

Kimia
Kertas 1
Ogos
2025
1 ¼ jam



MAKTAB RENDAH SAINS MARA

PEPERIKSAAN AKHIR SIJIL PENDIDIKAN MRSMA 2025

KIMIA
aDin
Kertas 1

Satu jam lima belas minit

JANGAN BUKA KERTAS PEPERIKSAAN INI SEHINGGA DIBERITAHU

1. *Kertas peperiksaan ini mengandungi 40 soalan.*
2. *Jawab semua soalan.*
3. *Bagi setiap soalan, pilih satu jawapan sahaja. Hitamkan jawapan anda pada kertas jawapan objektif yang disediakan.*
4. *Kertas soalan ini adalah dalam dwibahasa.*
5. **Kertas jawapan objektif** hendaklah diserahkan kepada pengawas peperiksaan pada akhir peperiksaan.

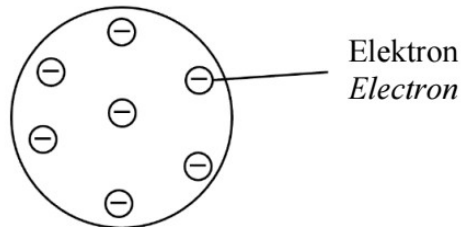
Kertas peperiksaan ini mengandungi 34 halaman bercetak dan 2 halaman tidak bercetak.

HALAMAN KOSONG

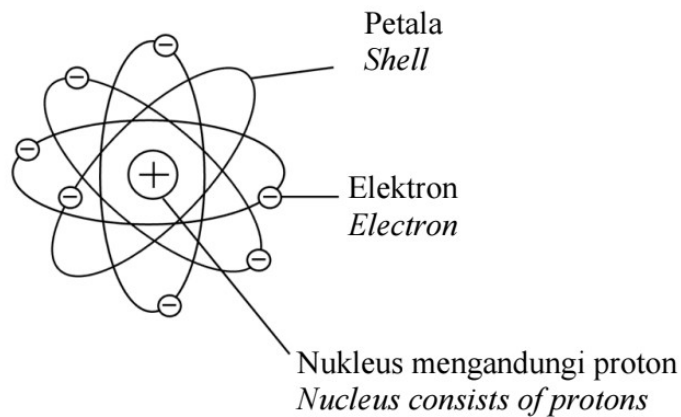
- 1 Antara berikut, yang manakah model struktur atom yang diperkenalkan oleh James Chadwick?

Which of the following atomic structure model was introduced by James Chadwick?

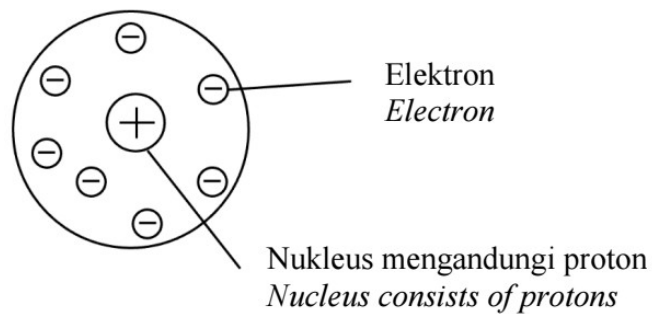
A



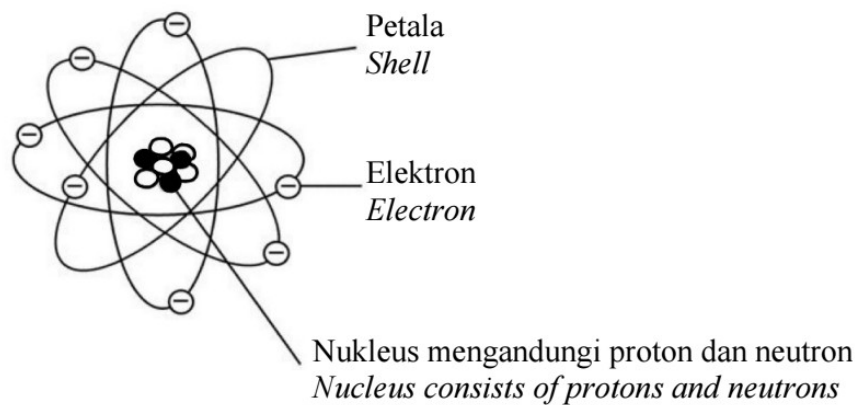
B



C



D



- 2 Antara pernyataan berikut, yang manakah benar bagi 0.5 mol gas oksigen?
Which of the following statement is true for 0.5 mol of oxygen gas?

[Jisim atom relatif: O = 16]
[Relative atomic mass: O = 16]

[Pemalar Avogadro = $6.02 \times 10^{23} \text{ mol}^{-1}$]
[Avogadro constant = $6.02 \times 10^{23} \text{ mol}^{-1}$]

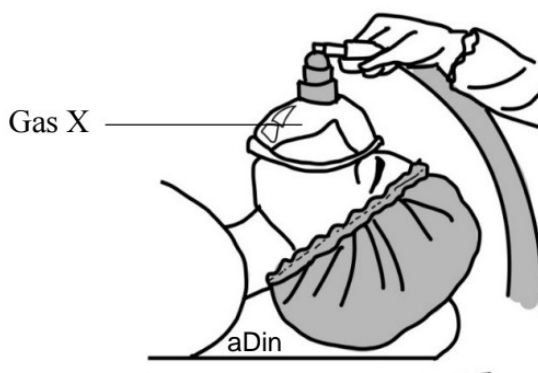
[Isi padu molar gas pada keadaan bilik = $24 \text{ dm}^3 \text{ mol}^{-1}$]
[Molar volume of gas at room conditions = $24 \text{ dm}^3 \text{ mol}^{-1}$]

[Relative atomic mass: O = 16]

[Avogadro constant = $6.02 \times 10^{23} \text{ mol}^{-1}$]

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

- A Jisim molekul relatif ialah 16
Relative molecular mass is 16
- B Bilangan molekul adalah 6.02×10^{23}
The number of molecule is 6.02×10^{23}
- C Menempati isipadu 24 cm^3 pada keadaan bilik
Occupies a volume of 24 cm^3 at room condition
- D Mempunyai bilangan atom yang sama dengan satu mol gas helium
The number of atom is same as one mole of helium
- 3 Rajah 1 menunjukkan gas X diberikan kepada seorang pesakit sebagai ubat bius.
Diagram 1 shows gas X given to a patient as an anesthesia.



Rajah 1
Diagram 1

Apakah gas X?
What is gas X?

- A Neon
Neon
- B Helium
Helium
- C Radon
Radon
- D Xenon
Xenon

- 4 Mengapakah kereaktifan unsur-unsur dalam Kumpulan 1 bertambah apabila menuruni kumpulan?

Why the reactivity of elements in Group 1 increases when going down the group?

- A Takat didih berkurang
The boiling point decreases
- B Ketumpatan unsur bertambah
Density of element increases
- C Bilangan elektron bertambah
The number of electrons increase
- D Daya tarikan nukleus terhadap elektron valens semakin lemah
The attraction force of nucleus towards valence electron becomes weaker

- 5 Antara berikut, yang manakah menunjukkan struktur Lewis bagi molekul hidrogen klorida?

Which of the following shows the Lewis structure of hydrogen chloride molecule?

