

This question paper consists of **50** questions. Answer **all** questions.

*Kertas soalan ini mengandungi **50** soalan. Jawab **semua** soalan.*

- 1** Which of the following is a monoatomic gas?

Antara yang berikut, yang manakah adalah satu gas monoatom?

- | | |
|-------------------|-------------------|
| A Oxygen | C Helium |
| <i>Oksigen</i> | <i>Helium</i> |
| B Fluorine | D Nitrogen |
| <i>Fluorin</i> | <i>Nitrogen</i> |

- 2** Which of the following occurs in oxidation reaction?

Antara yang berikut, yang manakah berlaku dalam tindak balas pengoksidaan?

- | |
|---------------------------------------|
| A Loss of oxygen |
| <i>Kehilangan oksigen</i> |
| B Gain of hydrogen |
| <i>Penerimaan hidrogen</i> |
| C Gain of electrons |
| <i>Penerimaan elektron</i> |
| D Increase in oxidation number |
| <i>Penambahan nombor pengoksidaan</i> |

- 3** What is the position of hydrogen ion in the electrochemical series?

Apakah kedudukan ion hidrogen dalam siri elektrokimia?

- | |
|--|
| A Between lead(II) ion and iron(II) ion |
| <i>Antara ion plumbum(II) dan ion serum(II)</i> |
| B Between zinc ion and iron(II) ion |
| <i>Antara ion zink dan ion serum(II)</i> |
| C Between lead(II) ion and copper(II) ion |
| <i>Antara ion plumbum(II) dan ion kuprum(II)</i> |
| D Between zinc ion and tin(II) ion |
| <i>Antara ion zink dan ion stannum(II)</i> |

- 4** The following equation represents the reaction between zinc and hydrochloric acid.

Persamaan berikut mewakili tindak balas antara zink dan asid hidroklorik.



Which method is the most suitable to increase the rate of reaction?

Kaedah manakah yang paling sesuai untuk meningkatkan kadar tindak balas?

- | |
|--|
| A Decrease the size of zinc |
| <i>Mengecilkan saiz zink</i> |
| B Decrease the volume of hydrochloric acid |
| <i>Mengurangkan isi padu asid hidroklorik</i> |
| C Decrease the temperature of hydrochloric acid |
| <i>Menurunkan suhu asid hidroklorik</i> |
| D Decrease the concentration of hydrochloric acid |
| <i>Mengurangkan kepekatan asid hidroklorik</i> |

- 5** Diagram 1 shows a beaker containing two layers of substances.

Rajah 1 menunjukkan sebuah bikar yang mengandungi dua lapisan bahan.

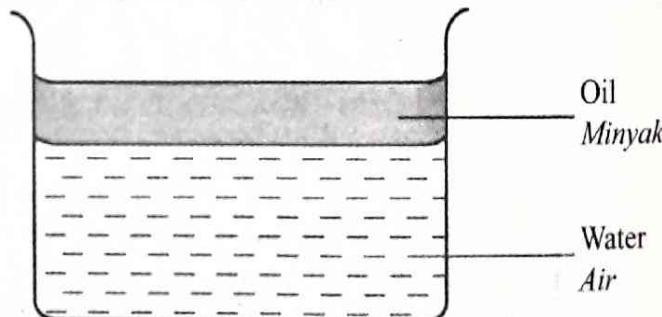


Diagram 1

Rajah 1

Which food additive is the most suitable to be added to ensure both substances are mixed?

Bahan tambah makanan manakah yang paling sesuai ditambah untuk memastikan kedua-dua bahan itu bercampur?

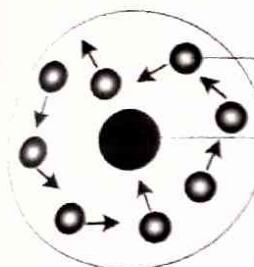
- | | |
|------------------------|-----------------------|
| A Stabilizer | C Preservative |
| <i>Penstabil</i> | <i>Pengawet</i> |
| B Antioxidant | D Flavouring |
| <i>Pengantioksidan</i> | <i>Perisa</i> |

- 6** Which unit is correct for the rate of reaction?
- Unit manakah yang betul untuk kadar tindak balas?*

- | | |
|------------------------------|-------------------------------|
| A g mol^{-1} | C mol dm^{-3} |
| B g min^{-1} | D kJ mol^{-1} |

Diagram 2 shows a model of an atom.

