NAMA: .....

TINGKATAN: .....

ANGKA GILIRAN: .....

MODUL PERKEMBANGAN PEMBELAJARAN 3 4541/1

SIJIL PELAJARAN MALAYSIA 2025

KIMIA
Kertas 1
Julai
1 ¼ jam
Satu jam lima belas minit

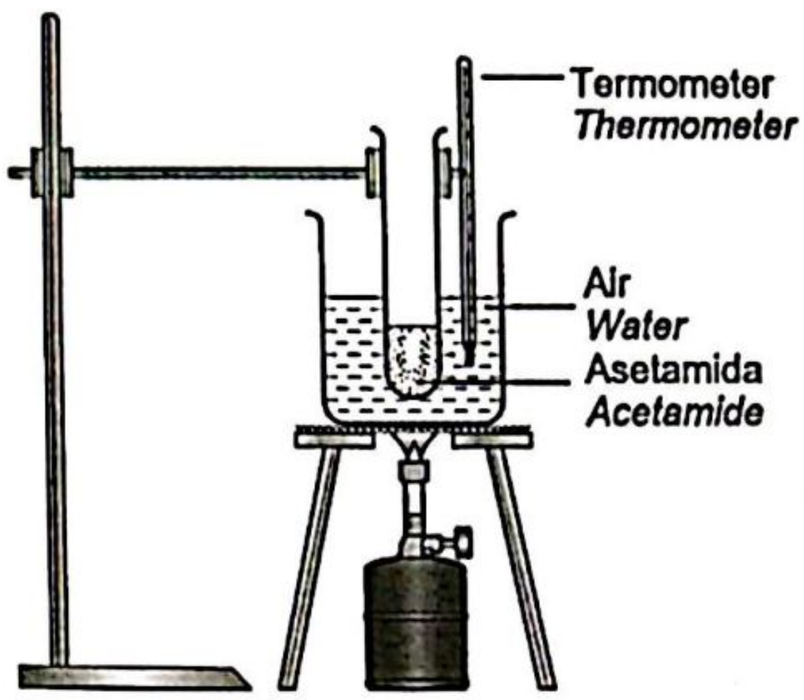
JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

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

Kertas soalan ini mengandungi 23 halaman bercetak tidak termasuk muka depan

1 Susunan radas manakah betul untuk menentukan takat lebur asetamida?
Which of the set-up apparatus is correct to determine the melting point of acetamide?

A



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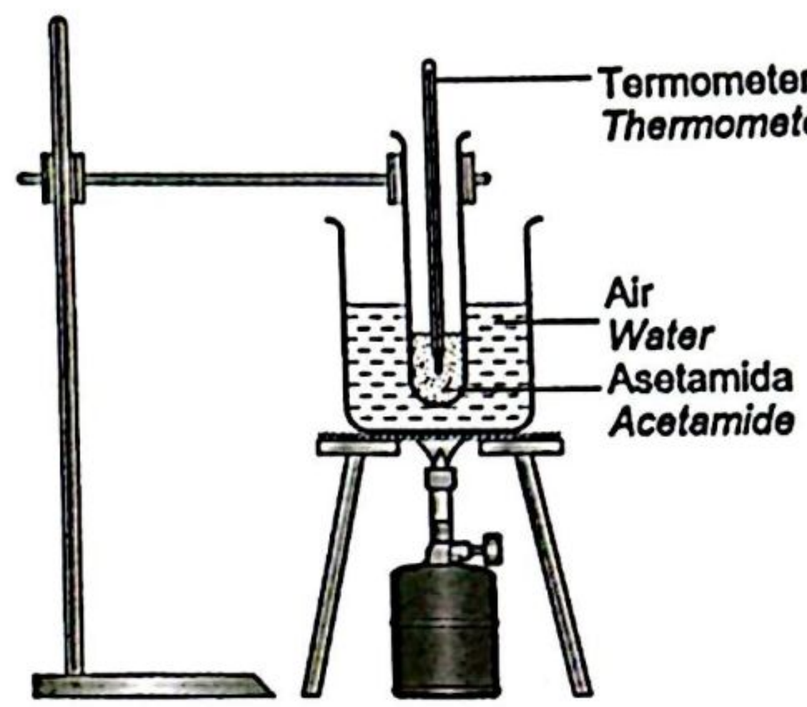

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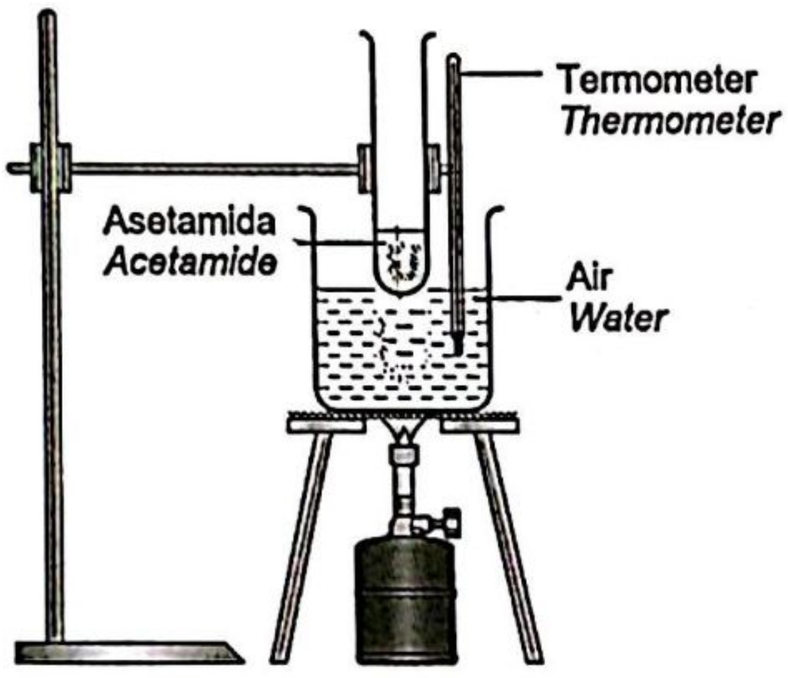

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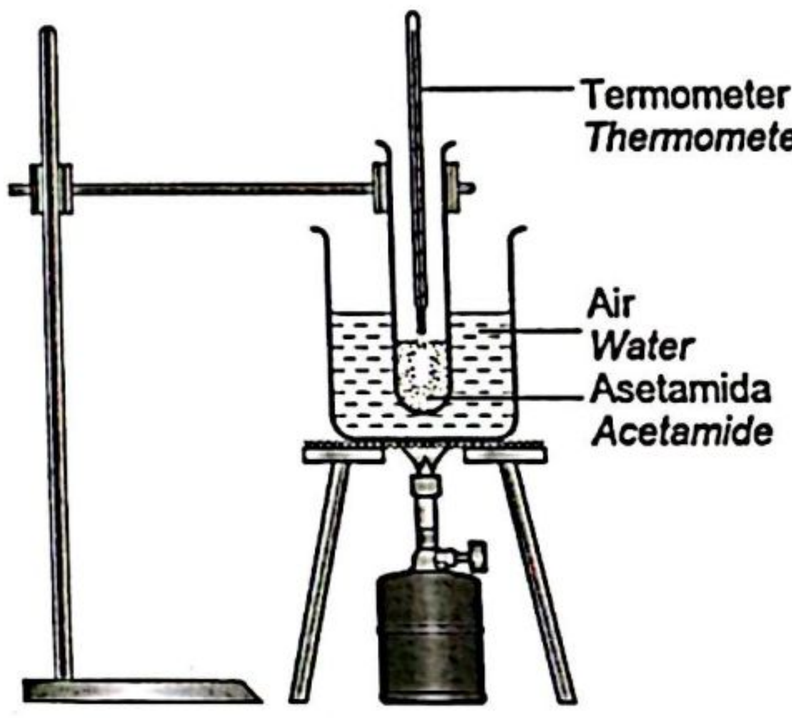


2 Mengapakah gas helium lengai secara kimia?
Why is helium gas chemically inert?

A Atomnya mempunyai 2 elektron valens
Its atom has 2 valence electrons

B Gas helium digunakan dalam belon kaji cuaca
Helium gas used in weather balloon

C Gas helium adalah gas monoatom
Helium gas is a monoatomic gas

D Atomnya mempunyai daya Van der Waals yang lemah
Its atom has weak Van der Waals forces

3 Di manakah kedudukan elektron valens dalam atom?
Where are the valence electrons located in an atom?

A Dalam petala terluar atom.
In the outermost shell of an atom.

B Di sekeliling nukleus sesuatu atom.
Around the nucleus of an atom.

C Disekeliling ion positif bagi atom unsur logam.
Surrounded by positive ions of metal element atoms.

D Dalam petala di sekeliling nukleus atom.
In the shell around the nucleus of an atom.