[Nombor proton, H = 1, Cl = 17]

[Proton number, H = 1, Cl = 17]

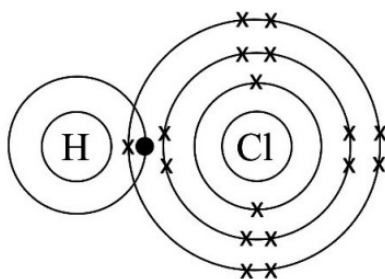
A



B



C



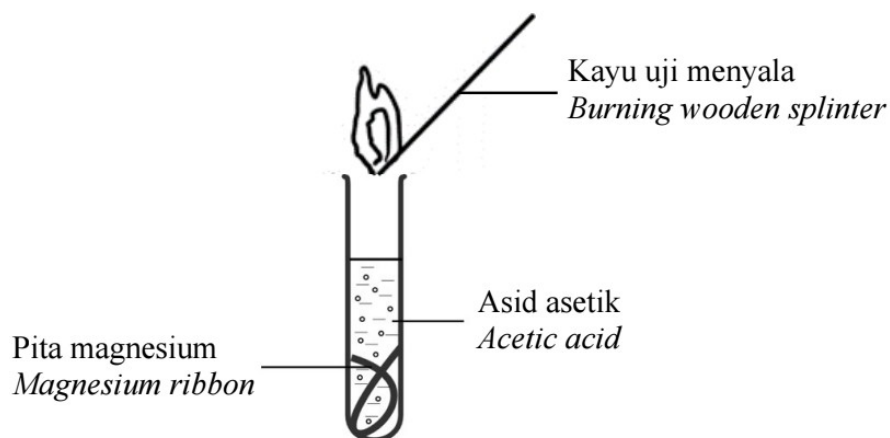
- 6 Antara berikut, bahan manakah boleh menghkonduksikan elektrik pada suhu bilik?

Which of the following substances can conduct electricity at room temperature?

- A Kuprum
Copper
- B Glukosa
Glucose
- C Silikon dioksida
Silicon dioxide
- D Natrium klorida
Sodium chloride

- 7 Rajah 2 menunjukkan ujian gas bagi satu tindak balas.

Diagram 2 shows a gas test for a reaction.



Rajah 2
Diagram 2

Apakah gas yang terhasil?

What is the gas produced?

- A Klorin
Chlorine
- B Oksigen
Oxygen
- C Hidrogen
Hydrogen
- D Karbon dioksida
Carbon dioxide

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



Apakah perubahan yang boleh diperhatikan dan diukur bagi tindak balas tersebut?

What is the observable and measurable changes for the reaction?

- A Pembentukan mendakan sulfur
Formation of sulphur precipitate
- B Pengurangan kepekatan asid hidroklorik
Decrease in concentration of hydrochloric acid
- C Penambahan jisim natrium tiosulfat
Increase in the mass of sodium thiosulphate
- D Pengurangan isipadu gas sulfur dioksida
Decrease in the volume of sulphur dioxide
- 9 Rajah 3 menunjukkan peralatan yang diperbuat daripada sejenis aloi.
Diagram 3 shows equipments made from an alloy.



Rajah 3
Diagram 3

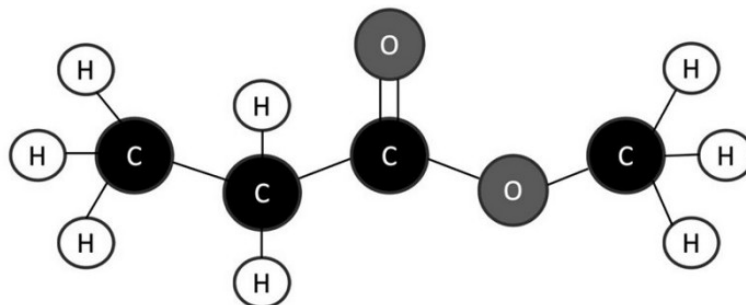
Antara berikut, padanan manakah yang betul tentang aloi tersebut?
Which of the following is the correct match about the alloy?

	Komponen utama <i>Main component</i>	Atom asing <i>Foreign atom</i>
A	Kuprum <i>Copper</i>	Stanum <i>Tin</i>
B	Ferum <i>Iron</i>	Kromium, nikel dan karbon <i>Chromium, nickel and carbon</i>
C	Stanum <i>Tin</i>	Antimoni dan kuprum <i>Antimony and copper</i>
D	Aluminium <i>Aluminium</i>	Kuprum, magnesium dan mangan <i>Copper, magnesium and manganese</i>

[lihat halaman sebelah
SULIT

- 10 Antara berikut, yang manakah betul tentang tindak balas pengoksidaan?
Which of the following is true about oxidation reaction?
- A Menerima elektron
Gain of electrons
 - B Kehilangan oksigen
Loss of oxygen
 - C Penambahan hidrogen
Gain of hydrogen
 - D Nombor pengoksidaan bertambah
Oxidation number increases
- 11 Antara berikut, pernyataan manakah benar tentang proses peretakan petroleum?
Which of the following statement is correct about petroleum cracking process?
- A Menggunakan mangkin
Use catalyst
 - B Berlaku pada suhu dan tekanan rendah
Occurs at low temperature and pressure
 - C Digunakan untuk menghasilkan hidrokarbon berantai panjang
Use to produce long chain hydrocarbon
 - D Pengasingan sebatian petroleum berdasarkan perbezaan takat didih
Separation of petroleum compounds is based on difference in boiling point

- 12 Rajah 4 menunjukkan formula struktur suatu sebatian.
Diagram 4 shows a structural formula of a compound.



Rajah 4
Diagram 4

Apakah siri homolog bagi sebatian tersebut?
What is the homologous series of the compound?

- A Ester
Ester
- B Alkena
Alkene
- C Alkohol
Alcohol
- D Asid karboksilik
Carboxylic acid
- 13 Antara yang berikut, bahan manakah yang menyerap haba apabila dilarutkan di dalam air?
Which of the following substances absorb heat when dissolves in water?
- A Asid sulfurik
Sulphuric acid
- B Kalium hidroksida
Potassium hydroxide
- C Natrium tiosulfat
Sodium thiosulphate
- D Kalsium oksida
Calcium oxide

- 14 Antara berikut, manakah yang betul tentang polimer semula jadi?
Which of the following is true about natural polymer?

	Monomer <i>Monomer</i>	Polimer <i>Polymer</i>
A	Sukrosa <i>Sucrose</i>	Kanji <i>Starch</i>
B	Glukosa <i>Glucose</i>	Selulosa <i>Cellulose</i>
C	Isoprena <i>Isoprene</i>	Protein <i>Protein</i>
D	Asid amino <i>Amino acid</i>	Getah asli <i>Natural rubber</i>

- 15 Apakah kesan sampingan *betamethasone valerate* dalam kosmetik?
What is the side effect of betamethasone valerate used in cosmetics?

- A Menyebabkan kerosakan buah pinggang dan sistem saraf
Causes damage to the kidneys and nervous system
- B Kulit menjadi hipersensitif
Hypersensitive skin
- C Kulit kemerahan dan mengelupas
Redness and peeling skin
- D Kulit merengsa dan perubahan pigmentasi kulit
Skin irritation and changes to skin pigmentation

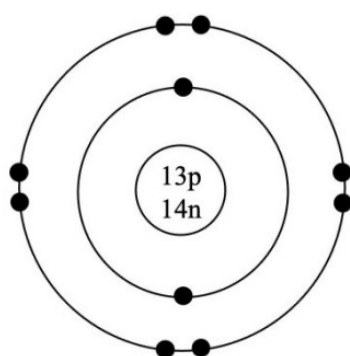
- 16 Berikut adalah maklumat bagi unsur Z.
The information for element Z is as follows.

- Susunan elektron bagi ion Z^{3+} ialah 2.8
Electron arrangement of Z^{3+} ion is 2.8
- Nombor nukleon atom Z adalah 27
Nucleon number of atom Z is 27

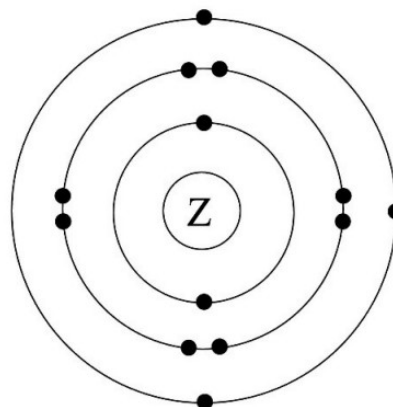
Berdasarkan maklumat di atas, yang manakah merupakan struktur atom unsur Z?

