  
*Turpentin*

33 Diagram 11 shows the apparatus set-up in the electroplating of an iron spoon with silver.

Rajah 11 menunjukkan susunan radas untuk menyadur satu sudu besi dengan argentum.

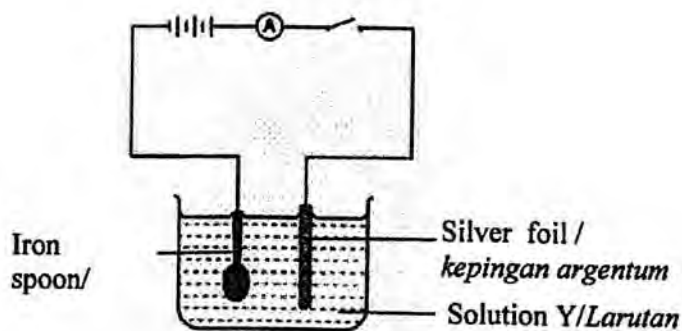


Diagram 11  
Rajah 11

What could be solution Y?

Antara yang berikut, yang manakah larutan Y?

- A Iron (II) sulphate  
*Ferum(II) sulfat*
- B Iron (II) chloride  
*Ferum (II) klorida*
- C Silver chloride  
*Argentum klorida*
- D Silver nitrate  
*Argentum nitrat*

34

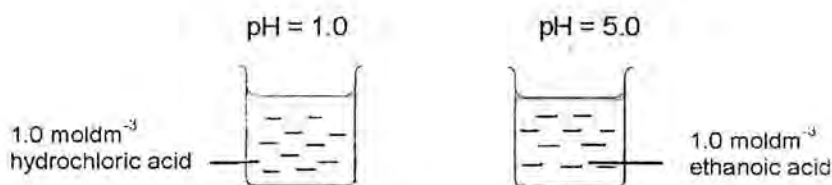


Diagram 12  
Rajah 12

In Diagram 12, the pH value of ethanoic acid is higher than the hydrochloric acid. Which of the following, explain the difference?

*Dalam Rajah 12, nilai pH asid etanoik lebih tinggi daripada asid hidroklorik. Antara yang berikut, yang manakah menerangkan perbezaan tersebut?*

- A Ethanoic acid has low concentration of H<sup>+</sup>  
*Asid etanoik mempunyai kepekatan H<sup>+</sup> yang rendah*
- B Ethanoic acid is a strong acid  
*Asid etanoik ialah asid kuat*
- C Hydrochloric acid is a weak acid  
*Asid hidroklorik ialah asid lemah*
- D Hydrochloric acid has high concentration of OH<sup>-</sup>  
*Asid hidroklorik mempunyai kepekatan OH<sup>-</sup> yang tinggi*

- 35 Diagram 13 shows a series of reaction that involves compound G.  
*Rajah 13 menunjukkan satu siri tindak balas yang melibatkan sebatian G*

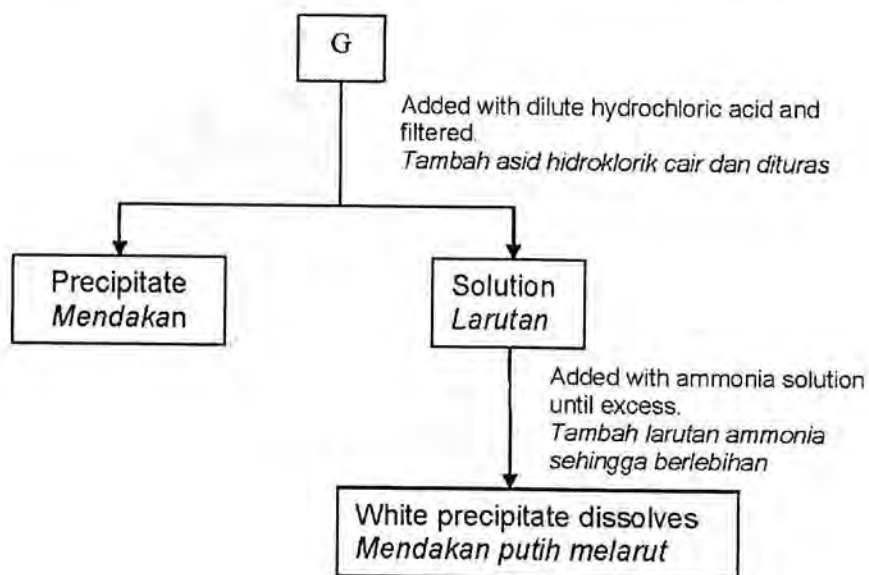


Diagram 13  
*Rajah 13*

G is a mixture of two salts. Among the following, what is G?