4 Antara berikut yang manakah merupakan asid diprotik?
Which of the following is diprotic acid?

A Asid etanoik
Ethanoic acid

B Asid nitrik
Nitric acid

C Asid sulfurik
Sulphuric acid

D Asid fosforik
Phosphoric acid

5 Suatu bahan yang biasa digunakan dalam kehidupan seharian didapati mempunyai nilai pH 9. Antara berikut yang manakah bahan tersebut?
A substance commonly used in daily life is found to have a pH *value of* 9. *Which of the following is the substance*?

A Kopi
Coffee

B Soda penaik
Baking soda

C Antasid
Antacid

D Larutan ammonia
Ammonia solution

6 Antara berikut, manakah mempunyai kadar tindak balas yang paling rendah?
Which of the following has the lowest rate of reaction?

A Pembakaran propanol
Combustion of propanol

B Pengoksidaan zink
Oxidation of zinc

C Penapaian glukosa
Fermentation of glucose

D Pemendakan kuprum(II) karbonat
Precipitation of copper(II) *carbonate*

7 Bahan manakah ialah bahan komposit?
Which substance is a composite material?

A Kaca borosilikat
Borosilicate glass

B Superkonduktor
Superconductor

C Duralumin
Duralumin

D Terilena
Terylene

8 Q mengandungi silikon dioksida, natrium karbonat dan kalsium karbonat.
Apakah Q?
Q *contains silicon dioxide, sodium carbonate and calcium carbonate.*
What is Q?

A Kaca plumbum
Lead glass

B Kaca soda kapur
Soda lime glass

C Kaca silika terlakur
Fused silica glass

D Kaca borosilikat
Borosilicate glass

9 Antara berikut, yang manakah merupakan tindak balas redoks?
Which of the following is a redox reaction?

A Penghalogenan
Halogenation

B Peneutralan
Neutralization

C Saponifikasi
Saponification

D Kakisan
Corrosion

10 Roket menggunakan campuran hidrogen dan oksigen sebagai bahan api. Persamaan bagi tindak balas adalah seperti berikut
Rockets use a mixture of hydrogen and oxygen as a fuel. The equation of the reaction is as follows

$$2H_2 + O_2 \rightarrow 2H_2O$$

Pernyataan manakah menerangkan tindak balas ini adalah redoks?
Which statement explains that the reaction is redox?

A Hidrogen diturunkan dan oksigen dioksidakan
Hydrogen is reduced and oxygen is oxidized.

B Hidrogen dioksidakan dan oksigen diturunkan
Hydrogen is oxidized and oxygen is reduced

C Hasil tindak balas mengandungi oksigen
The product contained oxygen

D Hidrogen adalah agen penurunan
Hydrogen is a reducing agent

11 Apakah nama proses yang terlibat dalam penghasilan tuak?
What is the name of the process involved in the production of tuak?

A Penapaian
Fermentation

B Pengesteran
Esterification

C Pengoksidaan
Oxidation

D Pendehidratan
Dehydration

12 Rajah 12 menunjukkan formula molekul bagi satu hidrokarbon.
Diagram 12 shows the molecular formula of a hydrocarbon.

$C_{10}H_{22}$

Rajah/*Diagram* 12

Apakah nama bagi sebatian hidrokarbon tersebut?
What is the name of the hydrocarbon compound?

A Dekana
Decane

B Oktana
Octane

C Heptana
Heptane

D Butana
Butane

13 Antara berikut yang manakah merupakan formula bagi mengira perbezaan kandungan tenaga haba?
Which of the following is the formula for calculating the difference in heat energy content?

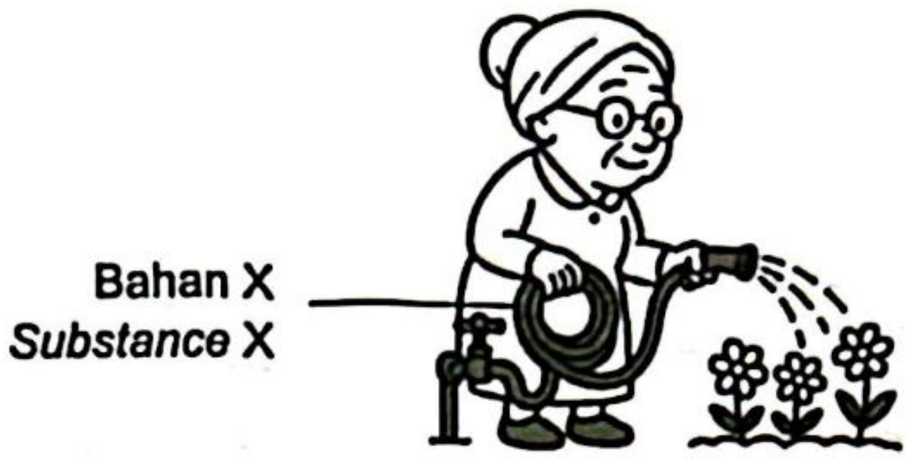
A $H_{\text{bahan tindak balas}} + H_{\text{hasil tindak balas}}$
$H_{reactants} + H_{products}$

B $H_{\text{bahan tindak balas}} - H_{\text{hasil tindak balas}}$
$H_{reactants} - H_{products}$

C $H_{\text{hasil tindak balas}} + H_{\text{bahan tindak balas}}$
$H_{products} + H_{reactants}$

D $H_{\text{hasil tindak balas}} - H_{\text{bahan tindak balas}}$
$H_{products} - H_{reactants}$

14 Rajah 14 menunjukkan bahan X yang digunakan untuk menyiram pokok bunga.
Figure 14 shows a substance X which is used for flower watering.



Rajah/*Figure* 14

Apakah ciri bahan yang bertanda X?
What are the properties of material X?

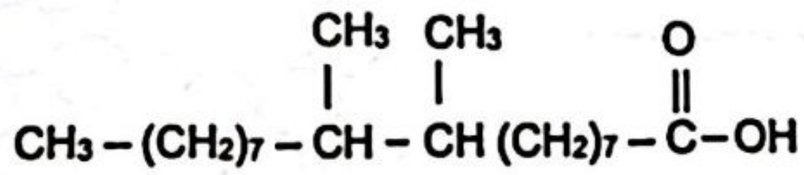
A Melebur apabila dipanaskan
Melt when heated

B Terurai atau hangus apabila dipanaskan
Decompose or burnt when heated

C Mempunyai sifat elastik yang tinggi
Has high elastic properties

D Mengeras apabila disejukkan
Hardens when cooled

15 Apakah formula struktur bagi asid lemak tak tepu?
What is the structural formula for unsaturated fatty acid?

A


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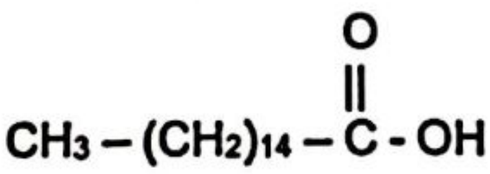

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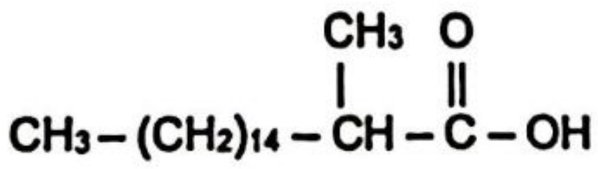
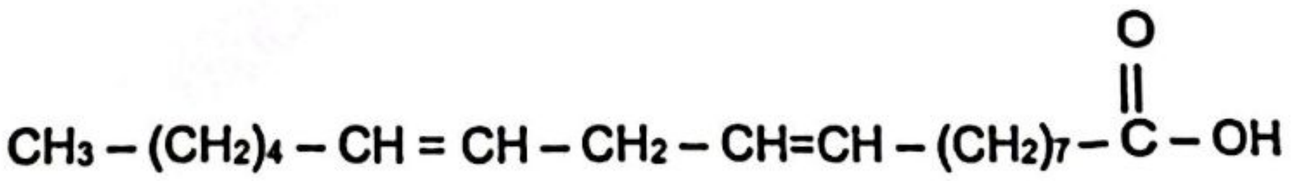
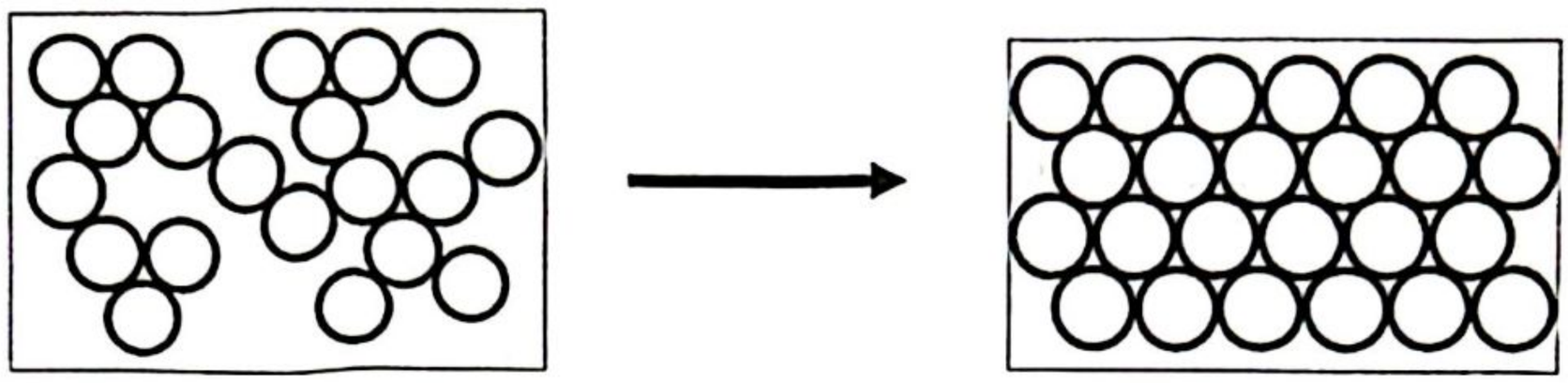


