

Chemistry
Kertas 1
Oktober
2020
1 $\frac{1}{4}$ jam



MAKTAB RENDAH SAINS MARA

PEPERIKSAAN AKHIR SIJIL PENDIDIKAN MRSM 2020

CHEMISTRY

Kertas 1

Satu jam lima belas minit

JANGAN BUKA KERTAS PEPERIKSAAN 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 peperiksaan ini.*

- 1 Which atom forms a cation?
Atom manakah yang membentuk kation?

- A Chlorine Cl^-
Klorin
- B Sodium Na^+
Natrium
- C Nitrogen N^-
Nitrogen
- D Oxygen O^-
Oksigen

- 2 What is the meaning of empirical formula?
Apakah maksud formula empirik?

- A Chemical formula that shows the type of element in the compound
Formula kimia yang menunjukkan jenis unsur di dalam sebatian
- B Chemical formula that shows how the atoms of elements are bonded
Formula kimia yang menunjukkan bagaimana atom setiap unsur terikat
- C Chemical formula that shows the simplest whole number ratio of atoms of each element in a compound
Formula kimia yang menunjukkan nisbah teringkas bilangan atom setiap unsur di dalam sebatian
- D Chemical formula that shows the actual number of atoms of each element in a molecule of a compound
Formula kimia yang menunjukkan bilangan sebenar atom setiap unsur di dalam satu molekul sebatian

- ~~3~~ Which chemical cell is not rechargeable?
Sel kimia manakah yang tidak boleh dicas semula?

A



C



B



D



4 Which of the following is a monoatomic gas? *group 11*
 Antara yang berikut, yang manakah adalah satu gas monoatom?

- A Hydrogen
Hidrogen
- B Chlorine
Klorin
- C Argon
Argon
- D Nitrogen
Nitrogen

5 Diagram 1 shows the standard representation of helium atom.
 Rajah 1 menunjukkan perwakilan piawai bagi atom helium.

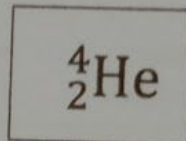
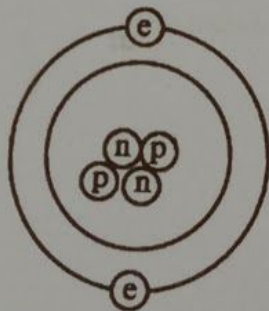


Diagram 1

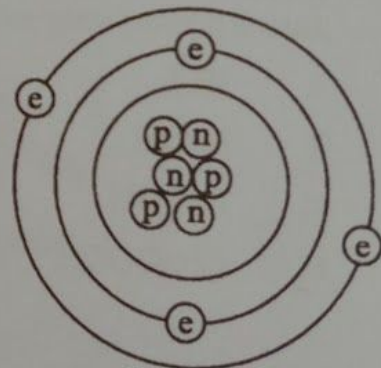
Rajah 1

Which of the following shows the atomic structure of the atom?
 Antara berikut, yang manakah menunjukkan struktur atom tersebut?

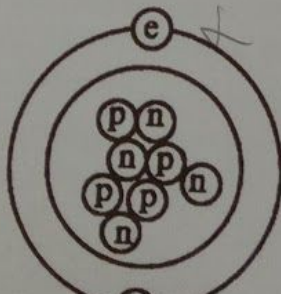
A



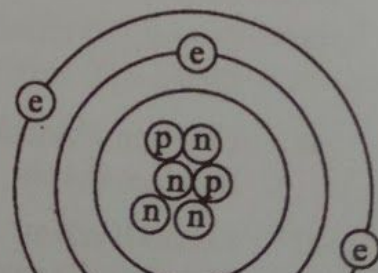
C



B



D



SULIT

4

- 6 Which pair correctly shows the differences between an electrolytic cell and a chemical cell?
Pasangan manakah yang betul menunjukkan perbezaan antara sel elektrolisis dengan sel kimia?

	Electrolytic cell <i>Sel elektrolisis</i>	Chemical cell <i>Sel kimia</i>
A	Contains electrolyte <i>Mengandungi elektrolit</i>	Does not contain electrolyte <i>Tidak mengandungi elektrolit</i>
B	Electrons flow from negative terminal to positive terminal <i>Elektron mengalir dari terminal negatif ke terminal positif</i>	Electrons flow from positive terminal to negative terminal <i>Elektron mengalir dari terminal positif ke terminal negatif</i>
C	Two different types of metals used as electrodes <i>Dua jenis logam berbeza digunakan sebagai elektrod</i>	The same type of metals used as electrodes <i>Logam yang sama jenis digunakan sebagai elektrod</i>
D	Converts electrical energy to chemical energy <i>Menukarkan tenaga elektrik kepada tenaga kimia</i>	Converts chemical energy to electrical energy <i>Menukarkan tenaga kimia kepada tenaga elektrik</i>

- 7 Which of the following substances ionise partially in water?
Antara berikut, yang manakah mengion separa di dalam air?

- A HCl
B NaOH
C CH₃OH
D CH₃COOH

- 8 Which of the following is an insoluble salt?
Antara berikut, yang manakah merupakan garam tak terlarutkan?

- A Copper(II) carbonate
Kuprum(II) karbonat
B Calcium chloride
Kalsium klorida
C Lead(II) nitrat
Plumbum(II) nitrat
D Zinc sulphate
Zink sulfat

- 9 Which of the following statements are true about a strong alkali?
Antara yang berikut, pernyataan manakah yang betul tentang alkali kuat?

- I Has a high pH value
Mempunyai nilai pH yang tinggi
- II Ionises completely in water
Mengion lengkap dalam air
- III Has a high concentration of hydrogen ions
Mempunyai kepekatan hidrogen ion yang tinggi
- IV Exist as molecules in water
Wujud sebagai molekul di dalam air

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

- 10 Diagram 2 shows a set of cookware usually in the kitchen.
Rajah 2 menunjukkan satu set peralatan memasak di dapur.



Diagram 2
Rajah 2

- Which of the following types of glass is suitable for making the cookware?
Antara jenis-jenis kaca yang berikut, yang manakah sesuai untuk membuat peralatan memasak tersebut?

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

SULIT

- 11 Which of the following is not made from composite substances?
Antara bahan berikut, yang manakah tidak dibuat daripada bahan komposit?