*G adalah campuran dua garam. Apakah G?*

- A Lead (II) nitrate and zinc carbonate  
*Plumbum(II) nitrat dan zink karbonat*
- B Lead(II) nitrate and aluminium nitrate  
*Plumbum(II) nitrat dan aluminium nitrat*
- C Silver sulphate and copper (II) carbonate  
*Argentum sulfat dan kuprum(II) karbonat*
- D Magnesium sulphate and lead(II) carbonate  
*Magnesium sulfat dan plumbum(II) karbonat*

- 36 Diagram 14 shows a camera.  
*Rajah 14 menunjukkan sejenis kamera.*



Diagram 14  
*Rajah 14*

What type of glass is used to make the quartz lens?  
*Apakah jenis kaca yang digunakan untuk membuat kanta kuarza?*

- A Fused glass  
*Kaca silika terlakur*
- B Soda lime glass  
*Kaca soda kapur*
- C Borosilicate glass  
*Kaca borosilikat*
- D Lead crystal glass  
*Kaca plumbum*

- 37 A student carried out an experiment to determine the rate of reaction between calcium carbonate and dilute hydrochloric acid. The volume of carbon dioxide gas collected at intervals of 0.5 minutes is recorded in Table 1.  
*Seorang pelajar menjalankan eksperimen untuk menentukan kadar tindak balas antara kalsium karbonat dan asid hidroklorik cair. Isipadu gas karbon dioksida yang terkumpul pada selang masa 0.5 minit direkod dalam Jadual 1.*

| Time (min)<br>Masa (min)   | 0 | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 |
|--|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Volume of CO <sub>2</sub> gas<br>(cm <sup>3</sup> )<br><i>Isipadu gas CO<sub>2</sub></i><br>(cm <sup>3</sup> ) | 0 | 27  | 46  | 59  | 70  | 79  | 86  | 92  | 95  | 95  | 95  |

Table 1  
Jadual 1

- What is the average rate of reaction in the third minute?  
*Apakah kadar tindak balas purata dalam minit ketiga ?*
- A 28.67 cm<sup>3</sup>min<sup>-1</sup>  
 B 23.75 cm<sup>3</sup>min<sup>-1</sup>  
 C 16 cm<sup>3</sup>min<sup>-1</sup>  
 D 14 cm<sup>3</sup>min<sup>-1</sup>
- 38 Propane, C<sub>3</sub>H<sub>8</sub> undergoes complete combustion to produce carbon dioxide, CO<sub>2</sub> and water, H<sub>2</sub>O.  
*Propana, C<sub>3</sub>H<sub>8</sub> mengalami pembakaran lengkap untuk menghasilkan karbon dioksida, CO<sub>2</sub> dan air, H<sub>2</sub>O.*
- Calculate the volume of carbon dioxide produced when 0.5 mol propane burns completely at room temperature.  
 [Molar volume = 24 dm<sup>3</sup>mol<sup>-1</sup> at room temperature]  
*Kira isipadu gas karbon dioksida yang terhasil apabila 0.5 mol propana terbakar dengan lengkap pada suhu bilik.*  
 [Isipadu molar = 24 dm<sup>3</sup>mol<sup>-1</sup> pada suhu bilik]
- A 72.0 dm<sup>3</sup>  
 B 36.0 dm<sup>3</sup>  
 C 24.0 dm<sup>3</sup>  
 D 12.5 dm<sup>3</sup>

39 What is the oxidation number of X in  $X_2O_7^{2-}$  ion ?  
Apakah nombor pengoksidaan bagi X dalam ion  $X_2O_7^{2-}$  ?

- A +3
- B +4
- C +5
- D +6

40 Table 2 shows the temperature readings for the reaction between  $25 \text{ cm}^3$  of  $0.1 \text{ mol dm}^{-3}$  hydrochloric acid and  $25 \text{ cm}^3$  of  $0.1 \text{ mol dm}^{-3}$  sodium hydroxide solution.