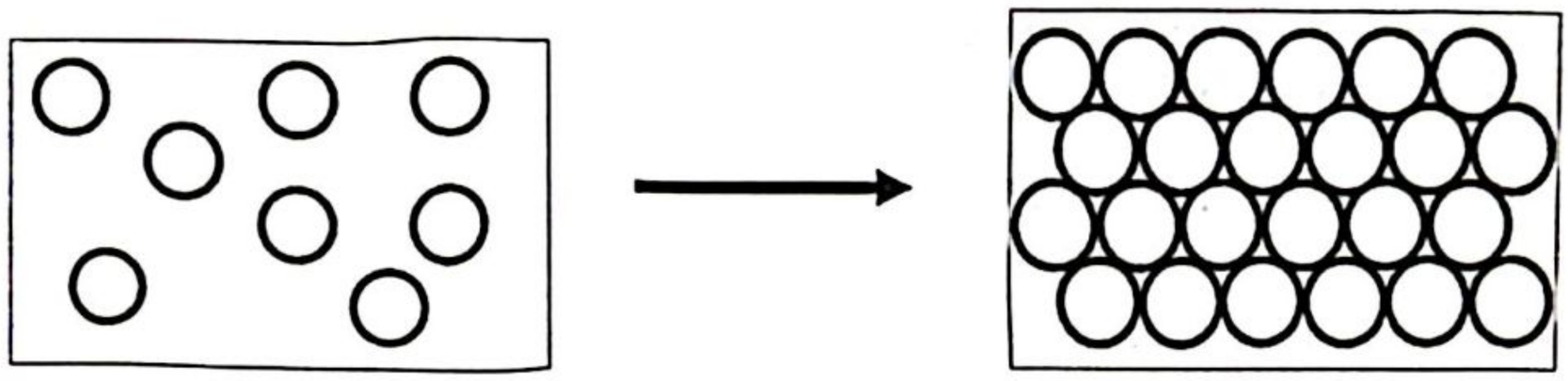
D


16 Sebatian D mengalami proses pengendapan.
Antara berikut, manakah menunjukkan perubahan keadaan jirim bagi sebatian D?
Compound D *undergoes deposition process.*
Which of the following shows the conversion of states of matter of the compound D?

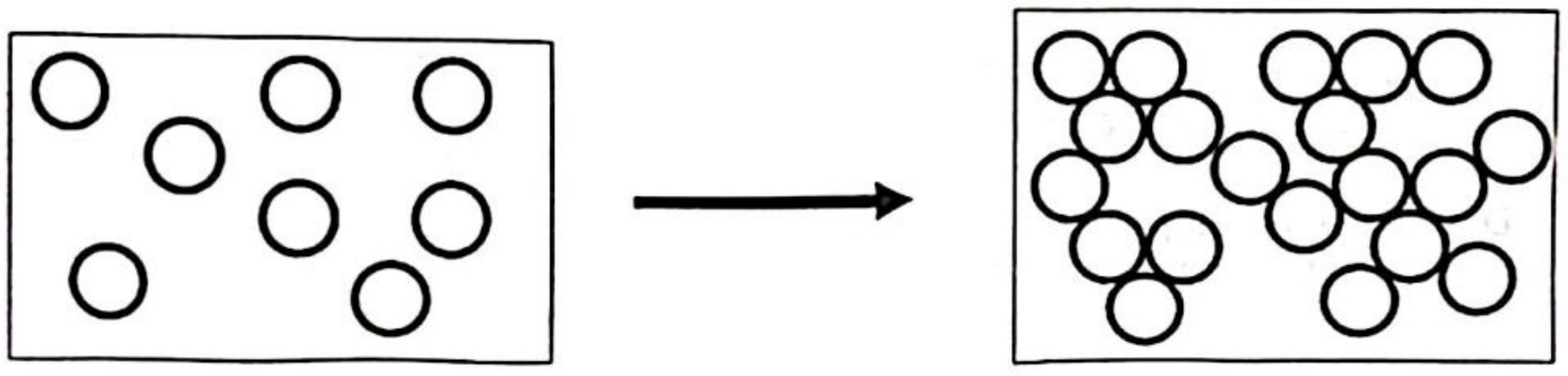
A



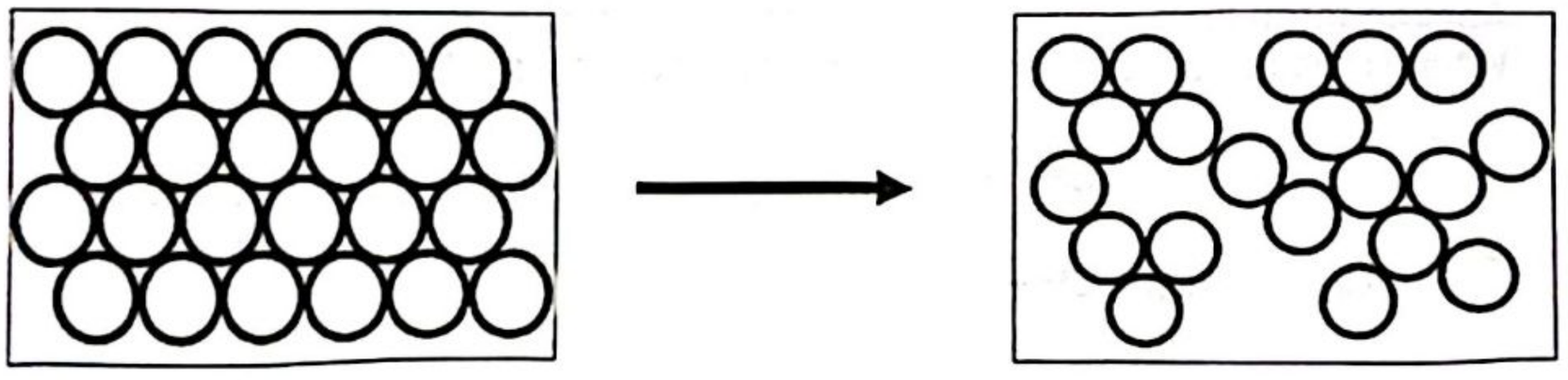
B



C



D



17 Antara zarah yang berikut, yang manakah bersamaan dengan 1 mol?
Which of the following particles equal to 1 mol?
[Jisim atom relatif */Relative atomic mass*: H=1]
[Pemalar Avogadro/ *Avogadro constant*, $N_A = 6.02 \times 10^{23}$ mol^{-1}]

A 6.02×10^{23} molekul hidrogen dalam gas hidrogen
6.02×10^{23} *of hydrogen molecule in hydrogen gas*

B 6.02×10^{23} atom hidrogen dalam gas hidrogen
6.02×10^{23} *of hydrogen atoms in hydrogen gas*

C Bilangan molekul dalam 1 g gas hidrogen
The number of molecules in 1 g *of hydrogen gas*

D Bilangan atom dalam 1 g gas hidrogen
The number of atoms in 1 g *of hydrogen gas*

18 Formula kimia manakah dinamakan dengan betul berdasarkan sistem penamaan IUPAC?
Which chemical formula is correctly named according to the IUPAC *nomenclature system?*

	Formula kimia *Chemical formula*	Nama *Name*
A	CO	Karbon oksida *Carbon oxide*
B	SO_3	Sulfur(III) oksida *Sulphur*(III) *oxide*
C	Fe_2O_3	Ferum(II) trioksida *Iron*(II) *trioxide*
D	FeO	Ferum(II) oksida *Iron*(II) *oxide*

19 Jadual 19 menunjukkan nombor proton bagi dua unsur dalam kumpulan 1 dalam Jadual Berkala Unsur.
Table 19 shows the proton number of two elements in Group 1 of The Periodic Table of Elements.