A



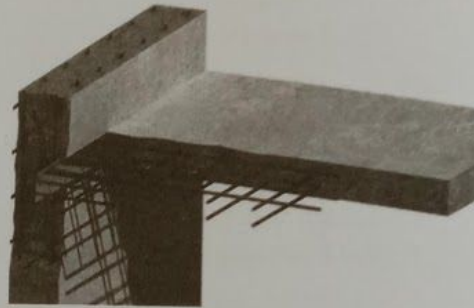
C



B



D



- 12 What is the name of the process of preparing alcohol from the fruit juice?
Apakah nama proses penyediaan alkohol daripada jus buah-buahan?

- A Fermentation
Penapaian
- B Esterification
Pengesteran
- C Dehydration
Pendehidratan
- D Halogenation
Penghalogenan

13 Which of the following explains effective collision?
Antara pernyataan berikut, yang manakah menerangkan perlanggaran berkesan?

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

14 Which statement is true about unsaturated hydrocarbons? *alkena*
Pernyataan manakah yang benar mengenai hidrokarbon tak tepu?

- A Soluble in water
Larut dalam air
- B Can conduct electricity in all state
Boleh mengalirkan arus elektrik dalam semua keadaan
- C Contain carbon, hydrogen and oxygen atoms
Hanya mengandungi atom karbon, hidrogen dan oksigen
- D Contain at least one double bond between carbon atoms
Mengandungi sekurang-kurangnya satu ikatan ganda dua antara atom-atom karbon

15 Diagram 3 shows the test tube containing iron nail and water
Rajah 3 menunjukkan sebuah tabung uji yang mengandungi paku besi dan air.

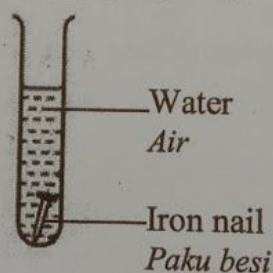


Diagram 3
Rajah 3

What type of reaction occurs in the test tube?
Apakah jenis tindak balas yang berlaku di dalam tabung uji?

- A Redox
Redoks
- B Double decomposition
Penguraian ganda dua

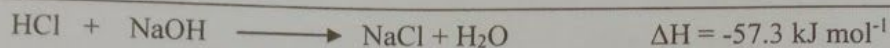
SULIT

8

- 16 Which of the following substance acts as oxidising agent?
Bahan yang manakah bertindak sebagai agen pengoksidaan?
- A Sodium sulphite solution
Larutan natrium sulfit
 - B Chlorine water
Air klorin
 - C Magnesium powder
Serbuk magnesium
 - D Potassium bromide solution
Larutan kalium bromida
- 17 Which substance is used in cold packs?
Bahan yang manakah digunakan dalam pek sejuk?
- A Potassium carbonate
Kalium karbonat
 - B Calcium chloride
Kalsium klorida
 - C Magnesium sulphate
Magnesium sulfat
 - D Sodium bicarbonate
Natrium bikarbonat
- 18 As a front liner, Ali's uniform sometimes stained with blood.
Which detergent additive will remove the blood stain effectively?
Sebagai petugas barisan hadapan, pakaian seragam Ali kadangkala mempunyai kesan darah.
Bahan tambah detergen manakah yang akan menghilangkan kesan darah itu dengan berkesan?
- A Fragrance agent
Agen pewangi
 - B Stabilising agent
Agen penstabil
 - C Biological enzyme
Enzim biologi
 - D Suspension agent
Agen antienapan

- 19 The following thermochemical equation represents the neutralisation between hydrochloric acid, HCl and sodium hydroxide solution, NaOH.

Persamaan termokimia berikut mewakili peneutralan antara asid hidroklorik, HCl dan larutan natrium hidroksida, NaOH.



Which substance is suitable to replace hydrochloric acid to obtain the same value of heat of neutralization?

Bahan yang manakah sesuai untuk menggantikan asid hidroklorik untuk memperoleh nilai haba peneutralan yang sama?

- A Nitric acid
Asid nitrik
- B Ethanoic acid
Asid etanoik
- C Carbonic acid
Asid karbonik
- D Phosphoric acid
Asid fosforik
- 20 Diagram 4 shows a box of aspirin which can relieve fever and pain.
Rajah 4 menunjukkan sekotak aspirin yang dapat melegakan demam dan kesakitan.



Relative molecular mass is 180
Jisim molekul relatif ialah 180

Diagram 4
Rajah 4

If the molecular formula of aspirin is $\text{C}_9\text{H}_x\text{O}_4$, determine the value of x .
[Relative atomic mass: H = 1, C = 12, O = 16]

*Jika formula molekul aspirin ialah $\text{C}_9\text{H}_x\text{O}_4$, tentukan nilai x .
[Jisim atom relatif: H = 1, C = 12, O = 16]*

- A 6
- B 7
- C 8
- D 9

$$12(9) + x + 16(4) = 180$$

$$x = 6$$

SULIT

21 Which compound is formed by transferring electrons?
Sebatian manakah yang terbentuk melalui pemindahan elektron?

- A Ammonia
Ammonia
- B Lithium oxide
Litium oksida
- C Carbon monoxide
Karbon monoksida
- D Hydrogen chloride
Hidrogen klorida

22 Table 1 shows the melting point of four substances.
Jadual 1 menunjukkan takat lebur empat bahan.

Substance <i>Bahan</i>	Melting point (°C) <i>Takat lebur (°C)</i>	Type of particle in substance <i>Jenis zarah dalam bahan</i>
W	80	Molecule <i>Molekul</i>
X	621	Atom <i>Atom</i>
Y	801	Ion <i>Ion</i>
Z	3200	Ion <i>Ion</i>

Table 1
Jadual 1

Which substance is suitable as an electrolyte when it is heated to a temperature of 900 °C?

Bahan manakah yang sesuai sebagai elektrolit apabila dipanaskan ke suhu 900 °C?

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

- 23 The boiling point of bromine is lower than iodine.
Which statement best explains this phenomenon?