Based on the information, which is the atomic structure for element Z?

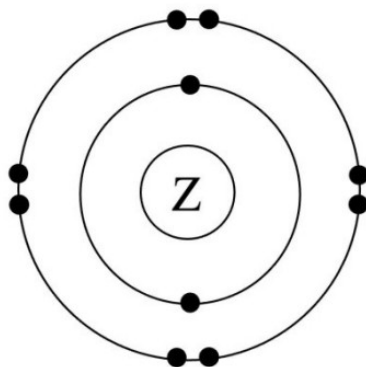
A



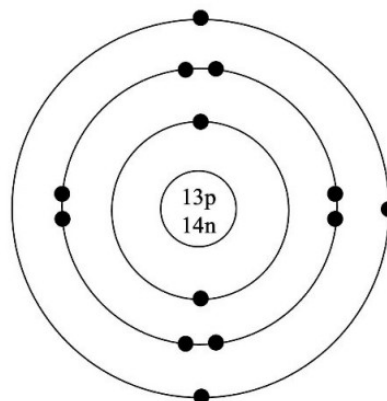
C



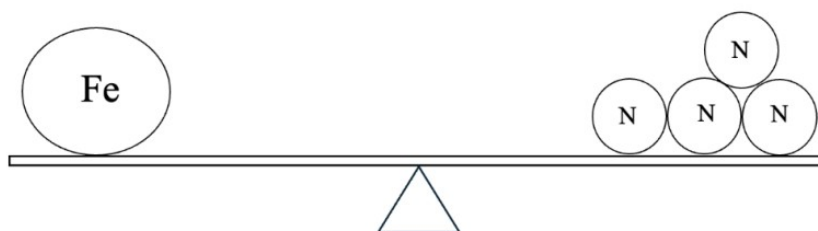
B



D



- 17 Rajah 5 menunjukkan perbandingan jisim atom ferum dengan atom nitrogen.
Diagram 5 shows comparison of mass between iron atom with nitrogen atom.



Rajah 5
Diagram 5

Antara berikut, manakah yang dapat menggantikan atom nitrogen, N?
Which of the following can replace nitrogen, N atom?

[Jisim atom relatif: Li = 7, N = 14, Mg = 24, Si = 28, S = 32]

[Relative atomic mass: Li = 7, N = 14, Mg = 24, Si = 28, S = 32]

- I 2 atom silikon
2 silicon atoms
 - II 3 atom magnesium
3 magnesium atoms
 - III 4 atom sulfur
4 sulphur atoms
 - IV 8 atom litium
8 lithium atoms
-
- A I dan II
I and II
 - B I dan IV
I and IV
 - C II dan III
II and III
 - D III dan IV
III and IV

- 18 Rajah 6 menunjukkan sebahagian daripada Jadual Berkala Unsur yang terdiri daripada unsur P, Q, R, S dan T.

Diagram 6 shows part of the Periodic Table of Elements consisting element P, Q, R, S and T.

P																	Q
R												S				T	

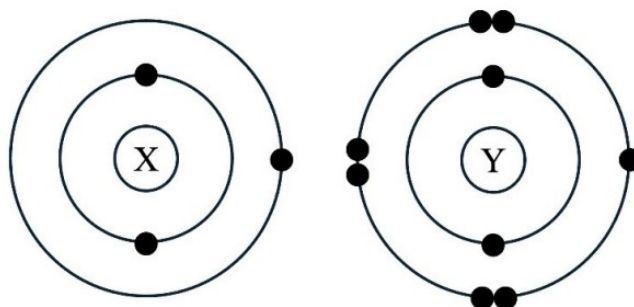
Rajah 6
Diagram 6

Berdasarkan Rajah 6, apakah susunan saiz atom mengikut tertib menaik bagi unsur P, Q, R, S dan T?

Based on Diagram 6, what is the arrangement of atomic size in ascending order for elements P, Q, R, S and T?

- A Q, P, T, S, R
B R, S, T, P, Q
C P, Q, R, S, T
D T, S, R, Q, P

- 19 Rajah 7 menunjukkan susunan elektron bagi atom X dan Y.
Diagram 7 shows the electron arrangement of atom X and Y.



Rajah 7
Diagram 7

Atom X dan Y bergabung untuk membentuk satu sebatian.
 Apakah jenis ikatan dan formula kimia sebatian itu?

Atom X and Y combine to form a compound.
What is the type of bond and chemical formula of the compound?

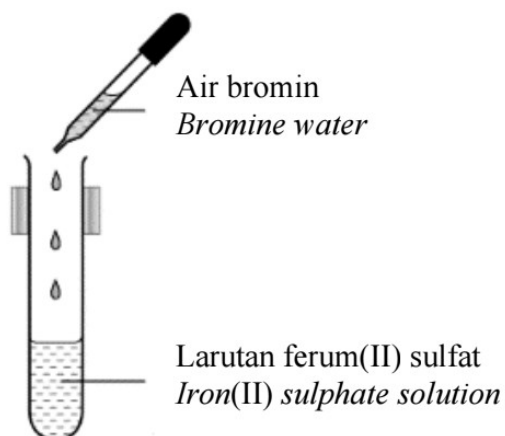
	Jenis ikatan <i>Type of bond</i>	Formula Kimia <i>Chemical Formula</i>
A	Ion <i>Ionic</i>	XY
B	Ion <i>Ionic</i>	XY ₂
C	Kovalen <i>Covalent</i>	XY ₂
D	Kovalen <i>Covalent</i>	XY

- 20 Ubat gigi boleh digunakan untuk merawat gigitan semut.
Apakah salah satu bahan kimia yang terdapat dalam gigitan semut tersebut?

Toothpaste can be used to treat ant bite.

What is one of the chemical substance that can be found in the ant bite?

- A Asid sulfurik
Sulphuric acid
 - B Natrium nitrat
Sodium nitrate
 - C Asid metanoik
Methanoic acid
 - D Natrium hidroksida
Sodium hydroxide
- 21 Rajah 8 menunjukkan eksperimen yang dijalankan oleh seorang pelajar.
Diagram 8 shows an experiment conducted by a student.



Rajah 8
Diagram 8

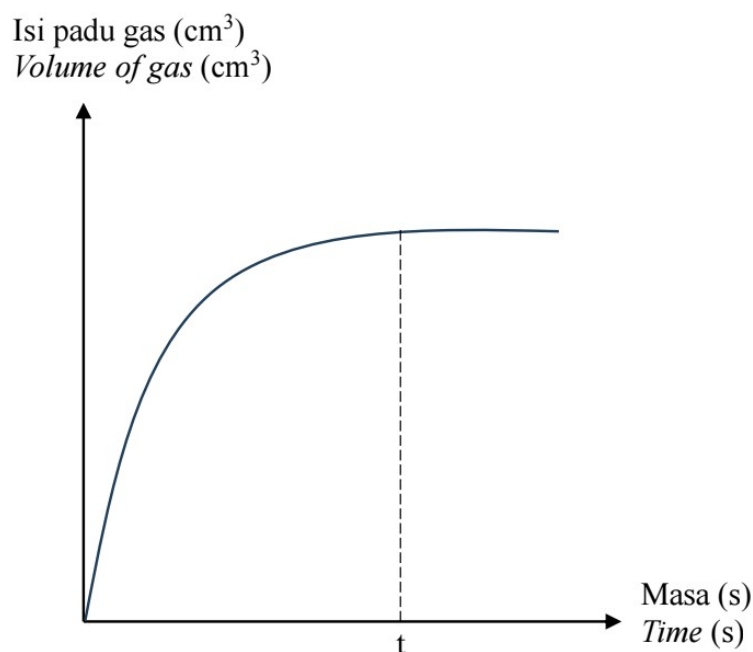
Apakah pemerhatian bagi eksperimen tersebut?
What is the observation for the experiment?