Unsur *Elements*	Nombor proton *Proton number*
X	3
Y	11

Jadual /*Table* 19

Antara yang berikut, pernyataan manakah yang betul tentang X dan Y?
Which of the following is the correct statement about X and Y?

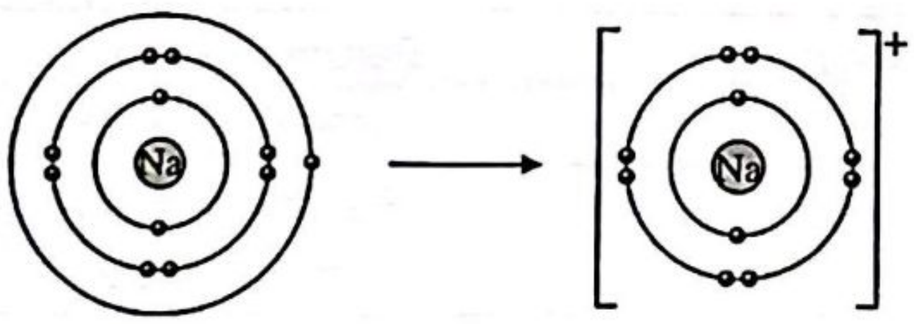
A Saiz atom Y lebih kecil daripada X
Atomic size of Y is smaller than X

B Daya tarikan antara nukleus dan elektron atom X lebih kuat daripada atom Y
Forces of attraction between nucleus and electron of atom X are stronger than Y

C Unsur Y lebih reaktif berbanding unsur X
Element Y is more reactive than element X

D Bilangan petala berisi elektron bagi atom X lebih daripada atom Y
The number of shells filled with electrons of atom X is more than Y

20 Rajah 20 menunjukkan pembentukan ion natrium.
Diagram 20 shows the formation of sodium ions.



Rajah/*Diagram* 20

Antara berikut, manakah persamaan setengah bagi pembentukan ion natrium?
Which of the following is the half-equation for the formation of sodium ions?

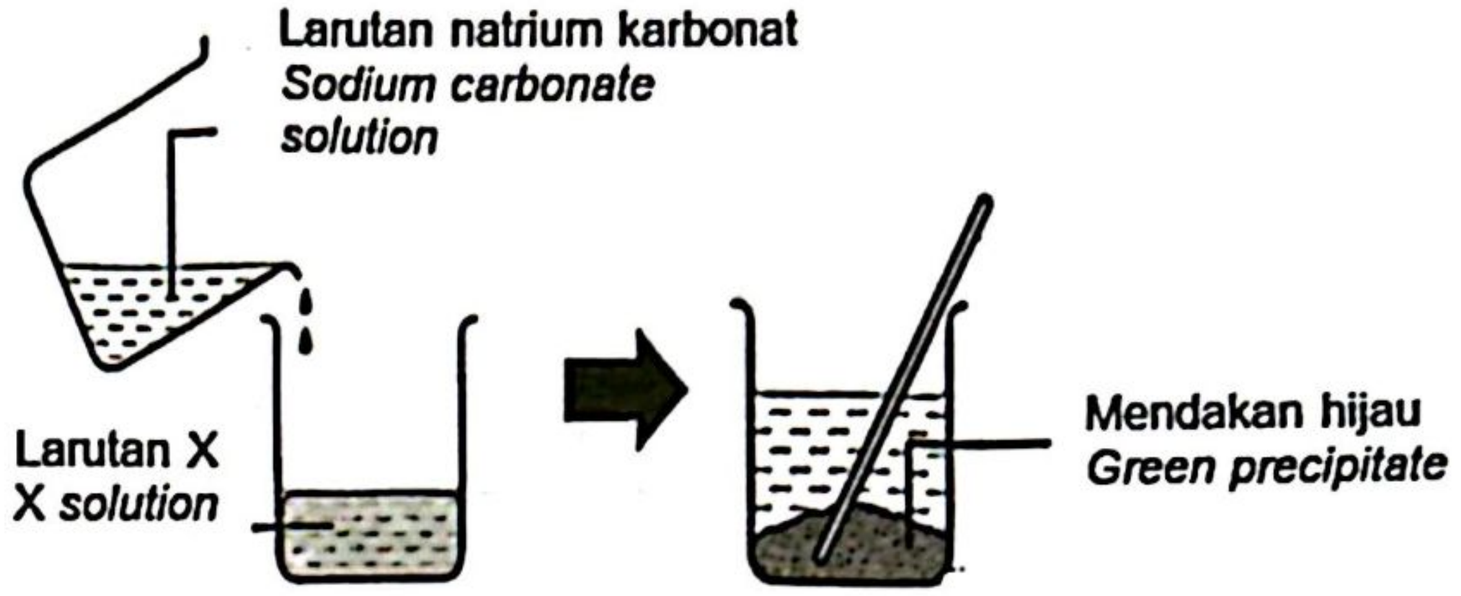
A $Na \rightarrow Na^+ + e$

B $Na + e \rightarrow Na^+$

C $Na^+ \rightarrow Na + e$

D $Na^+ + e \rightarrow Na$

21 Rajah 21 menunjukkan pemerhatian apabila larutan natrium karbonat ditambah kepada larutan X yang berwarna biru.
Diagram 21 shows the observation when sodium carbonate solution is added to solution X which is blue.



Rajah/*Diagram* 21

Antara berikut yang manakah merupakan nama bagi mendakan hijau?
Which of the following is the name for a green precipitate?

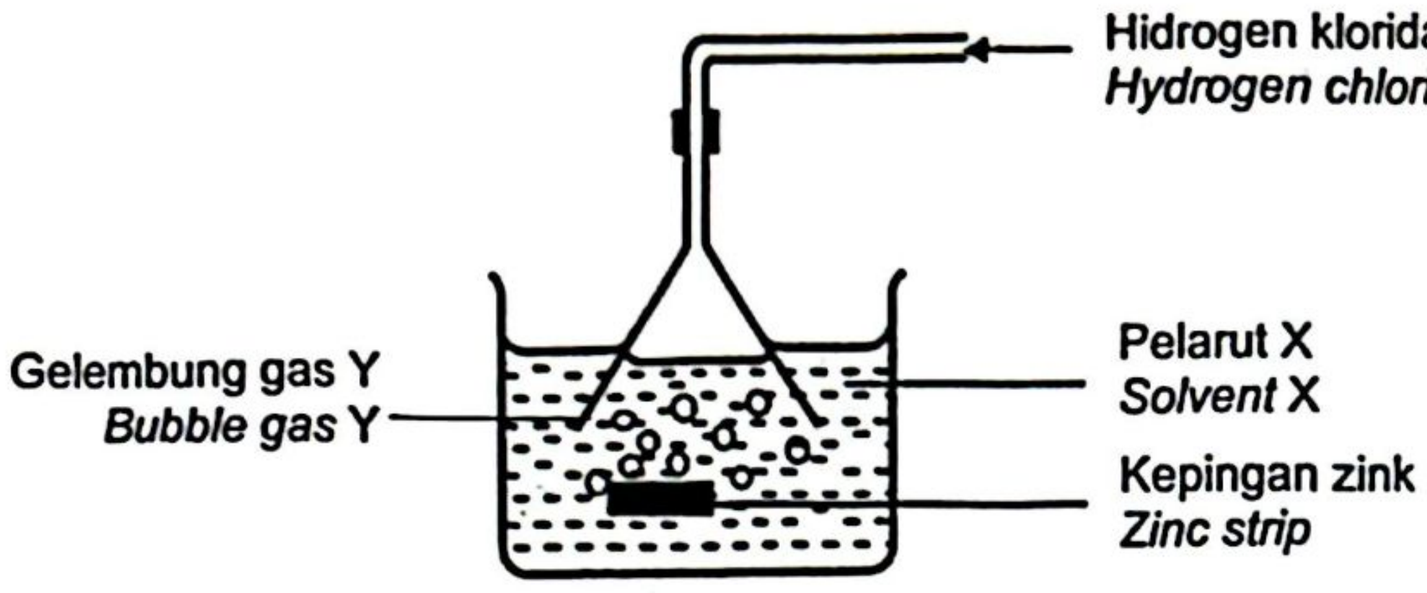
A Plumbum(II) iodida
Lead(II) *iodide*

B Ferum(II) klorida
Iron(II) *chloride*

C Natrium karbonat
Sodium carbonate

D Kuprum(II) karbonat
Copper(II) *carbonate*

22 Rajah 22 menunjukkan susunan radas bagi mengkaji sifat hidrogen klorida di dalam pelarut X.
Diagram 22 shows the arrangement of the apparatus to study the properties of hydrogen chloride in solvent X.



Rajah/*Diagram* 22

Berdasarkan pemerhatian dalam rajah 22, bagaimanakah kaedah untuk mengenal pasti gas Y yang terbebas?
Based on the observations in diagram 22, what is the method to identify the released gas Y?