Jadual 2 menunjukkan bacaan suhu untuk tindak balas di antara  $25 \text{ cm}^3$  asid hidroklorik  $0.1 \text{ mol dm}^{-3}$  dan  $25 \text{ cm}^3$  larutan natrium hidroksida  $0.1 \text{ mol dm}^{-3}$ .

|  |      |
|--|------|
| Average initial temperature before both solutions are mixed<br>Suhu awal kedua-dua larutan sebelum dicampurkan | 30°C |
| Highest temperature after both solutions are mixed<br>Suhu tertinggi larutan selepas dicampurkan               | 43°C |

Table 2  
Jadual 2

Calculate the heat produced from the reaction.  
Kirakan haba yang terhasil daripada tindak balas tersebut.

- A  $25 \text{ cm}^3 \times 4.2 \text{ J g}^{-1} \text{ }^\circ\text{C}^{-1} \times 13^\circ\text{C}$
- B  $25 \text{ cm}^3 \times 4.2 \text{ J g}^{-1} \text{ }^\circ\text{C}^{-1} \times 43^\circ\text{C}$
- C  $50 \text{ cm}^3 \times 4.2 \text{ J g}^{-1} \text{ }^\circ\text{C}^{-1} \times 13^\circ\text{C}$
- D  $50 \text{ cm}^3 \times 4.2 \text{ J g}^{-1} \text{ }^\circ\text{C}^{-1} \times 43^\circ\text{C}$

- 41 Diagram 15 shows the molecular formula of an organic compound.  
*Rajah 15 menunjukkan formula molekul bagi suatu sebatian organik.*



Diagram 15  
*Rajah 15*

The compound is an ingredient in making pineapple jam. What is the function of the compound?

*Sebatian itu adalah suatu bahan dalam penyediaan jem nenas. Apakah fungsi sebatian tersebut?*

- A To make the jam thicker  
*Untuk memekatkan jem*
- B To enhance the flavor  
*Untuk menambah perisa*
- C To prevent oxidation  
*Untuk mengelakkan pengoksidaan*
- D To sweeten the jam  
*Untuk menambah kemanisan jem*

42

| Substance<br><i>Bahan</i> | Melting point / °C<br><i>Takat lebur / °C</i> | Boiling point / °C<br><i>Takat didih / °C</i> |
|---------------------------|---|---|
| W                         | -123  | 78  |
| X                         | -10   | 104   |
| Y                         | 59  | 224   |
| Z                         | 120   | 445   |

Table 3  
*Jadual 3*

What are the physical states of substances W, X, Y and Z at 110°C?  
*Apakah keadaan fizikal bahan W, X, Y dan Z pada 110°C?*

|   | W                       | X                       | Y                       | Z                       |
|---|-------------------------|-------------------------|-------------------------|-------------------------|
| A | Liquid<br><i>Cecair</i> | Liquid<br><i>Cecair</i> | Solid<br><i>Pepejal</i> | Gas<br><i>Gas</i>       |
| B | Gas<br><i>Gas</i>       | Solid<br><i>Pepejal</i> | Liquid<br><i>Cecair</i> | Gas<br><i>Gas</i>       |
| C | Solid<br><i>Pepejal</i> | Liquid<br><i>Ce air</i> | Gas<br><i>Gas</i>       | Gas<br><i>Gas</i>       |
| D | Gas<br><i>Gas</i>       | Gas<br><i>Gas</i>       | Liquid<br><i>Liquid</i> | Solid<br><i>Pepejal</i> |

- 43 Table 4 shows the percentage by mass of each element in a compound and their relative atomic masses.

*Jadual 4 menunjukkan peratusan mengikut jisim bagi setiap unsur dalam satu sebatian dan juga jisim atom relatif masing-masing.*

|  |       |      |       |
|--|-------|------|-------|
| Elements<br><i>Unsur</i>                           | C     | H    | O     |
| Percentage (%)<br><i>Peratus(%)</i>                | 26.70 | 2.20 | 71.10 |
| Relative atomic mass<br><i>Jisim atom relative</i> | 12    | 1    | 16    |

Table 4  
*Jadual 4*

What is the empirical formula of the compound?  
*Apakah formula empirik untuk sebatian tersebut?*