- A Larutan hijau berubah menjadi perang
Green solution turns brown
- B Tiada perubahan yang berlaku
No changes occur
- C Larutan perang berubah menjadi hijau
Brown solution turns green
- D Larutan tanpa warna menjadi perang
Colourless solution turns brown

- 22 Rajah 9 menunjukkan graf bagi tindak balas antara serbuk zink berlebihan dengan asid sulfurik cair.
Kadar tindak balas pada masa t adalah sifar.

Diagram 9 shows the graph for the reaction between excess zinc powder with dilute sulphuric acid.

The rate of reaction at time t is zero.



Rajah 9
Diagram 9

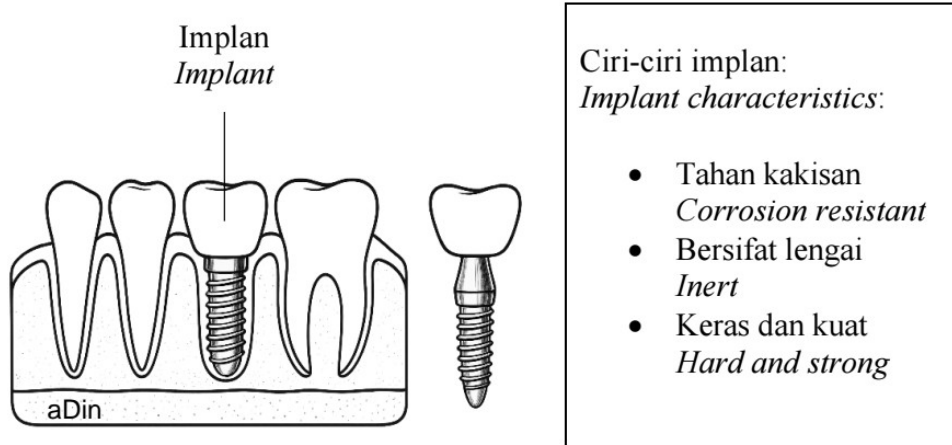
Antara berikut, yang manakah menerangkan kadar tindak balas pada masa t ?

Which of the following explains the rate of reaction at time t ?

- A Masa tindak balas bertambah
Time taken for reaction increases
- B Semua asid telah bertindak balas
All acid has reacted
- C Isi padu gas tidak berubah
Volume of gas remains constant
- D Semua serbuk zink telah bertindak balas
All zinc powder has reacted

- 23 Rajah 10 menunjukkan sejenis implan pergigian yang digunakan untuk menggantikan gigi yang hilang beserta ciri-ciri implan tersebut.

Diagram 10 shows a dental implant used to replace missing teeth along with the characteristics of the implant.



Rajah 10
Diagram 10

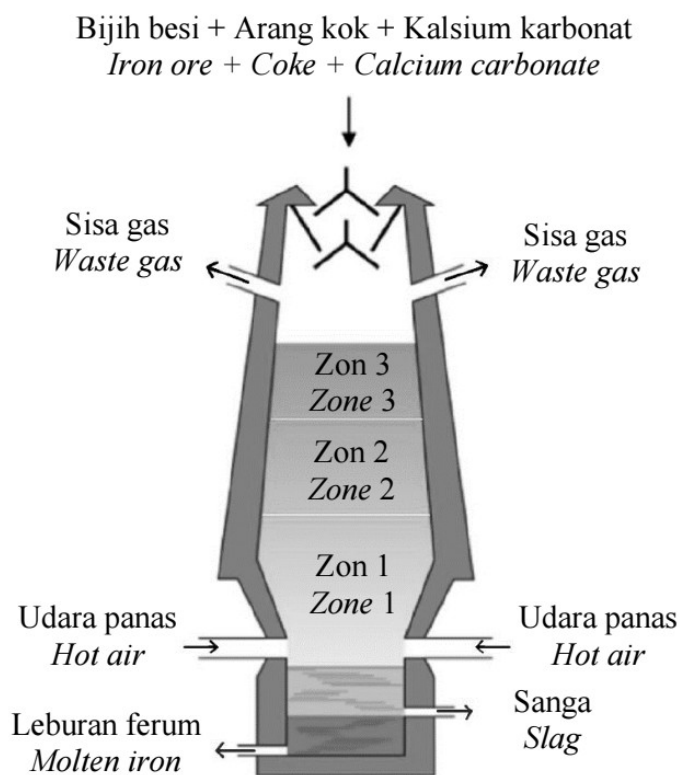
Antara berikut, manakah seramik paling sesuai digunakan untuk membuat implan seperti dalam Rajah 10?

Which of the following ceramic is the most suitable to produce an implant as in Diagram 10?

- A Silikon karbida
Silicon carbide
- B Alumina
Alumina
- C Zirkonia
Zirconia
- D Titanium karbida
Titanium carbide

- 24 Rajah 11 menunjukkan relau bagas yang digunakan dalam pengekstrakan besi dari bijihnya melalui penurunan oleh karbon.

Diagram 11 shows a blast furnace used in the extraction of iron from its ore through reduction by carbon.



Rajah 11
Diagram 11

Persamaan kimia berikut menunjukkan salah satu tindak balas dalam relau bagas tersebut.

The following chemical equation shows one of the reactions in the blast furnace.



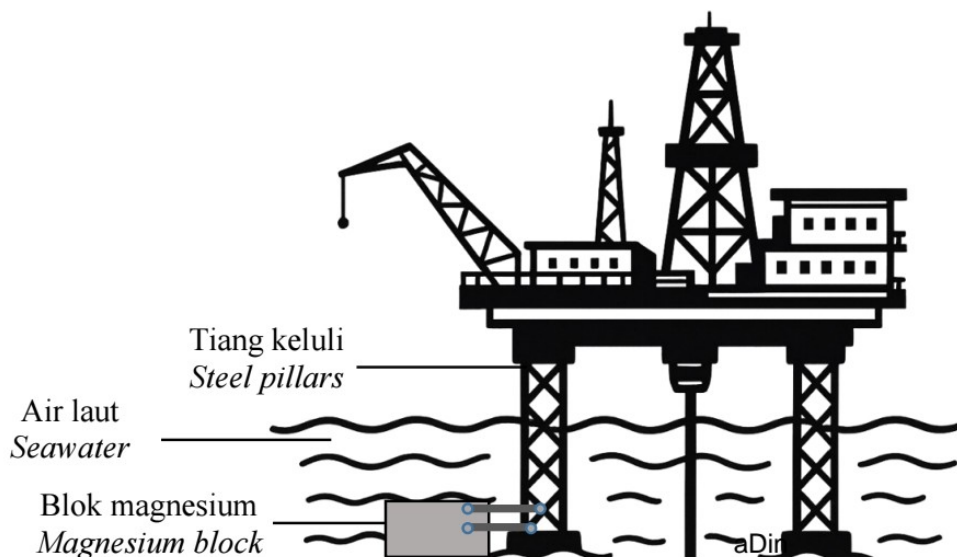
Pada zon manakah tindak balas tersebut berlaku?

Which zone does the reaction occurs?

- A Zon 1
Zone 1
- B Zon 2
Zone 2
- C Zon 3
Zone 3

- 25 Rajah 12 menunjukkan penggunaan blok magnesium pada tiang keluli pelantar minyak untuk mengelakkan pengkaratan.

Diagram 12 shows the use of magnesium blocks on the steel pillars of an oil rig to prevent rusting.



Rajah 12
Diagram 12

Bagaimanakah blok magnesium melindungi tiang keluli pelantar minyak daripada berkarat?

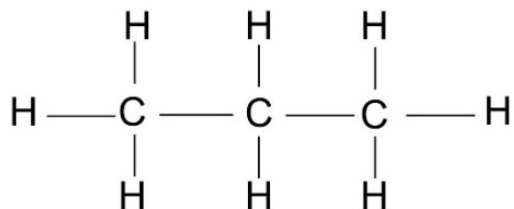
How the magnesium block protects the steel pillars of an oil rig from rusting?