*Takat didih bromin lebih rendah daripada iodin.
Pernyataan manakah yang paling baik menerangkan fenomena ini?*

- A The atomic size of bromine is smaller
Saiz atom bromin lebih kecil
- B The number of electrons in bromine is smaller
Bilangan elektron dalam bromin lebih kecil
- C The electronegativity of bromine is higher than iodine
Keelektronegatifan bromin lebih tinggi daripada iodin
- D The force of attraction between bromine molecules is weaker
Daya tarikan antara molekul bromin lebih lemah

F
S
N
C
B
I

- 24 Which statement about the bonding in carbon dioxide molecule is not correct?
[Proton number: C = 6, O = 8]

*Pernyataan manakah tentang ikatan dalam molekul karbon dioksida yang tidak benar?
[Nombor proton : C = 6, O = 8]*

- A Both carbon and oxygen atoms have achieved stable octet electron arrangement
Kedua-dua atom karbon dan oksigen telah mencapai susunan elektron oktet yang stabil
- B Carbon atom shares its four electrons with one oxygen atom
Atom karbon berkongsi empat elektronnya dengan satu atom oksigen
- C Each oxygen atom shares two electrons with one carbon atom
Setiap atom oksigen berkongsi dua elektron dengan satu atom karbon
- D Two double covalent bonds are formed
Dua ikatan kovalen ganda dua terbentuk

- 25 A solution of sodium hydroxide has a concentration of 60 g dm^{-3} .
What is the molarity of the alkali?

[Relative atomic mass : H = 1, O = 16, Na = 23]

*Suatu larutan natrium hidroksida mempunyai kepekatan 60 g dm^{-3} .
Apakah kemolaran alkali itu?*

[Jisim atom relatif : H = 1, O = 16, Na = 23]

- A 0.5 mol dm^{-3}
- B 1.0 mol dm^{-3}
- C 1.5 mol dm^{-3}
- D 2.0 mol dm^{-3}

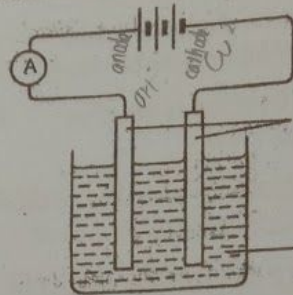
NaOH

23 + 16

= 39

$$\frac{16}{39} \times 60$$

- 26 Diagram 5 shows the apparatus set-up of an electrolytic cell.
Rajah 5 menunjukkan susunan radas bagi sel elektrolisis.



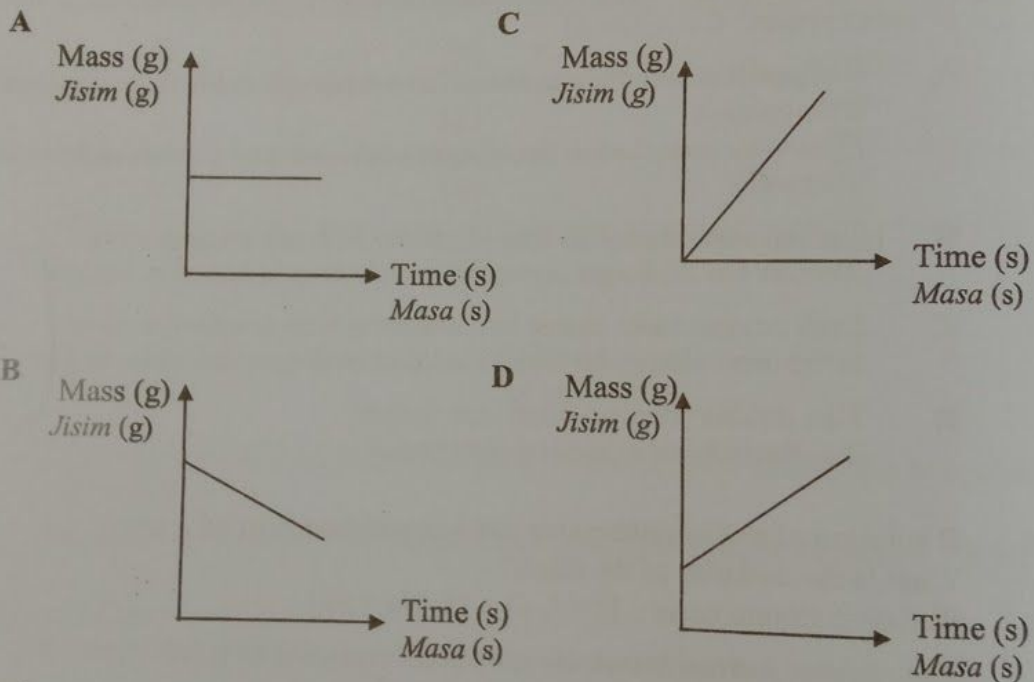
Copper electrodes
Elektrod kuprum

Copper(II) sulphate solution
Larutan kuprum(II) sulfat

Diagram 5
Rajah 5

Which of the following graphs shows the changes in mass of the cathode after 15 minutes of electrolysis?

Antara graf berikut manakah menunjukkan perubahan jisim katod selepas 15 minit elektrolisis dijalankan?



- 27 30 cm^3 mixture of methane, ethane and propene gases with the same volume is channelled into excess acidified potassium manganate(VII) solution.

What is the volume of gas in the final mixture?

30 cm^3 campuran gas metana, etana dan propena dengan isipadu yang sama disalurkan ke dalam larutan kalium manganat(VII) berasid yang berlebihan.

Apakah isipadu gas dalam campuran akhir?

- A 0 cm^3
B 10 cm^3
C 20 cm^3
D 30 cm^3

- 28 Diagram 6 shows metal guards made of a few blocks of zinc attached to hulls of a ship.

Rajah 6 menunjukkan pelindung logam yang diperbuat daripada beberapa blok zink yang dilekatkan pada badan sebuah kapal.

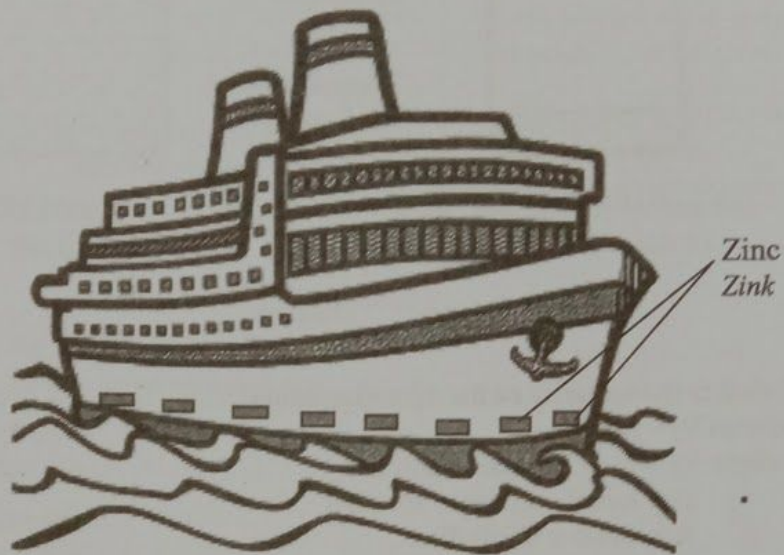


Diagram 6

Rajah 6

Why this action should be taken?