Rajah 2 menunjukkan satu model atom.



Electron moves outside the nucleus
Elektron bergerak di luar nukleus
Nucleus that contain proton
Nukleus yang mengandungi proton

Diagram 2
Rajah 2

Who introduced this model?

Siapakah yang memperkenalkan model ini?

- A Neils Bohr C J.J. Thompson
B John Dalton D Ernest Rutherford

8 Which substance is a diprotic acid?

Bahan manakah adalah satu asid diprotik?

- A Sulphuric acid
Asid sulfurik
B Ethanoic acid
Asid etanoik
C Phosphoric acid
Asid fosforik
D Hydrochloric acid
Asid hidroklorik

9 What is the meaning of electronegativity?

Apakah yang dimaksudkan dengan keelektronegatifan?

- A The ability of ion to lose electron
Keupayaan ion untuk membebaskan elektron
B The ability of ion to gain electron
Keupayaan ion untuk menerima elektron
C The ability of atom to lose electron
Keupayaan atom untuk membebaskan elektron
D The ability of atom to gain electron
Keupayaan atom untuk menerima elektron

10 Which compound is formed by transferring electron?

Sebatian manakah yang terbentuk melalui pemindahan elektron?

- A Oxygen, O₂
Oksigen, O₂
B Carbon dioxide, CO₂
Karbon dioksida, CO₂
C Sodium oxide, Na₂O
Natrium oksida, Na₂O
D Hydrogen peroxide, H₂O₂
Hidrogen peroksida, H₂O₂

11 Which of the following is correct about exothermic and endothermic reactions?

Antara yang berikut, yang manakah betul mengenai tindak balas eksotermik dan tindak balas endotermik?

	Exothermic reaction <i>Tindak balas eksotermik</i>	Endothermic reaction <i>Tindak balas endotermik</i>
A	Heat is absorbed <i>Haba diserap</i>	Heat is released <i>Haba dibebaskan</i>
B	Chemical bond is broken <i>Ikatan kimia dipecahkan</i>	Chemical bond is formed <i>Ikatan kimia terbentuk</i>
C	Temperature of surroundings increases <i>Suhu persekitaran meningkat</i>	Temperature of surroundings decreases <i>Suhu persekitaran menurun</i>
D	Total energy content of product is higher than total energy content of reactant <i>Jumlah kandungan tenaga hasil tindak balas lebih tinggi daripada jumlah kandungan tenaga bahan tindak balas</i>	Total energy content of reactant is higher than total energy content of product <i>Jumlah kandungan tenaga bahan tindak balas lebih tinggi daripada jumlah kandungan tenaga hasil tindak balas</i>

12 Heating of P oxide produces a product which is brown when hot and yellow when cold.

What is P?

Pemanasan oksida P menghasilkan suatu hasil tindak balas yang berwarna perang semasa panas dan berwarna kuning semasa sejuk.

Apakah P?

- A Lead
Plumbum
B Magnesium
Magnesium
C Silver
Argentum
D Zinc
Zink

13 The following are the characteristics of substance needed to produce a new product in industry.

Berikut adalah ciri-ciri bahan yang diperlukan untuk menghasilkan satu produk baharu dalam industri.

- No electrical resistance
Tiada rintangan elektrik
- Function under the extremely low temperature
Berfungsi di bawah suhu rendah yang melampau
- Transfer information with high speed
Memindahkan maklumat dengan kelajuan tinggi

What are the substances that can be used to produce the product?

Apakah bahan-bahan yang boleh digunakan untuk menghasilkan produk itu?

- I Ceramic
Seramik
- II Superconductor
Superkonduktor
- III Fibre optic
Gentian optik
- IV Fibre glass
Gentian kaca

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

14 Which of the following is correct about a strong alkali?

Antara yang berikut, yang manakah betul tentang suatu alkali kuat?

- A Shows purple colour in universal indicator
Menunjukkan warna ungu di dalam pemunjuk universal
- B Has high concentration of hydrogen ion
Mempunyai kepekatan ion hidrogen yang tinggi
- C Ionises partially in water
Mengion separa dalam air
- D Tastes sour
Rasa masam

15 Diagram 3 shows the apparatus set-up for the preparation of a salt.

Rajah 3 menunjukkan susunan radas bagi penyediaan suatu garam.