- A Blok magnesium lebih mudah mengalami tindak balas pengoksidaan
Magnesium block is easier to undergo oxidation reaction
- B Blok magnesium lebih mudah bertindak balas dengan tiang keluli
Magnesium block is easier to react with steel pillars
- C Blok magnesium merupakan agen pengoksidaan
Magnesium block is an oxidising agent
- D Blok magnesium menghalang tiang keluli dari bersentuh dengan air dan oksigen
Magnesium block prevents the steel pillars from in contact with water and oxygen

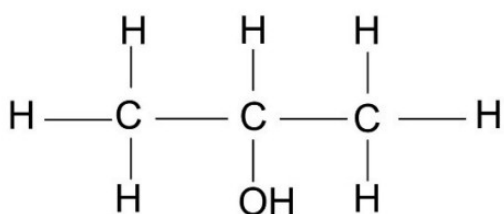
- 26 Antara berikut, manakah hasil yang terbentuk apabila gas propena bertindak balas dengan stim?

What is the product formed when propene gas reacts with steam?

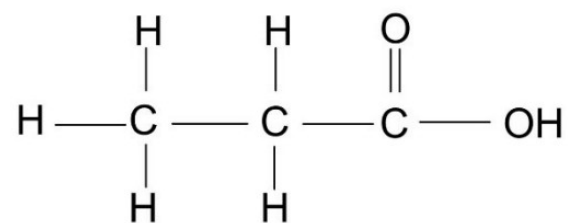
A



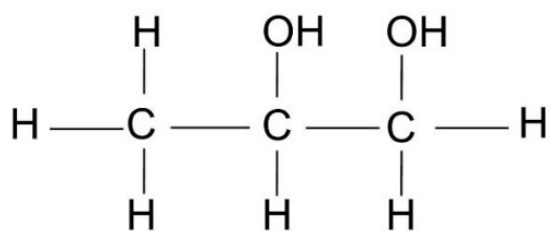
B



C

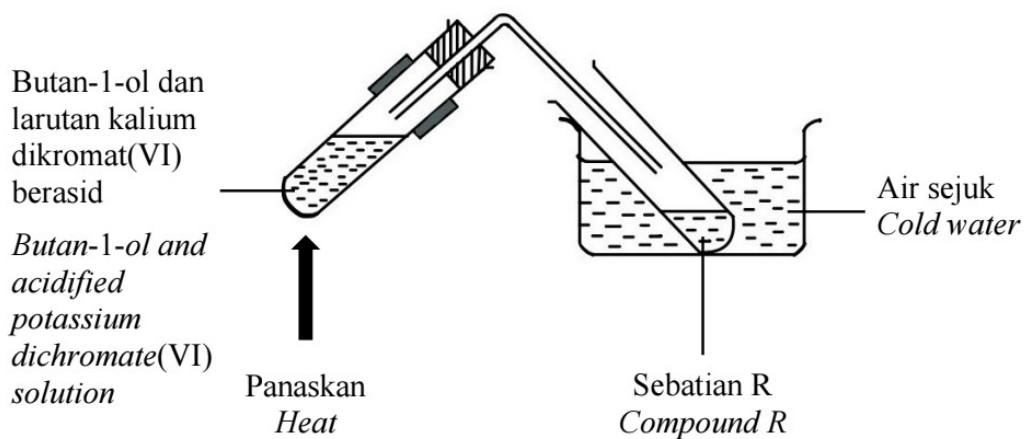


D



- 27 Rajah 13 menunjukkan susunan radas bagi tindak balas antara butan-1-ol dengan larutan kalium dikromat(VI) berasid bagi menghasilkan sebatian R.

Diagram 13 shows the apparatus set-up for the reaction between butan-1-ol and acidified potassium dichromate(VI) solution to produce compound R.



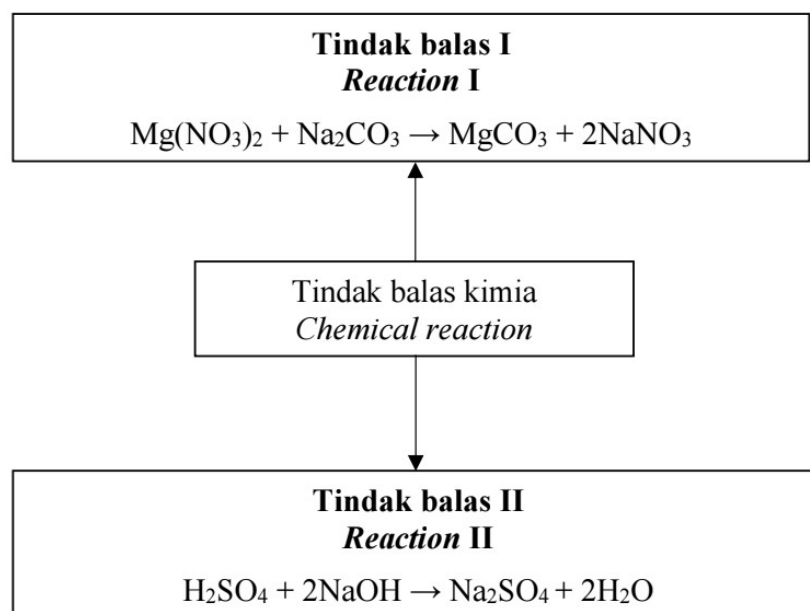
Rajah 13
Diagram 13

Apakah formula molekul bagi sebatian R?

What is the molecular formula for compound R?

- A $\text{C}_4\text{H}_9\text{OH}$
- B $\text{C}_4\text{H}_8(\text{OH})_2$
- C $\text{C}_3\text{H}_7\text{COOH}$
- D $\text{C}_4\text{H}_9\text{COOH}$

- 28 Rajah 14 menunjukkan dua tindak balas kimia.
Diagram 14 shows two chemical reactions.

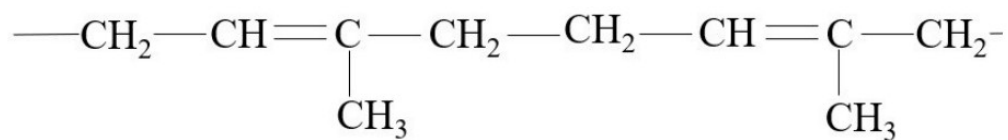


Rajah 14
Diagram 14

Antara berikut, yang manakah betul tentang tindak balas I dan tindak balas II?
Which of the following is correct about reaction I and reaction II?

	Tindak balas I Reaction I	Tindak balas II Reaction II
A	Membebaskan haba ke persekitaran <i>Releases heat to surrounding</i>	Menyerap haba dari persekitaran <i>Absorbs heat from surrounding</i>
B	Bekas menjadi panas <i>Container becomes hot</i>	Bekas menjadi sejuk <i>Container becomes cold</i>
C	Jumlah kandungan tenaga bahan tindak balas lebih rendah daripada hasil tindak balas <i>Total energy content of reactant is lower than product</i>	Jumlah kandungan tenaga bahan tindak balas lebih tinggi daripada hasil tindak balas <i>Total energy content of reactant is higher than product</i>
D	Suhu persekitaran meningkat <i>Temperature of surrounding increases</i>	Suhu persekitaran menurun <i>Temperature of surrounding decreases</i>

- 29 Rajah 15 menunjukkan struktur bagi suatu polimer.
Diagram 15 shows structure of a polymer.

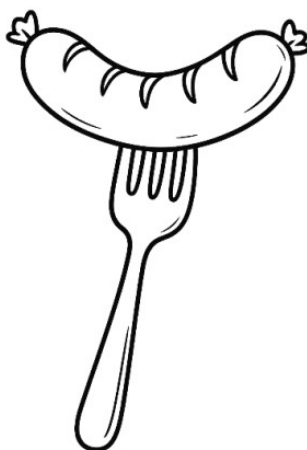


Rajah 15
Diagram 15

Antara yang berikut, manakah monomer bagi polimer tersebut?
Which of the following is the monomer for this polymer?