Mengapakah tindakan ini perlu dilakukan?

- A To broaden the base of the ship
Untuk meluaskan tapak kapal
- B To increase the weight of the ship
Untuk meningkatkan berat kapal
- C To prevent iron from coming into contact with water
Untuk mencegah besi dari bersentuhan dengan air
- D To prevent iron from rusting by using a more electropositive metal
Untuk mencegah besi dari berkarat menggunakan logam yang lebih elektropositif

SULIT

- 29 Diagram 7 shows a dilution process of hydrochloric acid.
Rajah 7 menunjukkan proses pencairan asid hidroklorik.

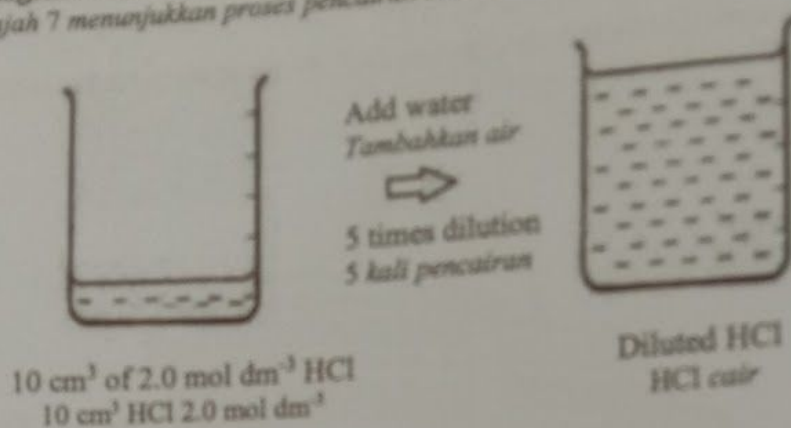


Diagram 7
Rajah 7

What is the molarity of the diluted solution?

Given $V_f = n \times V_i$

where V_f = final volume of solution

V_i = initial volume of solution

n = number of dilution

Apakah kemolaran larutan yang telah dicairkan ini?

Diberi $V_f = 5 \times V_i$

di mana V_f = isipadu akhir larutan

V_i = isipadu awal larutan

n = bilangan pencairan

- A 0.400 mol dm⁻³
B 0.100 mol dm⁻³
C 0.020 mol dm⁻³
D 0.004 mol dm⁻³
- 30 Diagram 8 shows the structure of a polymer.
Rajah 8 menunjukkan struktur satu polimer.

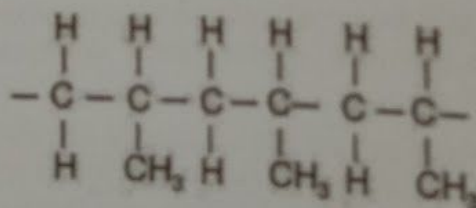


Diagram 8
Rajah 8

Which of the following is the correct monomer?

Antara yang berikut, yang manakah monomer yang betul?

A $\text{CH}_2 = \text{CH}_2$

B $\text{CH}_3 - \text{CH}_3$

- 31 Table 2 shows the observations for two chemical reactions.
Jadual 2 menunjukkan pemerhatian bagi dua tindak balas kimia.

Reaction <i>Tindak balas</i>	Reactant <i>Bahan tindak balas</i>	Observation <i>Pemerhatian</i>
I	Sulphuric acid, H ₂ SO ₄ and Q <i>Asid sulfurik, H₂SO₄ dan Q</i>	White precipitate is formed <i>Mendakan putih terbentuk</i>
II	Hydrochloric acid, HCl and Q <i>Asid hidroklorik, HCl dan Q</i>	Colourless solution is produced <i>Larutan tanpa warna terbentuk</i>

Table 2
Jadual 2

Which of the following substances is Q?
Antara bahan berikut, yang manakah Q?

- A Silver nitrate
Argentum nitrat
- B Barium nitrate
Barium nitrat
- C Lead(II) nitrate
Plumbum(II) nitrat
- D Magnesium nitrate
Magnesium nitrat
- 32 Which of the following compounds has the highest number of oxygen atoms?
Antara sebatian berikut, yang manakah mempunyai bilangan atom oksigen terbanyak?
- A Hydrogen peroxide
Hidrogen peroksida
- B Sodium dichromate(VI)
Natrium dikromat(VI)
- C Potassium chromate(VI)
Kalium kromat(VI)
- D Vanadium(V) oxide
Vanadium(V) oksida

SULIT

- 33 Table 3 shows the composition in an alloy.
Jadual 3 menunjukkan komposisi suatu aloi.

Material <i>Bahan</i>	Composition <i>Komposisi</i>
Iron <i>Ferum</i>	74 %
Chromium <i>Kromium</i>	18 %
Carbon <i>Karbon</i>	8 %

Table 3
Jadual 3

Which of the following item is made from this alloy?
Antara item berikut yang manakah diperbuat daripada aloi ini?

A



C



B



D



- 34 Diagram 9 shows the apparatus set-up for the reaction between sodium thiosulphate solution and sulphuric acid.

Rajah 9 menunjukkan susunan radas bagi tindak balas antara larutan natrium tiosulfat dan asid sulfurik.

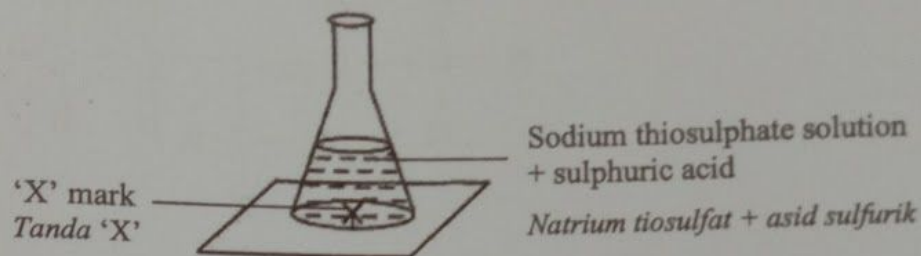


Diagram 9

Rajah 9

During the reaction, a pungent smell and 'X' mark is covered by a precipitate is observed.

Based on the observation, what are the products formed?

Semasa tindak balas, bau sengit dan tanda 'X' dilitupi oleh suatu mendakan diperhatikan.

Berdasarkan pemerhatian, apakah hasil tindak balas yang terbentuk?