Diagram 3
Rajah 3

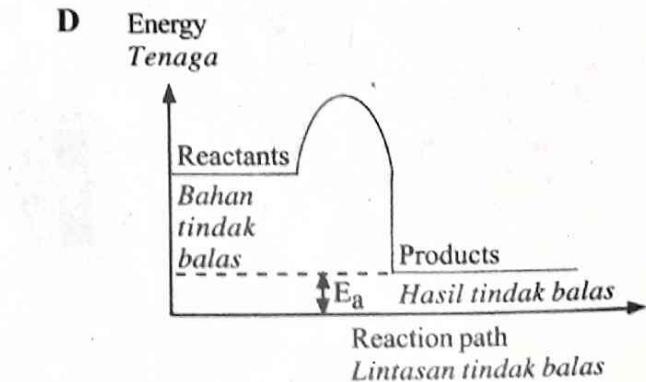
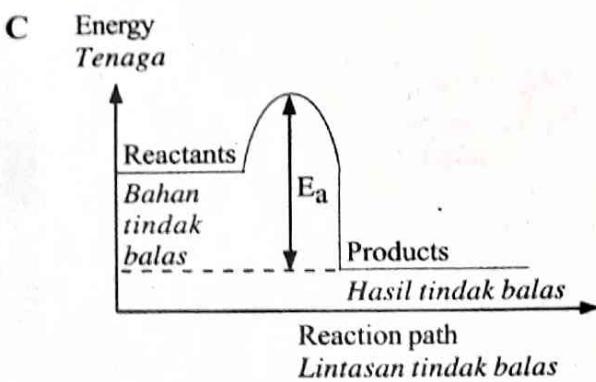
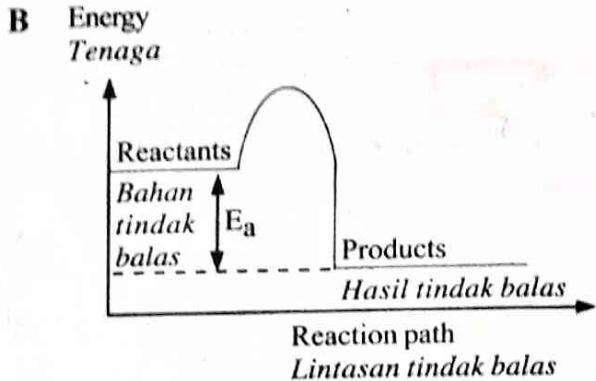
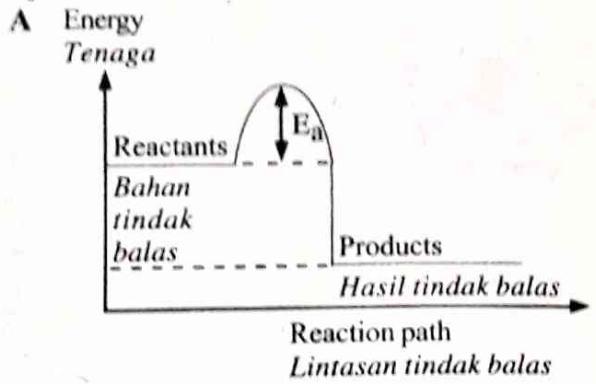
Which salt is prepared through this method?

Garam manakah yang disediakan melalui kaedah ini?

- A Zinc sulphate
Zink sulfat
- B Sodium sulphate
Natrium sulfat
- C Magnesium nitrate
Magnesium nitrat
- D Aluminium nitrate
Aluminium nitrat

16 Which diagram shows the correct label of activation energy, E_a ?

Rajah manakah menunjukkan label tenaga pengaktifan, E_a yang betul?



17 Which statement is not correct about latex?

Penyataan manakah yang tidak betul tentang lateks?

- A Obtained from rubber tree
Diperolehi daripada pokok getah
- B Withstands high temperature
Tahan terhadap suhu yang tinggi
- C Made of monomer called isoprene
Terbina daripada monomer yang dipanggil isoprena
- D Exists as a white solid at room temperature
Wujud sebagai pepejal putih pada suhu bilik

18 Magnesium chloride is an ionic compound. Which substance can dissolve magnesium chloride? Magnesium klorida adalah sebatian ion. Bahan manakah yang boleh mlarutkan magnesium klorida?