- A $\text{CH}_3\text{---CH}=\text{CH---CH}_3$
- B $\text{CH}_2=\text{CH---}\underset{\text{CH}_3}{\text{C}}=\text{CH}_2$
- C $\text{CH}_3\text{---CH}=\underset{\text{CH}_3}{\text{C}}\text{---CH}_3$
- D $\text{CH}_3\text{---}\underset{\text{CH}_3}{\text{C}}=\text{CH}_2$

- 30 Rajah 16 menunjukkan sejenis makanan yang mengandungi bahan tambah X.
Diagram 16 shows a type of food containing additives X.

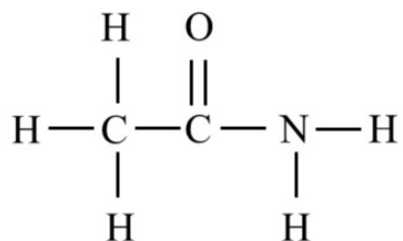


Rajah 16
Diagram 16

Antara berikut, pasangan manakah yang betul bagi bahan tambah X?
Which of the following pairs are correct about additive X?

	Bahan tambah X <i>Additive X</i>	Fungsi <i>Function</i>
A	Trifenil <i>Triphenyl</i>	Pewarna <i>Dyes</i>
B	Propil etanoat <i>Propyl ethanoate</i>	Perasa <i>Flavourings</i>
C	Natrium nitrit <i>Sodium nitrite</i>	Pengawet <i>Preservatives</i>
D	Asid askorbik <i>Ascorbic acid</i>	Pengantioksida <i>Antioxidants</i>

- 31 Rajah 17 menunjukkan formula struktur bagi molekul asetamida.
Diagram 17 shows the structural formula for acetamide molecule.



Rajah 17
Diagram 17

Berapakah bilangan atom karbon di dalam 14.75 g asetamida?
What is the number of carbon atoms in 14.75 g acetamide?

[Jisim atom relatif: H = 1, C = 12, N = 14, O = 16]

[Pemalar Avogadro = $6.02 \times 10^{23} \text{ mol}^{-1}$]

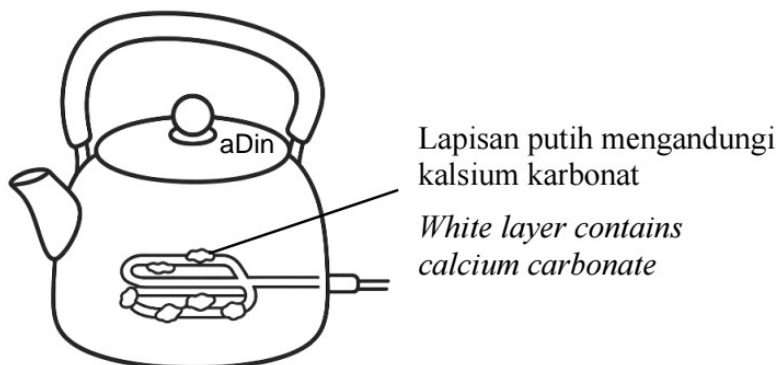
[Relative atomic mass: H = 1, C = 12, N = 14, O = 16]

[Avogadro constant = $6.02 \times 10^{23} \text{ mol}^{-1}$]

- A 1.5×10^{23}
- B 3.0×10^{23}
- C 1.2×10^{24}
- D 1.4×10^{24}

- 32 Rajah 18 menunjukkan cerek elektrik yang sering digunakan oleh Ali. Selepas beberapa tahun, didapati terdapat lapisan putih terbentuk pada lingkaran pemanas dalam cerek elektrik tersebut.

Diagram 18 shows an electric kettle that is frequently used by Ali. After several years, a white layer formed on the heating coil inside the electric kettle.



Rajah 18
Diagram 18

Apakah bahan yang Ali boleh gunakan untuk membuang lapisan putih itu?
What are the substance that Ali can use to remove the white layer?

- I Cuka
Vinegar
 - II Serbuk penaik
Baking powder
 - III Sabun
Soap
 - IV Lemon
Lemon
-
- A I dan II
I and II
 - B I dan IV
I and IV
 - C II dan III
II and III
 - D III dan IV
III and IV

- 33** Jadual 1 menunjukkan maklumat bagi unsur L dan M.
Table 1 shows the information for element L and M.

Unsur L <i>Element L</i>	Unsur M <i>Element M</i>
Kala 3 <i>Period 3</i>	Kala 2 <i>Period 2</i>
Kumpulan 2 <i>Group 2</i>	Kumpulan 16 <i>Group 16</i>

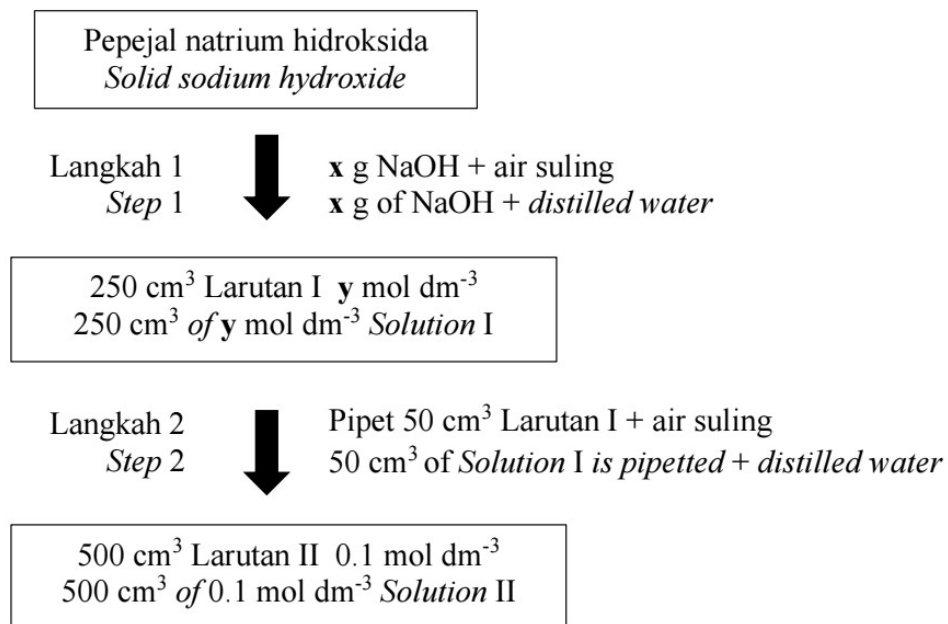
Jadual 1
Table 1

Antara berikut, manakah yang mewakili persamaan kimia bagi tindak balas antara unsur L dan M?

Which of the following represent chemical equation for the reaction between element L and M?

- A** $L + M \rightarrow LM$
B $L + 2M \rightarrow LM_2$
C $L_2 + M \rightarrow L_2M$
D $2L + M_2 \rightarrow 2LM$

- 34** Rajah 19 menunjukkan langkah-langkah penyediaan 500 cm^3 Larutan II, 0.1 mol dm^{-3} daripada Larutan I melalui kaedah pencairan.
Diagram 19 shows steps to prepare 500 cm^3 of 0.1 mol dm^{-3} Solution II from Solution I by dilution method.



Rajah 19
Diagram 19

Berapakah nilai x dan y ?
What is the value of x and y ?

[Jisim atom relatif: $\text{H} = 1$, $\text{O} = 16$, $\text{Na} = 23$]

[Relative atomic mass: $\text{H} = 1$, $\text{O} = 16$, $\text{Na} = 23$]

	x	y
A	2.0	0.2
B	8.0	0.8
C	10.0	1.0
D	44.0	4.0

- 35** Jadual 2 menunjukkan isi padu gas karbon dioksida, CO₂ yang terkumpul dalam tindak balas antara serbuk batu kapur dan asid hidroklorik cair.