I Water
Air

II Sulphur
Sulfur

III Sodium sulphate
Natrium sulfat

IV Sulphur dioxide
Sulfur dioksida

A I and II
I dan II

B II and III
II dan III

C I and IV
I dan IV

D II and IV
II dan IV

- 35 Diagram 10 represents a structural formula of a compound.
Rajah 10 mewakili formula struktur suatu sebatian.

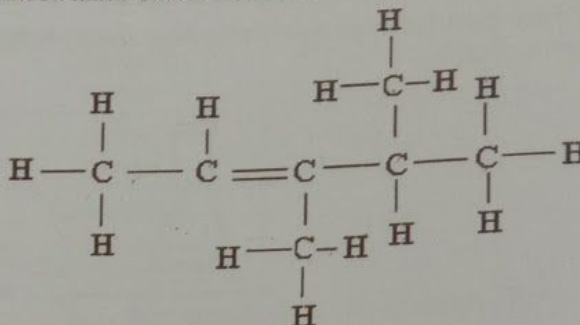


Diagram 10
Rajah 10

What is IUPAC name for this structure?
Apakah nama IUPAC bagi struktur ini?

- A 2,3-dimethylpent-3-ene
2,3-dimetilpent-3-ena
- B 3,4-dimethylpent-2-ene
3,4-dimetilpent-2-ena
- C 1,1,2-trimethylbut-2-ene
1,1,2-trimetilbut-2-ena
- D 3-ethylpent-2-ene
3-etilpent-2-ena
- 36 3.2 g of gas R occupies 1120 cm³.
What is the relative molecular mass of R?
[Molar volume of gas at standard temperature and pressure = 22.4 dm³ mol⁻¹]
3.2 g gas R menempati 1120 cm³.
Berapakah jisim molekul relatif bagi R?
[Isi padu molar gas pada suhu dan tekanan piawai = 22.4 dm³ mol⁻¹]
- A 16
- B 32
- C 64
- D 70

$$\frac{1120}{22.4} = 50$$

$$\frac{3.2}{r} = 50$$

$$50r = 3.2$$

$$r = 0.064$$

- 37 Diagram 11 shows the energy level diagram of a chemical reaction between substance T and water.
Rajah 11 menunjukkan gambar rajah aras tenaga bagi tindak balas antara bahan T dan air.

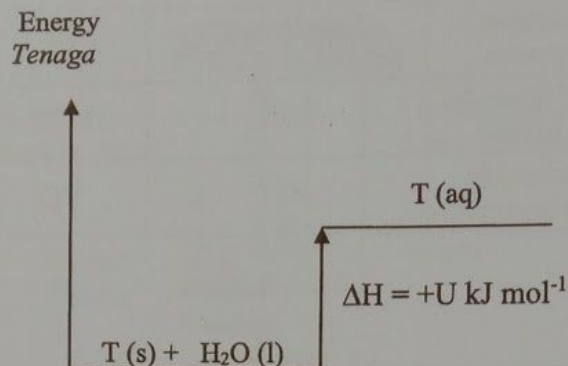
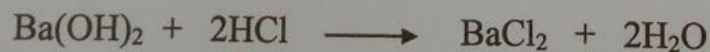


Diagram 11
Rajah 11

What is substance T?
Apakah bahan T?

- A Sodium hydroxide
Natrium hidroksida
- B Ammonium sulphate
Ammonium sulfat
- C Potassium metal
Logam kalium
- D Concentrated nitric acid
Asid nitrik pekat
- 38 The following equation represents the reaction between barium hydroxide solution and hydrochloric acid.
Persamaan yang berikut mewakili tindak balas antara barium hidroksida dan asid hidroklorik.



What is the volume of 0.5 mol dm^{-3} hydrochloric acid needed to neutralise 25 cm^3 of 0.1 mol dm^{-3} barium hydroxide solution?

Berapakah isi padu asid hidroklorik 0.5 mol dm^{-3} yang diperlukan untuk meneutralkan 25 cm^3 larutan barium hidroksida 0.1 mol dm^{-3} ?

- A 12.5 cm^3
- B 10.0 cm^3
- C 5.0 cm^3
- D 2.5 cm^3

$$\frac{0.5}{2} = \frac{0.1}{25}$$

- 39 Table 4 shows the information of elements X, Y and Z.
Jadual 4 menunjukkan maklumat bagi unsur X, Y dan Z.

Element <i>Unsur</i>	X	Y	Z
Proton number <i>Nombor proton</i>	Less than 12 <i>Kurang daripada 12</i>	12	More than 12 <i>Lebih daripada 12</i>
Formula of chloride <i>Formula klorida</i>	XCl ₂	YCl ₂	ZCl ₂
Formula of oxide <i>Formula oksida</i>	XO	YO	ZO

Table 4
Jadual 4

Which statement is correct?

Penyataan manakah yang betul?

- A The relative atomic mass decreases from element X, Y and Z
Jisim atom relatif berkurang dari unsur X, Y dan Z
- B Elements X, Y and Z show similar chemical properties
Unsur X, Y dan Z menunjukkan sifat kimia yang sama
- C Elements X, Y and Z dissolve in water to produce acidic solution
Unsur X, Y dan Z larut dalam air untuk menghasilkan larutan berasid
- D Black solid is formed when elements X, Y and Z react with oxygen
Pepejal hitam terbentuk apabila unsur X, Y dan Z bertindak balas dengan oksigen

- 40 Diagram 12 shows a chromatography technique used to separate carbohydrate molecule in a food sample.

Rajah 12 menunjukkan teknik kromatografi yang digunakan untuk mengasingkan molekul karbohidrat dalam sampel makanan.

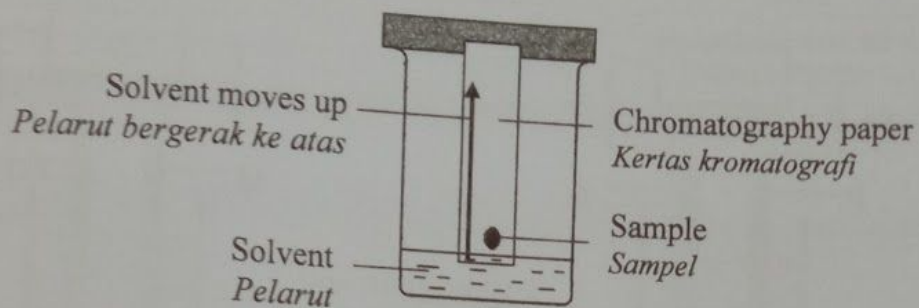


Diagram 12

Rajah 12

Carbohydrate is a natural polymer where the type of bond in the molecule is a covalent bond.