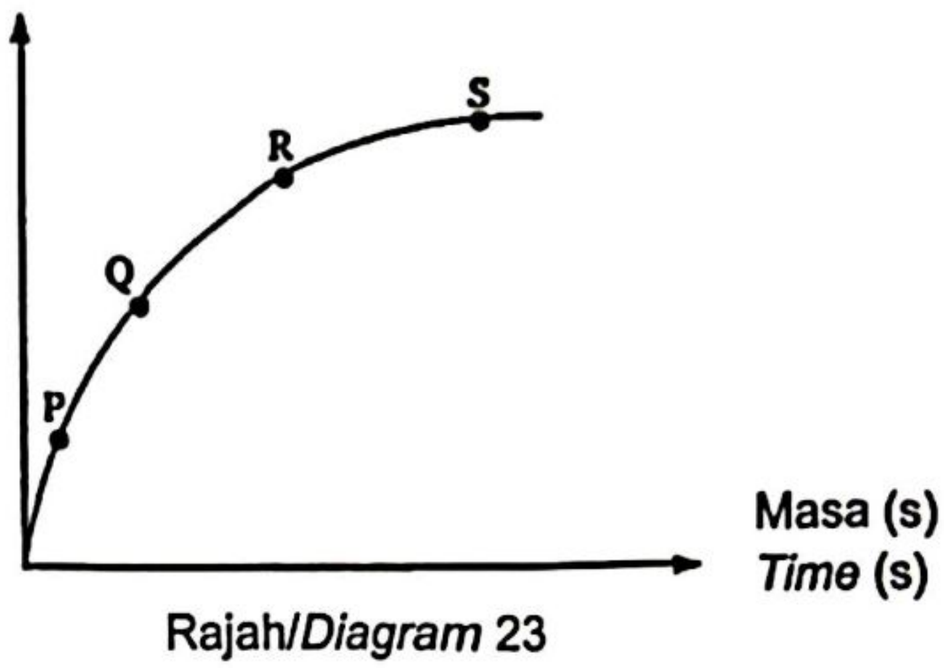
A Masukkan kayu uji berbara ke dalam tabung uji yang mengandungi gas Y.
Insert the burning wooden splinter into the test tube containing gas Y.

B Dekatkan kertas litmus merah lembap ke mulut tabung uji yang mengandungi gas Y.
Place the damp red litmus paper close to the mouth of the test tube containing the gas Y.

C Alirkan gas Y ke dalam tabung uji yang mengandungi air kapur
Flow gas Y into a test tube containing lime water.

D Masukkan kayu uji menyala ke mulut tabung uji yang mengandungi gas Y
Insert the lighting wooden splinter close to the mouth of the test tube containing gas Y.

23 Rajah 23 menunjukkan satu graf isi padu gas oksigen yang terkumpul melawan masa dalam tindak balas penguraian hidrogen peroksida apabila menggunakan mangkin mangan dioksida.
Diagram 23 shows a graph of volume of oxygen gas collected against time in the decomposition reaction of hydrogen peroxide when using manganese dioxide as catalyst.



Rajah/*Diagram* 23

Titik manakah yang menunjukkan kadar tindak balas paling tinggi?
Which point shows the highest rate of reaction?

A P

B Q

C R

D S

24 Elektrolisis larutan X dengan menggunakan elektrod karbon menghasilkan gas pada kedua-dua elektrod. Apakah larutan X?
Electrolysis of solution X using carbon electrodes produces gases at both electrodes. What is solution X?

A Larutan argentum nitrat
Silver nitrate solution

B Larutan natrium klorida
Sodium chloride solution

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

25 Larutan magnesium klorida, 0.1 mol dm^{-3} di elektrolisis menggunakan elektrod karbon.
Yang manakah setengah persamaan bagi tindak balas yang berlaku di anod dan katod?
Magnesium chloride solution, 0.1mol dm^{-3} *is electrolyzed using carbon electrodes.*
Which are the half equations for the reactions occurring at the anode and cathode?

	Anod *Anode*	Katod *Cathode*
A	$4OH^- \rightarrow O_2 + 2H_2O + 4e$	$Mg^{2+} + 2e \rightarrow Mg$
B	$4OH^- \rightarrow O_2 + 2H_2O + 4e$	$2H^+ + 2e \rightarrow H_2$
C	$2Cl^- \rightarrow Cl_2 + 2e$	$2H^+ + 2e \rightarrow H_2$
D	$2Cl^- \rightarrow Cl_2 + 2e$	$Mg^{2+} + 2e \rightarrow Mg$

26 Apakah yang berlaku apabila getah asli divulkankan?
What happens when natural rubber is vulcanized?

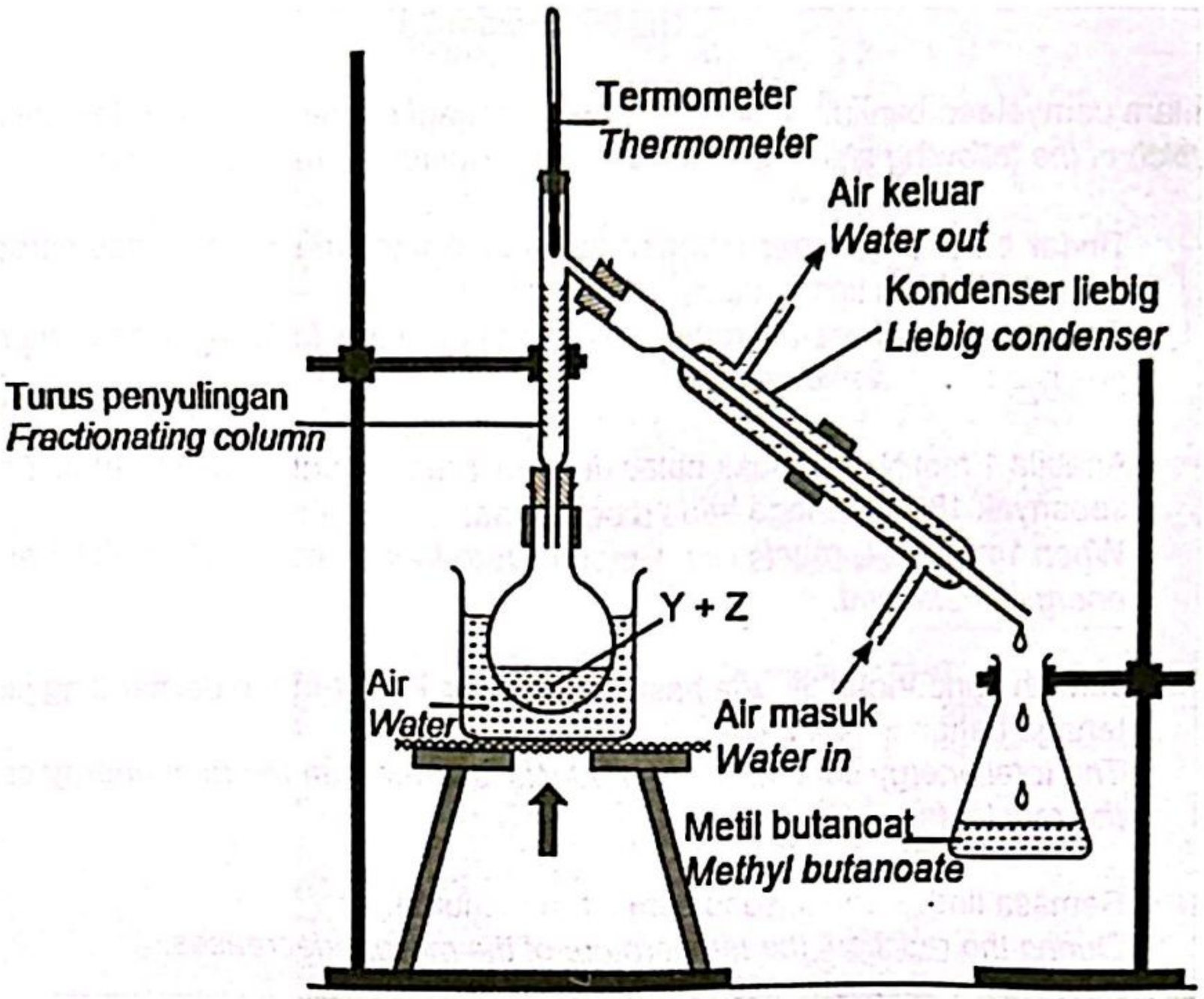
A Takat lebur getah berkurangan
The melting point of rubber decreases

B Getah tervulkan kurang rintangan terhadap haba
The vulcanised rubber is less resistant towards heat

C Molekul getah menggelongsor lebih mudah antara satu sama lain
Rubber molecules slide more easily between each other

D Atom sulfur membentuk rangkai silang di antara molekul getah
Sulphur atoms form cross-links between rubber molecules

27 Rajah 27 menunjukkan susunan radas bagi proses penghasilan ester metil butanoat.
Diagram 27 shows the arrangement of the apparatus for the process of producing methyl butanoate ester.