- A CHO
- B CHO<sub>2</sub>
- C CH<sub>2</sub>O
- D C<sub>2</sub>HO
- 44 Element Z forms an oxide with the chemical formula of Z<sub>2</sub>O<sub>3</sub>. Which of the following is true about this oxide?  
*Unsur Z membentuk oksida dengan formula molekul Z<sub>2</sub>O<sub>3</sub>. Antara yang berikut, yang manakah benar tentang oksida ini?*
- A The oxide of Z reacts with acid only.  
*Oksida Z bertindak balas dengan asid sahaja.*
- B The oxide of Z reacts with alkali only.  
*Oksida Z bertindak balas dengan alkali sahaja.*
- C The oxide of Z reacts with both acid and alkali.  
*Oksida Z bertindak balas dengan kedua-dua asid dan alkali.*
- D The oxide of Z does not react with both acid and alkali.  
*Oksida Z tidak bertindak balas dengan kedua-dua asid dan alkali.*

- 45 Atom X has an electron arrangement of 2.4. Atom Y has proton number of 17. What are the properties of the compound formed between elements X and Y?  
*Atom X mempunyai susunan elektrom 2.4. Atom Y mempunyai nombor proton 17. Apakah ciri-ciri sebatian yang terbentuk antara unsur X dan unsur Y?*
- I It has high boiling point.  
*ia mempunyai takat lebur yang tinggi.*
- II It does not conduct electricity.  
*ia tidak boleh mengkonduksi elektrik.*
- III It does not exist as a solid at room temperature.  
*ia tidak wujud sebagai pepejal pada keadaan bilik.*
- IV It is soluble in organic solvent.  
*ia larut dalam pelarut organik.*
- A I and II only  
*I dan II sahaja*
- B III and IV only  
*III dan IV sahaja*
- C I, II and III only  
*I, II dan III sahaja*
- D II, III and IV only  
*II, III dan IV sahaja*
- 46 The electrolysis of copper (II) sulphate solution was carried out using copper electrodes. What are the observation at anode and the product at cathode?  
*Elektrolisis larutan kuprum (II) sulfat menggunakan elektrod-elektrod kuprum dijalankan. Apakah pemerhatian di anod dan hasil di katod?*

|   | Observation at anode<br><i>Pemerhatian di anod</i>               | Product at cathode<br><i>Hasil di katod</i> |
|---|--|---|
| A | Electrode becomes thicker<br><i>Elektrod menjadi lebih tebal</i> | Copper metal<br><i>Logam kuprum</i>         |
| B | Electrode becomes thinner<br><i>Elektrod menjadi lebih nipis</i> | Copper metal<br><i>Logam kuprum</i>         |
| C | Colourless gas bubbles<br><i>Gelembung gas tidak berwarna</i>    | Oxygen gas<br><i>Gas oksigen</i>            |
| D | Colourless gas bubbles<br><i>Gelembung gas tidak berwarna</i>    | Hydrogen gas<br><i>Gas hydrogen</i>         |

- 47 The equation below shows the reaction between magnesium and hydrochloric acid.  
*Persamaan di bawah menunjukkan tindak balas di antara magnesium dan asid hidroklorik.*



If 0.48 g of magnesium is used, calculate the volume of 0.5 mol dm<sup>-3</sup> hydrochloric acid needs to be added for complete reaction.

[Relative atomic mass : H=1; Mg=24; Cl=35.5]

*Jika 0.48 g magnesium digunakan, hitungkan isipadu asid hidroklorik 0.5 mol dm<sup>-3</sup> yang perlu ditambah untuk tindak balas yang lengkap.*

*[Jisim atom relatif : H=1; Mg=24; Cl=35.5]*

- A 0.08 cm<sup>3</sup>
- B 0.8 cm<sup>3</sup>
- C 8 cm<sup>3</sup>
- D 80 cm<sup>3</sup>

- 48 Diagram 16 shows the set up of the apparatus for the action of heat on zinc carbonate. After a few minutes lime water turns cloudy.  
*Rajah 16 menunjukkan susunan radas bagi kesan haba ke atas bahan W. Selepas beberapa minit air kapur menjadi keruh.*

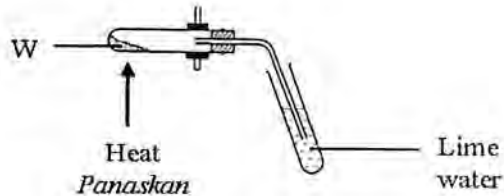


Diagram 16  
*Rajah 16*

The mass of the boiling tube with the content before and after the heating is recorded in Table 5 below.