Table 2 shows the volume of carbon dioxide, CO₂ gas collected in the reaction between limestone powder and dilute hydrochloric acid.

Masa (s) Time (s)	0	30	60	90	120	150	180	210	240
Isi padu gas CO ₂ (cm ³) Volume of CO ₂ gas (cm ³)	0.00	19.00	22.80	36.40	44.20	49.50	55.00	55.00	55.00

Jadual 2
Table 2

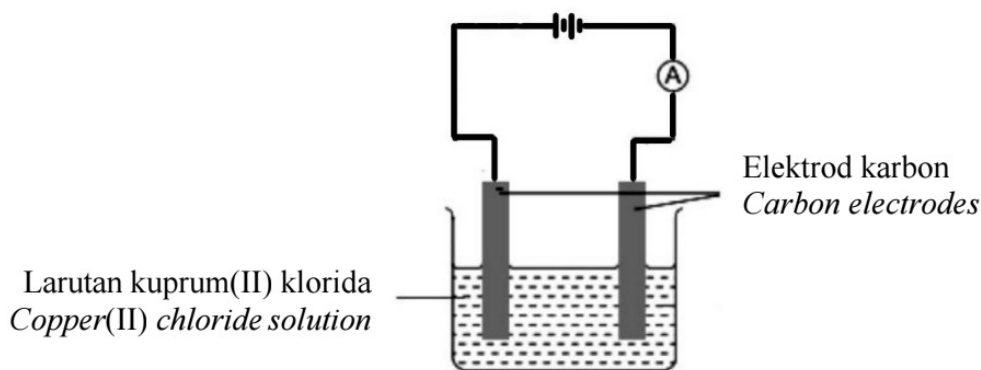
Apakah kadar tindak balas purata dalam minit kedua?

What is the average rate of reaction in the second minute?

- A** 0.260 cm³ s⁻¹
- B** 0.306 cm³ s⁻¹
- C** 0.357 cm³ s⁻¹
- D** 0.368 cm³ s⁻¹

- 36 Rajah 20 menunjukkan elektrolisis bagi larutan kuprum(II) klorida, CuCl_2 1.0 mol dm^{-3} .

Diagram 20 shows the electrolysis of 1.0 mol dm^{-3} copper(II) chloride, CuCl_2 solution.



Rajah 20
Diagram 20

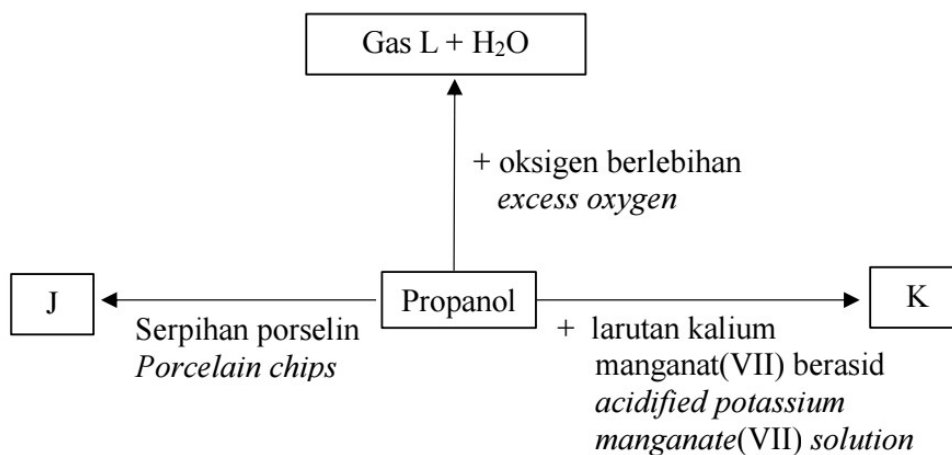
Diberi nilai keupayaan elektrod piawai:
Given the standard electrode potential value:

Tindak balas sel setengah <i>Half-cell equation</i>	E^0 / V (298K)
$2\text{H}^+ + 2\text{e}^- \rightleftharpoons \text{H}_2$	0.00
$\text{Cu}^{2+} + 2\text{e}^- \rightleftharpoons \text{Cu}$	+ 0.34
$\text{O}_2 + 2\text{H}_2\text{O} + 4\text{e}^- \rightleftharpoons 4\text{OH}^-$	+ 0.40
$\text{Cl}_2 + 2\text{e}^- \rightleftharpoons 2\text{Cl}^-$	+ 1.36

Apakah setengah persamaan bagi tindak balas di anod dan di katod?
What is the half equation for the reactions at anode and cathode?

	Anod <i>Anode</i>	Katod <i>Cathode</i>
A	$2\text{Cl}^- \rightarrow \text{Cl}_2 + 2\text{e}^-$	$\text{Cu}^{2+} + 2\text{e}^- \rightarrow \text{Cu}$
B	$\text{Cl}_2 + 2\text{e}^- \rightarrow 2\text{Cl}^-$	$2\text{H}^+ + 2\text{e}^- \rightarrow \text{H}_2$
C	$\text{O}_2 + 2\text{H}_2\text{O} + 4\text{e}^- \rightarrow 4\text{OH}^-$	$\text{H}_2 \rightarrow 2\text{H}^+ + 2\text{e}^-$
D	$4\text{OH}^- \rightarrow \text{O}_2 + 2\text{H}_2\text{O} + 4\text{e}^-$	$\text{Cu}^{2+} + 2\text{e}^- \rightarrow \text{Cu}$

- 37 Rajah 21 menunjukkan beberapa tindak balas yang melibatkan propanol.
Diagram 21 shows several reactions involving propanol.



Rajah 21
Diagram 21

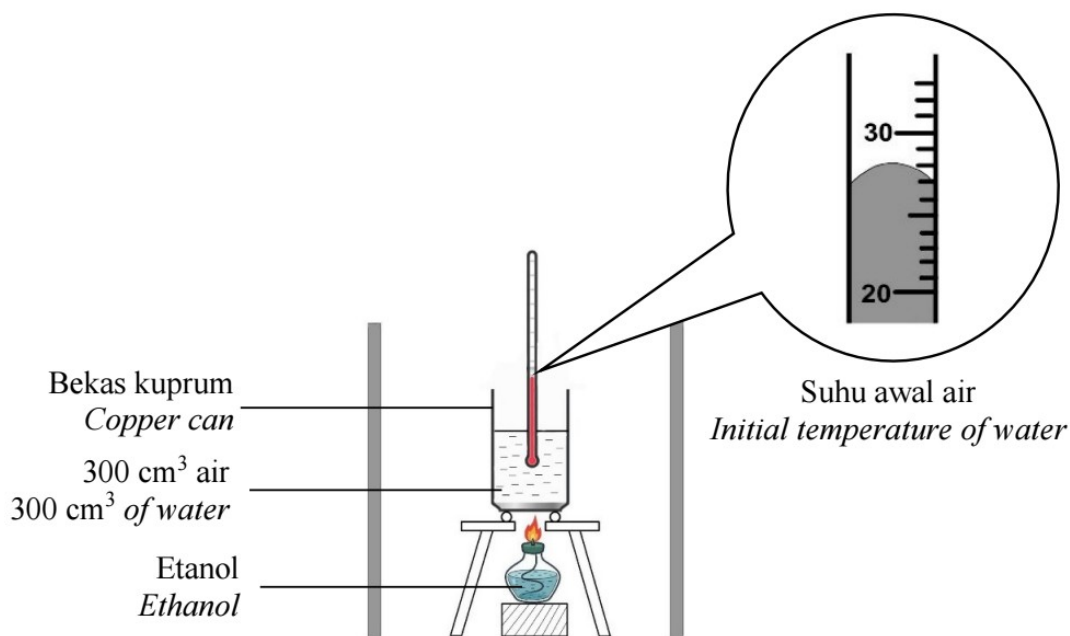
Antara reagen berikut, yang manakah digunakan dalam ujian pengesahan sebatian J, K dan L?