Which of the following is suitable to be used as the solvent?

Karbohidrat ialah polimer semulajadi di mana jenis ikatan dalam molekul ialah ikatan kovalen.

Antara pelarut berikut, yang manakah sesuai digunakan?

- A Ethanol
Etanol
- B Propane
Propana
- C Water
Air
- D Ethanoic acid
Asid etanoik

- 41 Diagram 13 shows four chemical cells using pairs of metals P/S, Q/S, P/R and Q/R.
Rajah 13 menunjukkan empat sel kimia menggunakan pasangan logam P/S, Q/S, P/R dan Q/R.

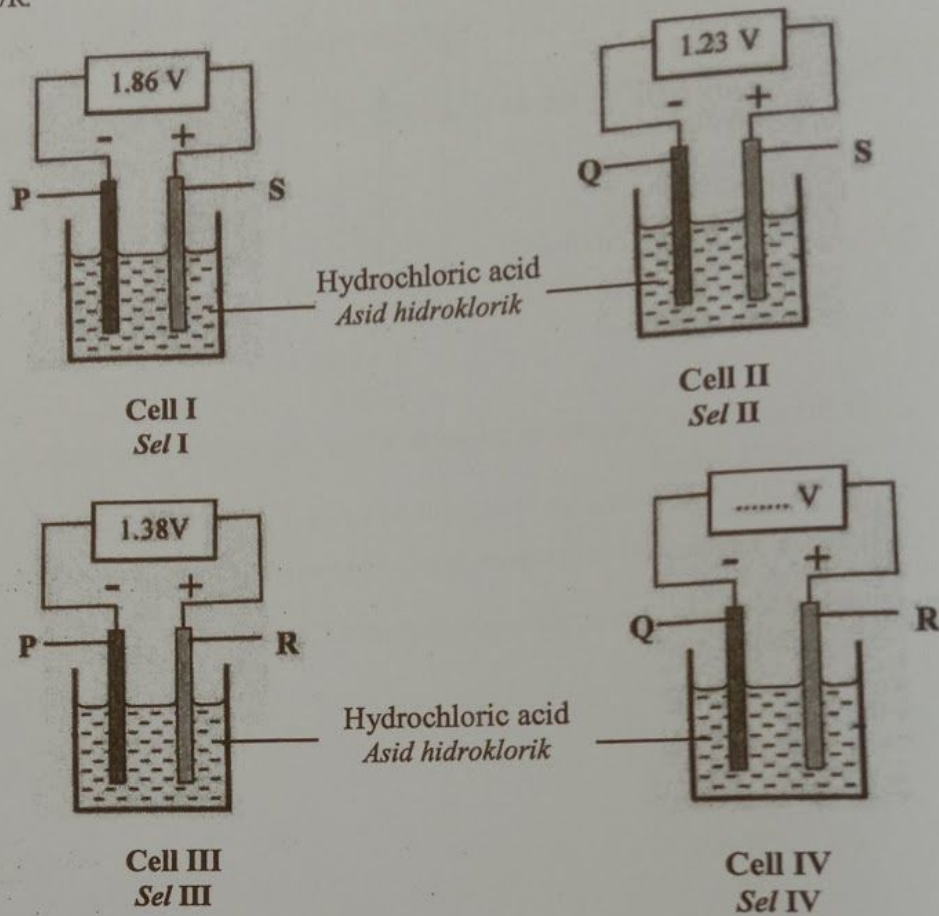


Diagram 13
Rajah 13

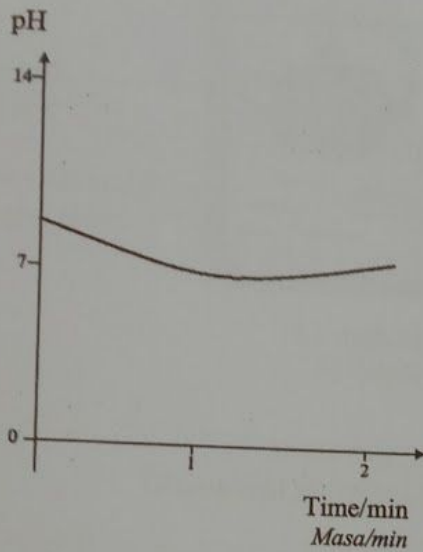
What is the voltage of cell IV?
 Apakah voltan bagi sel IV?

- A 0.48 V
- B 0.63 V
- C 0.75 V
- D 0.92 V

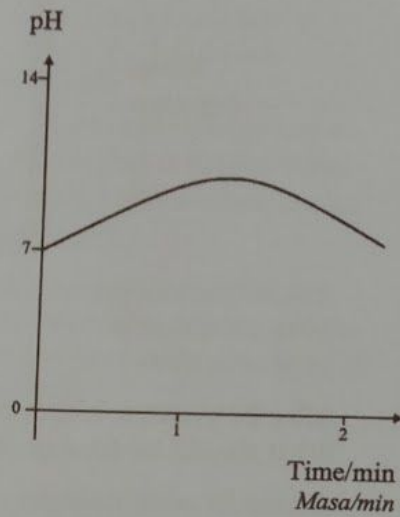
- 42 A student eats a sweet that contain citric acid. Chewing a sweet stimulate the formation of saliva which is slightly alkaline. Which of the following graphs shows the changes in pH of the saliva while chewing?

Seorang pelajar memakan sebiji gula-gula yang mengandungi asid sitrik. Mengunyah gula-gula akan merangsang penghasilan air liur yang bersifat sedikit alkali. Antara berikut, graf manakah menunjukkan perubahan pH air liur semasa mengunyah?

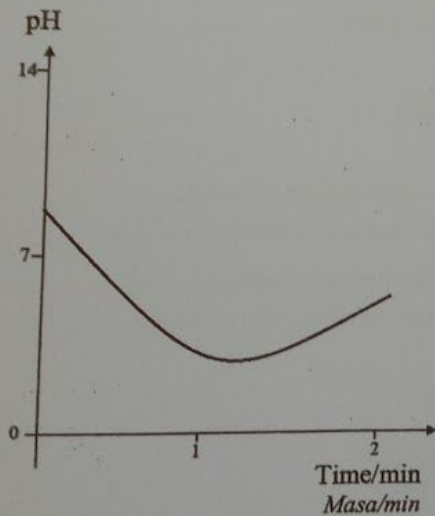
A



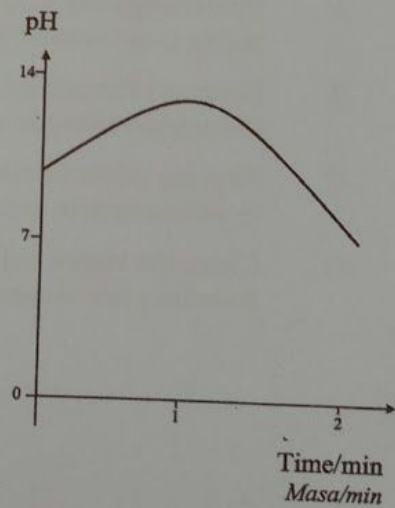
C



B



D



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- 43 Diagram 14 shows the apparatus set-up for electroplating a teapot with silver metal.
Rajah 14 menunjukkan susunan radas penyaduran teko dengan logam argentum.