*Jisim tabung didih dengan kandungannya sebelum dan selepas dipanaskan dicatatkan dalam Jadual 5 di bawah.*

|                                     |        |
|-------------------------------------|--------|
| Before heating<br>Sebelum pemanasan | 31.25g |
| After heating<br>Selepas pemanasan  | 20.25g |

Table 5  
*Jadual 5*

Calculate the volume of the gas released in  $\text{dm}^3$  at room temperature.

[Relative atomic mass: C=12; O=16; Zn=65; Molar volume at room temperature =  $24 \text{ dm}^3 \text{ mol}^{-1}$ ]

*Hitung isipadu gas yang terbebas dalam  $\text{dm}^3$  pada suhu bilik.*

*[Jisim atom relatif: C=12; O=16; Zn=65; Isipadu molar pada suhu bilik =  $24 \text{ dm}^3 \text{ mol}^{-1}$ ]*

- A 3  
 B 6  
 C 11  
 D 12

- 49 Diagram 16 shows four iron nails in test tubes, P, Q, R and S.  
*Rajah 16 menunjukkan empat paku diletakkan di dalam empat tabung uji P, Q, R dan S.*

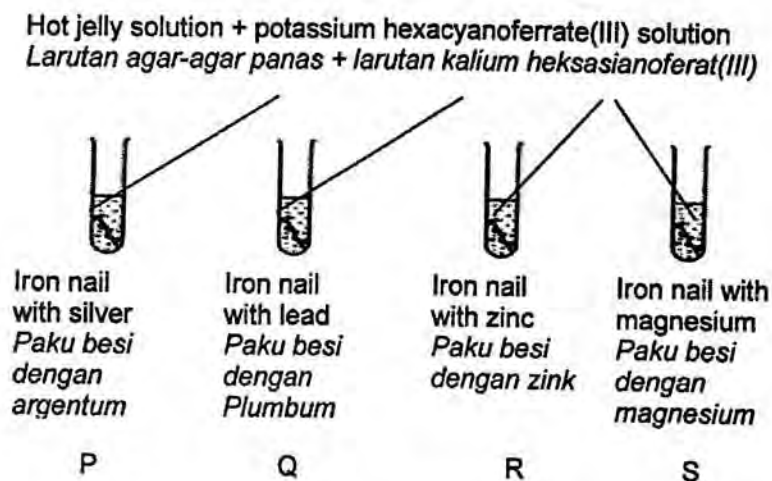


Diagram 16  
*Rajah 16*

Which test tube shows the highest intensity of blue colouration after a day?  
*Tabung uji manakah yang mempunyai keamatan warna biru yang tinggi selepas satu hari?*

- A P  
 B Q  
 C R  
 D S

- 50 Table 6 shows a data recorded when  $100 \text{ cm}^3$  of water was heated using methanol,  $\text{CH}_3\text{OH}$  as a fuel.  
*Jadual 6 menunjukkan data yang direkodkan apabila  $100 \text{ cm}^3$  air dipanaskan dengan menggunakan metanol,  $\text{CH}_3\text{OH}$  sebagai bahan api.*

|  |                             |
|--|-----------------------------|
| Mass of water<br><i>Jisim air</i>  | 100 g                       |
| Change in temperature of water, $\theta$<br><i>Perubahan suhu air, <math>\theta</math></i> | $20 \text{ }^\circ\text{C}$ |
| Mass of methanol burnt<br><i>Jisim metanol terbakar</i>                                    | 0.32 g                      |

Table 6  
*Jadual 6*

What is the heat of combustion of methanol in the reaction?  
*Apakah haba pembakaran metanol di dalam tindak balas tersebut?*

[Specific heat capacity of solution:  $4.2 \text{ J g}^{-1} \text{ }^\circ\text{C}^{-1}$ ; molar mass of methanol,  $\text{CH}_3\text{OH}$  is  $32 \text{ g mol}^{-1}$ ]

*[Haba kapasiti spesifik larutan:  $4.2 \text{ J g}^{-1} \text{ }^\circ\text{C}^{-1}$ ; Jisim molar metanol,  $\text{CH}_3\text{OH}$  adalah  $32 \text{ g mol}^{-1}$ ]*

- A  $0.84 \text{ kJ mol}^{-1}$
- B  $8.4 \text{ kJ mol}^{-1}$
- C  $84 \text{ kJ mol}^{-1}$
- D  $840 \text{ kJ mol}^{-1}$

END OF QUESTION PAPER

KERTAS SOALAN TAMAT