Which of the following reagents are use in the confirmatory test of compound J, K and L?

	Sebatian J <i>Compound J</i>	Sebatian K <i>Compound K</i>	Sebatian L <i>Compound L</i>
A	Larutan kalium manganat(VII) berasid <i>Acidified potassium manganate(VII) solution</i>	Etanol <i>Ethanol</i>	Kayu uji bernyala <i>Lighted wooden splinter</i>
B	Kalsium karbonat <i>Calcium carbonate</i>	Air bromin <i>Bromine water</i>	Air kapur <i>Limewater</i>
C	Air bromin <i>Bromine water</i>	Kalsium karbonat <i>Calcium carbonate</i>	Air kapur <i>Limewater</i>
D	Etanol <i>Ethanol</i>	Kalsium karbonat <i>Calcium carbonate</i>	Kayu uji bernyala <i>Lighted wooden splinter</i>

- 38 Rajah 22 menunjukkan eksperimen menentukan haba pembakaran etanol, $\text{C}_2\text{H}_5\text{OH}$.

Diagram 22 shows an experiment to determine the heat of combustion of ethanol, $\text{C}_2\text{H}_5\text{OH}$.



Rajah 22
Diagram 22

Haba pembakaran etanol adalah $-1371 \text{ kJ mol}^{-1}$.
Berapakah suhu tertinggi air apabila 1.15 g etanol terbakar lengkap?

*The heat combustion of ethanol is $-1371 \text{ kJ mol}^{-1}$.
What is the highest temperature of water when 1.15 g of ethanol burnt completely?*

[Jisim atom relatif, $\text{H} = 1$, $\text{C} = 12$, $\text{O} = 16$]

[Muatan haba tentu air = $4.2 \text{ J g}^{-1} \text{ } ^\circ\text{C}^{-1}$]

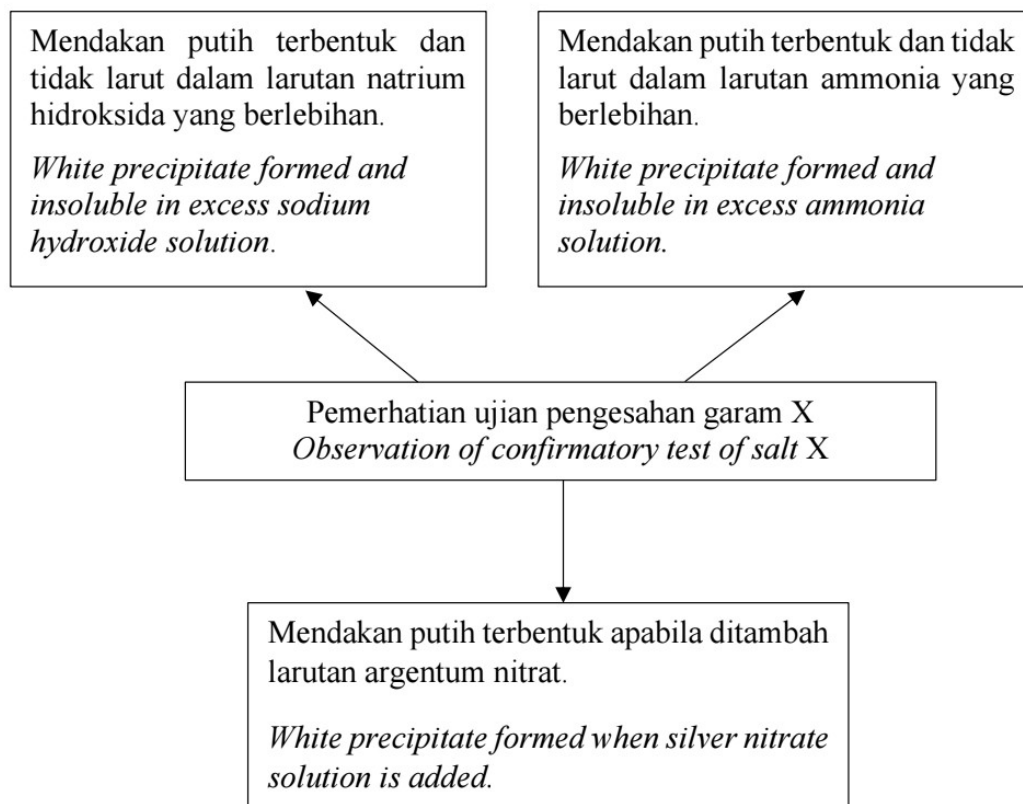
[Relative atomic mass, $\text{H} = 1$, $\text{C} = 12$, $\text{O} = 16$]

[Specific heat capacity of water = $4.2 \text{ J g}^{-1} \text{ } ^\circ\text{C}^{-1}$]

- A 36.0 °C
- B 53.0 °C
- C 55.0 °C
- D 59.0 °C

- 39 Rajah 23 menunjukkan pemerhatian ujian pengesahan kation dan anion bagi larutan garam X.

Diagram 23 shows the observations of confirmatory test of cation and anion for salt solution X.



Rajah 23
Diagram 23

Apakah garam X?
What is salt X?

- A Zink klorida
Zinc chloride
- B Kalsium nitrat
Calcium nitrate
- C Aluminium sulfat
Aluminium sulphate
- D Magnesium klorida
Magnesium chloride

- 40 Rajah 24 menunjukkan keputusan bagi tindak balas peneutralan bagi asid X, asid Y dan asid Z dengan 50 cm³ larutan natrium hidroksida, NaOH pada kepekatan berbeza.

Diagram 24 shows the results for neutralisation reactions of acid X, acid Y and acid Z with 50 cm³ of sodium hydroxide, NaOH solution at different concentration.

Set	Tindak balas <i>Reaction</i>	Kenaikan suhu (°C) <i>Temperature increase (°C)</i>
I	50 cm ³ larutan asid X 1.0 mol dm ⁻³ + 50 cm ³ larutan natrium hidroksida, NaOH 2.0 mol dm ⁻³ 50 cm ³ of 1.0 mol dm ⁻³ acid X solution + 50 cm ³ of 2.0 mol dm ⁻³ of sodium hydroxide, NaOH solution.	13.0
II	50 cm ³ larutan asid Y 1.0 mol dm ⁻³ + 50 cm ³ larutan natrium hidroksida, NaOH 1.0 mol dm ⁻³ 50 cm ³ of 1.0 mol dm ⁻³ acid Y solution + 50 cm ³ of 1.0 mol dm ⁻³ of sodium hydroxide, NaOH solution.	6.5
III	50 cm ³ larutan asid Z 1.0 mol dm ⁻³ + 50 cm ³ larutan natrium hidroksida, NaOH 1.0 mol dm ⁻³ 50 cm ³ of 1.0 mol dm ⁻³ acid Z solution + 50 cm ³ of 1.0 mol dm ⁻³ of sodium hydroxide, NaOH solution.	6.0

Rajah 24
Diagram 24

Antara berikut, padanan manakah yang betul berkaitan asid X, asid Y dan asid Z?

Which of the following is true about acid X, acid Y and acid Z?

	Asid X <i>Acid X</i>	Kebesan asid Y <i>Basicity of acid Y</i>	Kekuatan asid Z <i>Strength of acid Z</i>
A	Asid sulfurik <i>Sulphuric acid</i>	Monoprotik <i>Monoprotic</i>	Lemah <i>Weak</i>
B	Asid hidroklorik <i>Hydrochloric acid</i>	Diprotik <i>Diprotic</i>	Kuat <i>Strong</i>
C	Asid fosforik <i>Phosphoric acid</i>	Monoprotik <i>Monoprotic</i>	Lemah <i>Weak</i>
D	Asid nitrik <i>Nitric acid</i>	Diprotik <i>Diprotic</i>	Kuat <i>Strong</i>

KERTAS PEPERIKSAAN TAMAT
END OF QUESTION PAPER