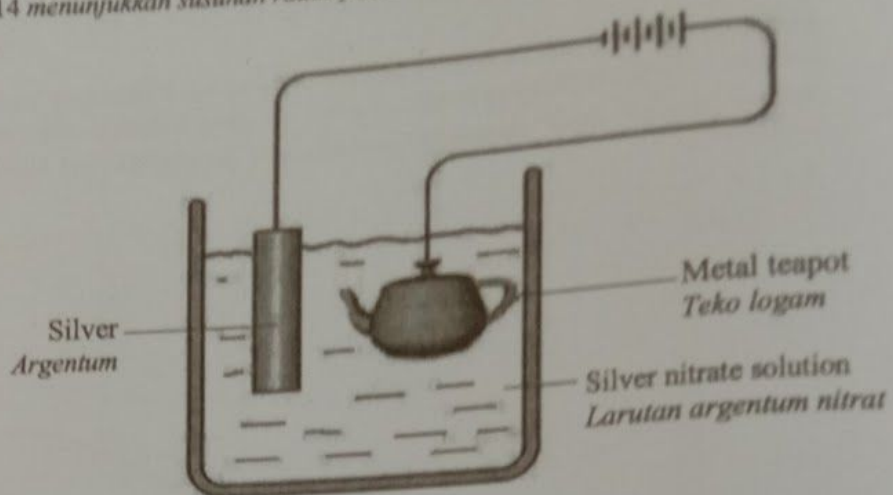


Diagram 14
Rajah 14

After 20 minutes, electroplating does not occur.
 What should be done to ensure electroplating take place?

*Selepas 20 minit, tiada penyaduran berlaku.
 Apakah yang perlu dilakukan untuk memastikan penyaduran berlaku?*

- A Interchange the terminals of the cells
Saling tukar terminal pada sel
- B Decrease the number of dry cells
Kurangkan bilangan sel kering
- C Replace silver nitrate solution with silver chloride
Gantikan larutan argentum nitrat dengan argentum klorida
- D Clean the teapot with sandpaper before electroplating
Bersihkan teko dengan kertas pasir sebelum penyaduran

- 44 Table 5 shows the observation from tests carried out on salt X.
Jadual 5 menunjukkan pemerhatian daripada ujian yang dijalankan ke atas garam X.

Test <i>Ujian</i>	Procedure <i>Prosedur</i>	Observation <i>Pemerhatian</i>
I	Add excess sodium hydroxide solution <i>Tambah larutan natrium hidroksida sehingga berlebihan.</i>	A white precipitate which dissolve in excess sodium hydroxide solution is formed. <i>Mendakan putih yang larut di dalam larutan natrium hidroksida berlebihan terbentuk</i>
II	Heating of solid salt X <i>Pemanasan pepejal garam X</i>	A brown gas release and a residue that is brown when hot and yellow when cooled is formed. <i>Gas perang dibebaskan dan baki berwarna perang semasa panas dan kuning semasa sejuk terhasil.</i>

Table 5
Rajah 5

What is salt X?
Apakah garam X?

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

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- 45 Diagram 15 shows a pack of Epsom Salt which is used as a laxative.
Rajah 15 menunjukkan sebungkus Garam Epsom yang digunakan sebagai pelarvas.

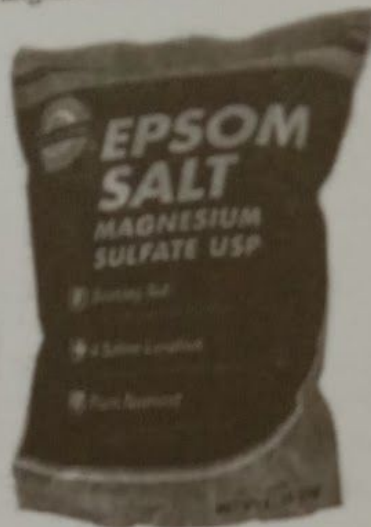


Diagram 15
Rajah 15

Which substances cannot be used to prepare Epsom Salt?
Bahan manakah yang tidak boleh digunakan untuk menyediakan Garam Epsom?

- A Magnesium chloride with dilute sulphuric acid
Magnesium klorida dengan asid sulfurik cair
- B Magnesium oxide with dilute sulphuric acid
Magnesium oksida dengan asid sulfurik cair
- C Magnesium carbonate with dilute sulphuric acid
Magnesium karbonat dengan asid sulfurik cair
- D Magnesium metal with dilute sulphuric acid
Logam magnesium dengan asid sulfurik cair

- 46 Diagram 16 shows a graph of concentration of sodium thiosulphate solution against time. The curve X was obtained when sodium thiosulphate solution of different concentrations react with 5 cm^3 of 2.0 mol dm^{-3} hydrochloric acid at $30.0 \text{ }^\circ\text{C}$. The experiment are repeated at temperature of $10.0 \text{ }^\circ\text{C}$, $20.0 \text{ }^\circ\text{C}$, $40.0 \text{ }^\circ\text{C}$ and $50.0 \text{ }^\circ\text{C}$.

Which curve corresponds to the experiment carry out at $20.0 \text{ }^\circ\text{C}$?

Rajah 16 menunjukkan graf kepekatan larutan natrium tiosulfat melawan masa. Lengkung X diperolehi daripada tindak balas antara larutan natrium tiosulfat yang berlainan kepekatan dengan 5 cm^3 asid hidroklorik 2.0 mol dm^{-3} pada suhu $30.0 \text{ }^\circ\text{C}$. Eksperimen diulang menggunakan larutan asid hidroklorik pada suhu $10.0 \text{ }^\circ\text{C}$, $20.0 \text{ }^\circ\text{C}$, $40.0 \text{ }^\circ\text{C}$ dan $50.0 \text{ }^\circ\text{C}$.