Rajah/*Diagram* 27

Y dan Z adalah dua bahan yang digunakan untuk menghasilkan metil butanoat yang berbau seperti epal.
Apakah bahan Y dan Z?
Y *and* Z *are two substances used to produce methyl butanoate which smells like apples.*
What substances are Y and Z?

A Metanol dan asid butanoik
Methanol and butanoic acid

B Pentanol dan asid etanoik
Pentanol and ethanoic acid

C Etanol dan asid butanoik
Ethanol and butanoic acid

D Butanol dan asid metanoik
Butanol and methanoic acid

28 Rajah 28 menunjukkan satu persamaan termokimia.
Diagram 28 shows a thermochemical equation.

$$N_2(g) + O_2(g) \rightarrow 2NO(g) \quad \Delta H = +180 \text{ kJmol}^{-1}$$

Rajah/*Diagram* 28

Antara pernyataan berikut yang manakah benar bagi menerangkan tindak balas di atas?
Which of the following statements is correct to explain the reaction above?

A Tindak balas antara gas nitrogen dan gas oksigen membentuk gas nitrogen monoksida ialah tindak balas eksotermik.
The reaction between nitrogen gas and oxygen gas to form nitrogen monoxide gas is an exothermic reaction.

B Apabila 1 mol N_2 bertindak balas dengan 1 mol O_2 untuk membentuk 2 mol NO, sebanyak 180 kJ tenaga haba dibebaskan.
When 1 mol *of* N_2 *reacts with* 1 mol *of* O_2 *to form* 2 mol *of* NO, 180 kJ *of heat energy is released.*

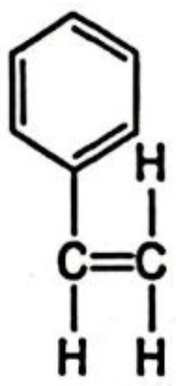
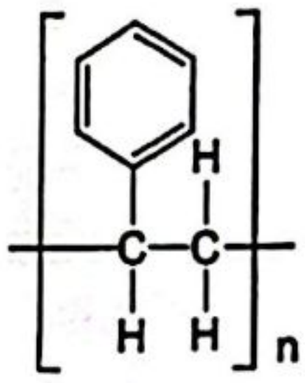
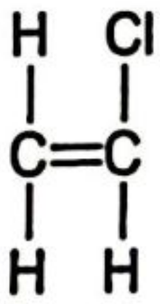
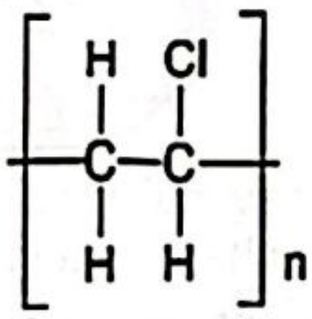
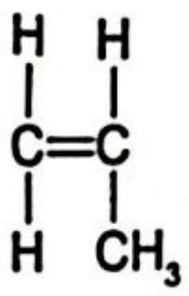
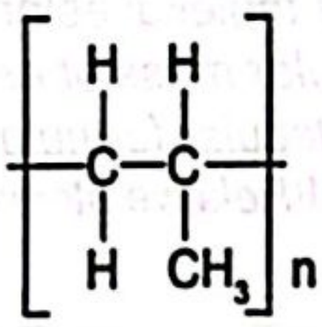
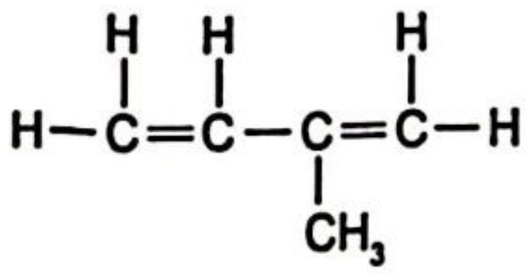
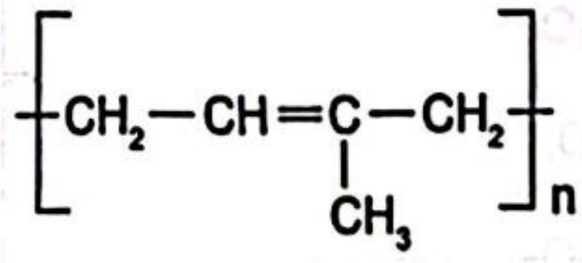
C Jumlah kandungan tenaga hasil tindak balas lebih rendah berbanding jumlah tenaga bahan tindak balas.
The total energy content of the products is lower than the total energy content of the reactants.

D Semasa tindak balas, suhu campuran menurun.
During the reaction, the temperature of the mixture decreases.

29 Rajah 29 di bawah menunjukkan seorang wanita menoreh getah di ladangnya.
Figure 29 below shows a woman tapping rubber in her rubber estate.

Rajah/*Diagram* 29

Apakah formula struktur monomer dan polimer bahan X?
What is the structural formula of monomer and polymer substance X?

	Struktur monomer *Structure of monomer*	Struktur polimer *Structure of polymer*
A		
B		
C		
D		

30 Antara berikut, yang manakah fungsi analgesik?
Which of the following is the function of an analgesic?

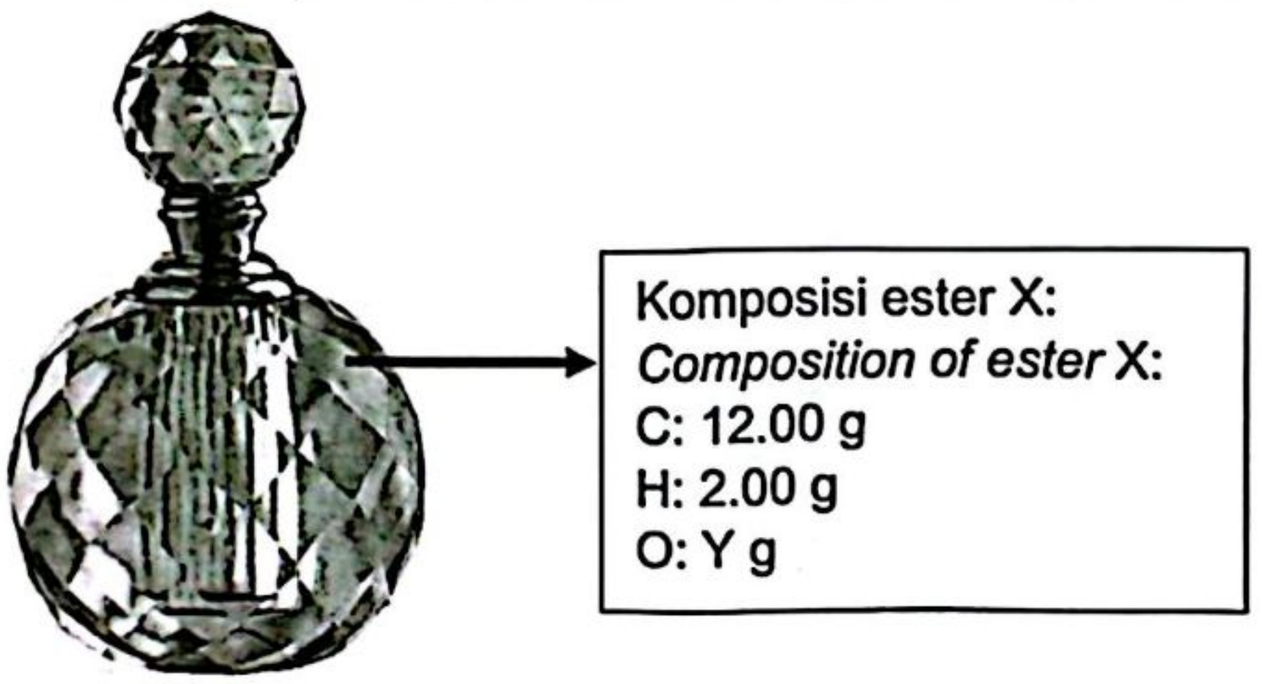
A Melegakan rasa sakit
To relieve pain

B Merawat penyakit asma
To treat asthma

C Menenangkan emosi pesakit
To calm down the emotion of the patient

D Membunuh bakteria
To destroy bacteria

31 Rajah 31 menunjukkan sebotol minyak wangi yang mengandungi 50 g bahan termasuk ester X. Ester X merupakan pelarut bagi minyak wangi tersebut. 44 % daripada jisim bahan tersebut adalah ester X.
Diagram 31 *shows a bottle of perfume containing* 50 g *of substance including ester* X. *Ester* X *which is the solvent in the perfume.* 44 % *of the mass substance is an ester* X.