Lengkung manakah yang akan mewakili eksperimen yang dijalankan pada suhu $20.0 \text{ }^\circ\text{C}$?

Concentration of sodium thiosulphate solution (mol dm^{-3})

Kepekatan larutan natrium tiosulfat (mol dm^{-3})

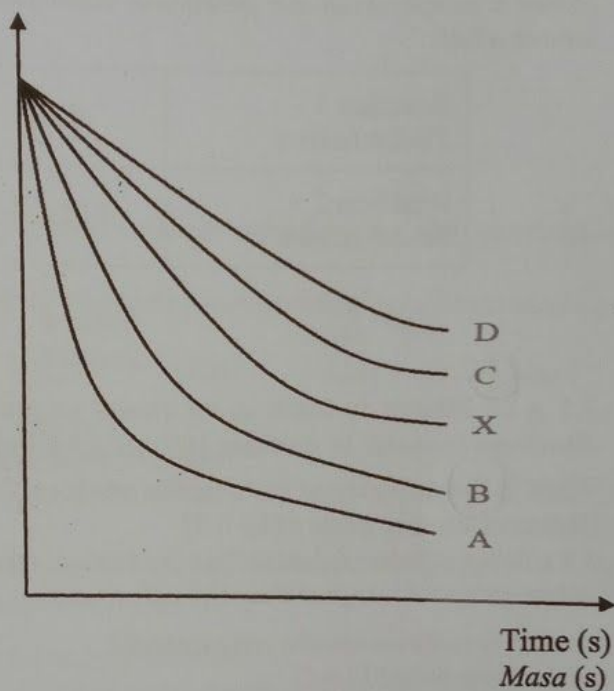


Diagram 16
Rajah 16

- 47 A student adds magnesium ribbon into four different solutions. Which solution produce the highest rate of reaction?
Seorang pelajar memasukkan pita magnesium ke dalam empat larutan berbeza. Larutan manakah menghasilkan kadar tindak balas yang paling tinggi?

- A 100 cm³ of 2.0 mol dm⁻³ CH₃COOH
 B 100 cm³ of 2.0 mol dm⁻³ HCl
 C 100 cm³ of 2.0 mol dm⁻³ H₂SO₄
 D 100 cm³ of 2.0 mol dm⁻³ H₃PO₄

- 48 Table 6 shows two chemical equations involved in preparation of an alkaline solution.

Jadual 6 menunjukkan dua persamaan kimia yang terlibat dalam penyediaan suatu larutan alkali.

Reaction 1 <i>Tindak balas 1</i>	$4\text{Li} + \text{O}_2 \rightarrow 2\text{Li}_2\text{O}$
Reaction 2 <i>Tindak balas 2</i>	$\text{Li}_2\text{O} + \text{H}_2\text{O} \rightarrow 2\text{LiOH}$

Table 6
Jadual 6

3.5 g of lithium is burnt in an excess oxygen. The metal oxide produced is dissolved in water to produce 100 cm³ of solution.

What is the molarity of the solution produced?

[Relative atomic mass of Li = 7]

3.5 g litium dibakar dalam oksigen berlebihan. Oksida logam yang terhasil dilarutkan dalam air untuk menghasilkan 100 cm³ larutan.

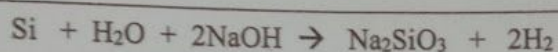
Apakah kemolaran larutan yang terhasil?

[*Jisim atom relatif* Li = 7]

- A 2.500 mol dm⁻³
 B 5.000 mol dm⁻³
 C 0.005 mol dm⁻³
 D 0.025 mol dm⁻³

- 49 Sodium silicate is an inorganic salt that is widely used in cosmetic and skincare products. The following chemical equation shows the reaction for the formation of sodium silicate.

Natrium silikat ialah garam tak organik yang digunakan secara meluas dalam produk kosmetik dan penjagaan kulit. Persamaan kimia berikut menunjukkan tindak balas pembentukan natrium silikat.

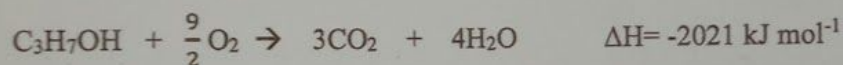


What is the change in oxidation number of silicon?

Apakah perubahan nombor pengoksidaan silikon?

- A 0 to +2
B 0 to +4
C +2 to +4
D +2 to -2
- 50 The following shows the thermochemical equation for the combustion of propanol.

Berikut menunjukkan persamaan termokimia untuk tindak balas pembakaran propanol.



1.68 g of propanol is burnt in excess oxygen.

What is the maximum temperature of the 500 cm³ of water if the initial temperature is 30.0 °C?

[Molar mass of propanol = 60 g mol⁻¹, Density of water = 1 g cm⁻³,
Specific heat capacity of water = 4.2 J g⁻¹ °C⁻¹]

1.68 g propanol dibakar dalam oksigen berlebihan.

Apakah suhu maksimum 500 cm³ air jika suhu awalnya ialah 30.0 °C?

*[Jisim molar propanol = 60 g mol⁻¹, Ketumpatan air = 1 g cm⁻³,
Muatan haba tentu air = 4.2 Jg⁻¹ °C⁻¹]*

- A 19.0 °C
B 27.0 °C
C 49.0 °C
D 57.0 °C

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INFORMATION FOR CANDIDATES
MAKLUMAT UNTUK CALON

1. This question paper consists of 50 questions.
Kertas soalan ini mengandungi 50 soalan.
2. Answer **all** questions.
Jawab semua soalan
3. Each question is followed by four alternative answers **A, B, C** and **D**. For each question, choose **one** answer only. Blacken your answer on the objective answer sheet provided.
*Tiap-tiap soalan di ikuti oleh empat pilihan jawapan, iaitu **A, B, C** dan **D**. Bagi setiap soalan, pilih **satu** jawapan sahaja. Hitamkan jawapan anda pada kertas jawapan objektif yang disediakan.*
4. If you wish to change your answer, erase the blackened mark that you have made. Then blacken the new answer.
Sekiranya anda hendak menukar jawapan, padamkan tanda yang telah dibuat. Kemudian hitamkan jawapan yang baru.
5. The diagrams in the questions provided are not drawn to scale unless stated.
Rajah yang mengiringi soalan tidak dilukiskan mengikut skala kecuali dinyatakan.
6. You may use a scientific calculator.
Anda dibenarkan menggunakan kalkulator saintifik.