Rajah/*Diagram* 31

Jisim molekul relatif bagi ester X adalah 88.
Apakah formula molekul ester X?
Relative molecular mass of ester X *is* 88.
What is the molecular formula of ester X?
[Jisim atom relatif/*Relative atomic mass* ; H = 1, C=12, O=16]

A C_2H_4O

B C_4H_4O

C CH_2O_2

D $C_4H_8O_2$

32 Formula bagi ion sulfat adalah SO_4^{2-} dan ion nitrat adalah NO_3^-.
Jika formula garam sulfat bagi T ialah TSO_4, apakah formula garam nitrat bagi T?
The formula for a sulphate ion is SO_4^{2-} *and for a nitrate ion is* NO_3^-.
If the formula of the sulphate salts of T *is* TSO_4, *what is the formula of the nitrate salt of* T?

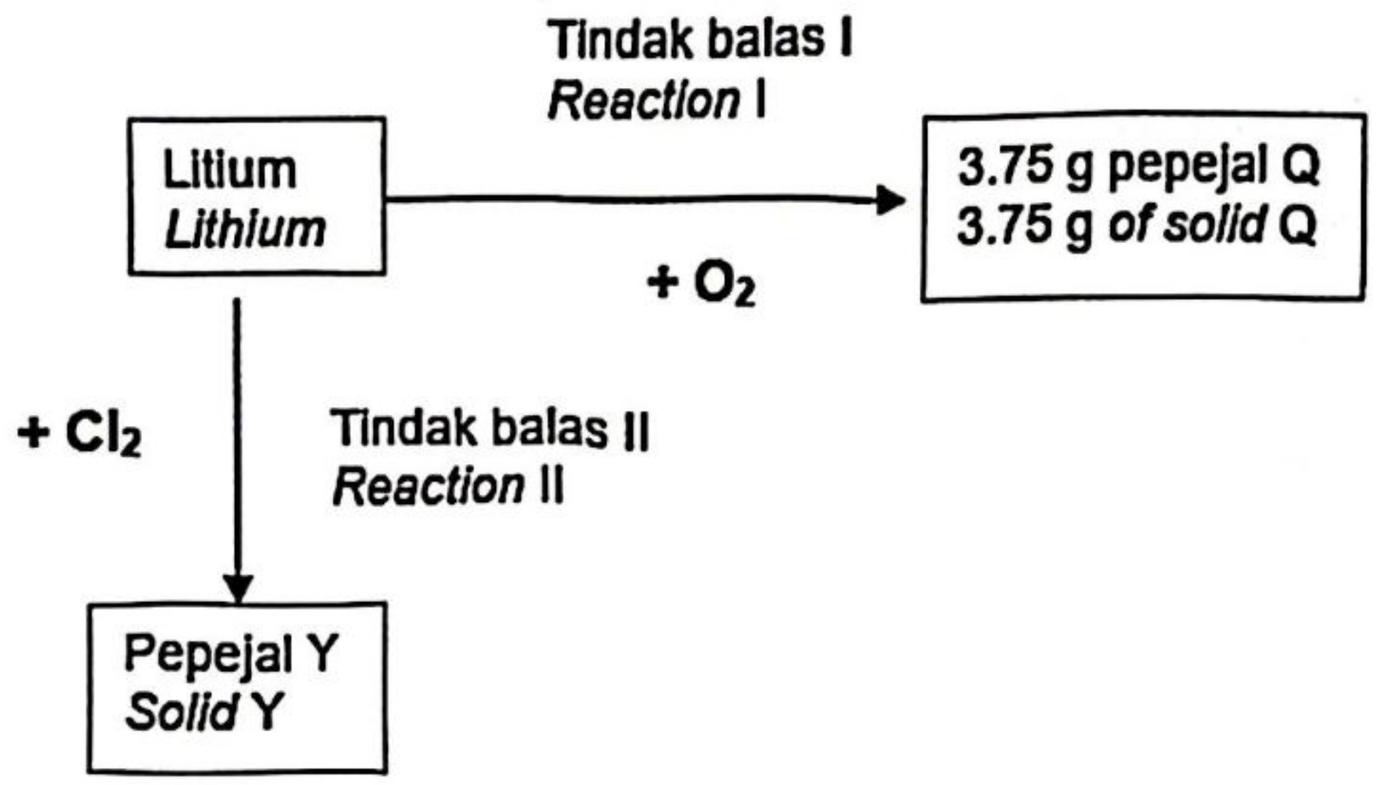
A $T(NO_3)_3$

B $T(NO_3)_2$

C T_2NO_3

D TNO_3

33 Rajah 33 menunjukkan dua tindak balas berbeza bagi suatu logam.
Diagram 33 *shows two different reactions of a metal.*



Rajah/*Diagram* 33

Berapakah jisim pepejal Y yang terbentuk apabila jisim litium yang sama digunakan?
What is the mass of solid Y *formed when the same mass of lithium is used*?
[Jisim atom relatif */Relative atomic mass*: Li = 7, 0 = 16, Cl = 35.5]

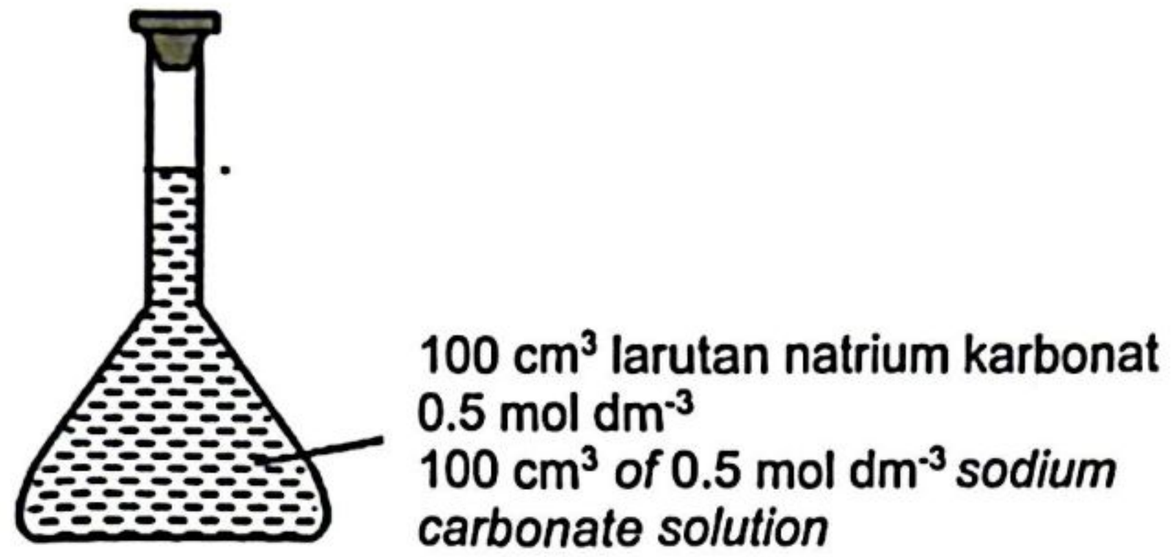
A 5.312 g

B 10.625 g

C 21.250 g

D 47.600 g

34 Rajah 34 menunjukkan penyediaan larutan stok natrium karbonat.
Diagram 34 shows the preparation of sodium carbonate stock solution.



Rajah/*Diagram* 34

Berapakah isipadu larutan stok yang perlu ditambah supaya dapat menghasilkan 500 cm^3 larutan natrium karbonat 0.01 mol dm^{-3} melalui kaedah pencairan?
How much volume of stock solution needs to be added to produce 500 cm^3 *of* 0.01 mol dm^{-3} *sodium carbonate solution using the dilution method*?

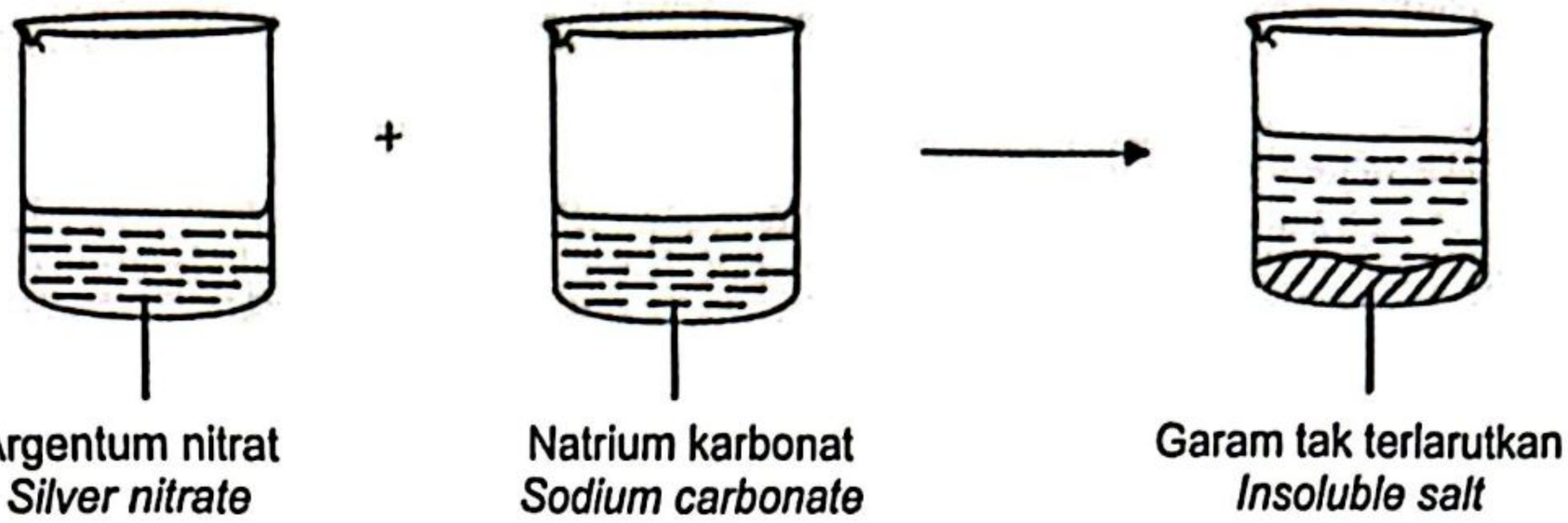
A 10 cm^3

B 50 cm^3

C 100 cm^3

D 500 cm^3

35 Rajah 35 menunjukkan tindak balas dua jenis garam terlarutkan untuk menghasilkan satu garam tak terlarutkan.
Diagram 35 shows the reaction of two types of soluble salts to produce an insoluble salt.



Rajah/*Diagram* 35

Hitung jisim garam tak terlarutkan yang terhasil jika 20 cm^3 larutan argentum nitrat 0.5 mol dm^{-3} digunakan.
Calculate the mass of insoluble salt produced if 20 cm^3 *of* 0.5 mol dm^{-3} *silver nitrate solution is used.*
[Jisim molar garam tak terlarutkan/*Molar mass of insoluble salt* = 276 $gmol^{-1}$]

A 2.76 g

B 1.70 g

C 1.38 g

D 0.83 g

36 Besi dihasilkan apabila hematit , Fe_2O_3 bertindak balas dengan karbon monoksida seperti di bawah;
Iron is produced when haematite, Fe_2O_3 *reacts with carbon monoxide as shown below;*

$$Fe_2O_3 + 3CO \rightarrow 2Fe + 3CO_2$$

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

	Ferum *Iron*	Karbon *Carbon*
A	+2 → 0	0 → +2
B	+3 → 0	+2 → +4
C	+2 → +3	0 → +2
D	+3 → +2	+2 → +4

37 2.3 g etanol terbakar dengan lengkap dalam oksigen berlebihan menghasilkan gas karbon dioksida dan air.
Hitung isipadu bagi gas karbon dioksida yang terbebas.
2.3 g *ethanol burns completely in excess oxygen producing carbon dioxide gas and water.*
Calculate the volume of carbon dioxide gas liberated.
[Jisim atom relatif/ *Relative atomic mass*: C = 12 ; H= 1 ; O = 16
Isipadu molar gas pada keadaan bilik/*molar volume at room temperature* = 24 dm^3 mol^{-1}]

A 0.5 dm^3

B 1.2 dm^3

C 2.4 dm^3

D 3.6 dm^3

38 Persamaan berikut mewakili tindak balas pemendakan.
The following equation represents the precipitation reaction.

$$Ba(NO_3)_2 + Na_2SO_4 \rightarrow BaSO_4 + 2NaNO_3 \quad \Delta H = -42\ kJmol^{-1}$$

Berapakah nilai peningkatan suhu tindak balas apabila 100 cm^3 setiap larutan dicampurkan dan 13.98 g mendakan terbentuk.
What is the value of the increase in reaction temperature when 100 cm^3 *of each solution is mixed and* 13.98 g *of precipitate is formed.*
[Muatan haba tentu larutan/*Specific heat capacity* = 4.2 $Jg^{-1}°C^{-1}$
Ketumpatan larutan/*Density of solution* = 1 gcm^{-3}
Jisim atom relatif/*Relative atomic mass* ; Ba = 137, S=32, Na= 23, O=16, N=14]

A 0.5°C

B 2.5°C

C 3.0°C

D 4.2°C

39 Persamaan berikut mewakili satu tindak balas antara 40 cm^3 asid nitrik 0.5 mol dm^{-3} dan kalsium karbonat berlebihan. Masa yang diambil untuk tindak balas itu lengkap adalah 360 saat.
The following equation represents a reaction between 40 cm^3 of 0.5 mol dm^{-3} *nitric acid and excess calcium carbonate. The time taken for the reaction to complete is* 360 *seconds.*

$$2HNO_3 + CaCO_3 \rightarrow Ca(NO_3)_2 + CO_2 + H_2O$$

Apakah kadar tindak balas purata tersebut?
What is the average rate of reaction?
[Isipadu molar gas pada keadaan bilik/*molar volume at room temperature* = 24 dm^3 mol^{-1}]

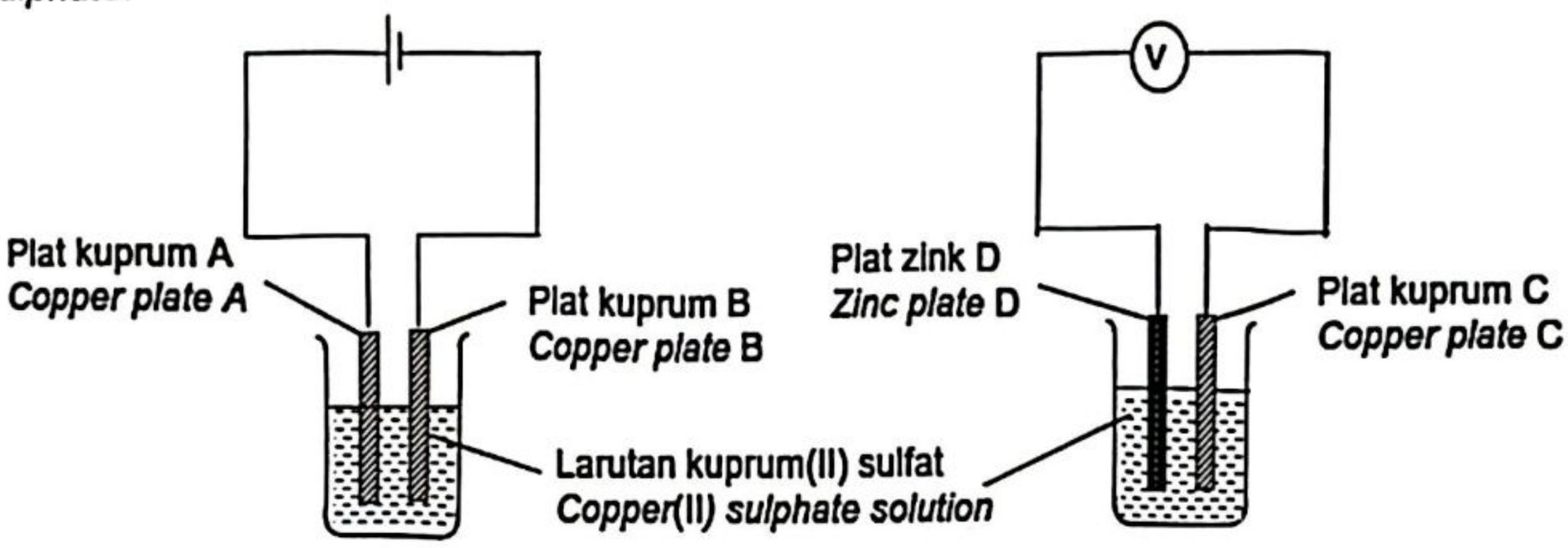
A 0.055 cm^3 s^{-1}

B 0.111 cm^3 s^{-1}

C 0.667 cm^3 s^{-1}

D 1.333 cm^3 s^{-1}

40 Rajah 40 menunjukkan sel elektrolisis dan sel voltan yang menggunakan elektrolit yang sama, kuprum(II) sulfat
Diagram 40 *shows electrolytic cell and voltaic cell using the same electrolyte, copper*(II) *sulphate.*



Rajah / Diagram 40

Perubahan jisim plat kuprum A, B dan C, yang manakah benar?
Which of the changes in mass of copper plates A, B *and* C *are true?*

	Jisim plat kuprum A (g) *Mass of copper plate* A (g)	Jisim plat kuprum B (g) *Mass of copper plate* B (g)	Jisim plat kuprum C (g) *Mass of copper plate* C (g)
A	Bertambah *Increases*	Berkurang *Decreases*	Bertambah *Increases*
B	Berkurang *Decreases*	Bertambah *Increases*	Bertambah *Increases*
C	Bertambah *Increases*	Berkurang *Decreases*	Berkurang *Decreases*
D	Berkurang *Decreases*	Bertambah *Increases*	Berkurang *Decreases*