- | | |
|-----------------|---------------------------------|
| A Ether
Eter | C Hexane
Heksana |
| B Water
Air | D Methylbenzene
Metilbenzena |

19 Which of the following is the similarity between ethene and ethanol?

Antara yang berikut, yang manakah persamaan antara etena dan etanol?

- A Both have double bond
Kedua-duanya mempunyai ikatan ganda dua
- B Both are soluble in water
Kedua-duanya larut dalam air
- C Both decolourised bromine water
Kedua-duanya menyahwarkan air bromin
- D Both decolourised acidified potassium manganate(VII) solution
Kedua-duanya menyahwarkan larutan kalium manganat(VII) berasid

20 Which of the following are the differences of isotopes of elements?

Antara yang berikut, yang manakah adalah perbezaan isotop bagi unsur?

- I Number of protons
Bilangan proton
 - II Number of neutrons
Bilangan neutron
 - III Physical properties
Sifat fizik
 - IV Chemical properties
Sifat kimia
- | | |
|--------------------------|----------------------------|
| A I and III
I dan III | C II and III
II dan III |
| B I and IV
I dan IV | D II and IV
II dan IV |

21 Diagram 4 shows the electron arrangement of a compound formed between atom W and atom Y. Rajah 4 menunjukkan susunan elektron bagi sebatian yang terbentuk antara atom W dengan atom Y.

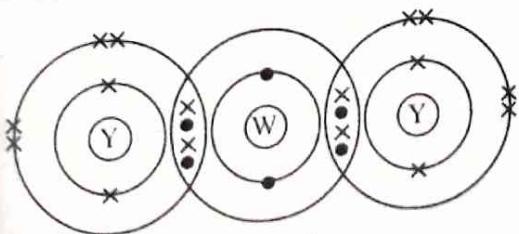


Diagram 4
Rajah 4

Atom Y also form a compound with atom Z.

Which of the following is the electron arrangement of the compound formed?
[Proton number of Z = 11]

Atom Y juga membentuk satu sebatian dengan atom Z. Antara yang berikut, yang manakah susunan elektron bagi sebatian yang terbentuk?

[Nombor proton Z = 11]

- A
- B
- C
- D

22 The reaction between aluminium and iron(III) oxide produce iron and substances X.

What is the chemical formula of X?

Tindak balas di antara aluminium dengan ferum(III) oksida menghasilkan ferum dan bahan X.

Apakah formula kimia bagi X?

- | | |
|--------------------|----------------------------------|
| A AlO | C Al ₂ O ₃ |
| B AlO ₂ | D Al ₃ O ₂ |

23 Diagram 5 shows an observation when lead strip reacts with hydrochloric acid, bubbles of gas are produced.

Rajah 5 menunjukkan satu pemerhatian apabila kepingan plumbum bertindak balas dengan asid hidroklorik, gelembung gas dihasilkan.

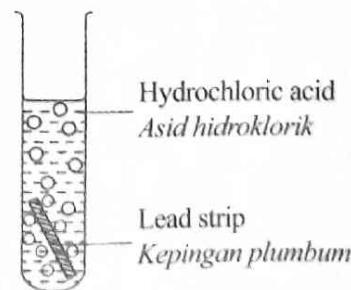


Diagram 5
Rajah 5

Which metal is suitable to replace lead to produce the least gas bubbles?

Logam manakah yang sesuai bagi menggantikan plumbum untuk menghasilkan gelembung gas yang paling sedikit?

- A Zinc
Zink
- B Copper
Kuprum
- C Iron
Ferum
- D Aluminium
Aluminium

24 Diagram 6 shows the arrangement of particles in three states of matter at room temperature.

Rajah 6 menunjukkan susunan zarah dalam tiga keadaan jirim pada suhu bilik.

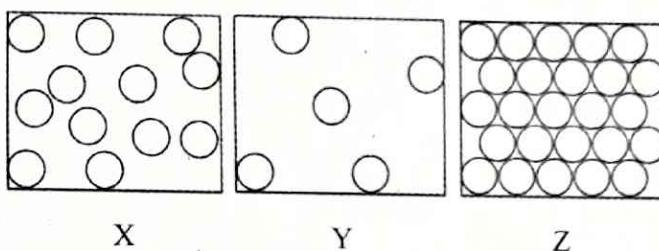


Diagram 6
Rajah 6

What are substances X, Y and Z at room temperature?

Apakah bahan X, Y dan Z pada suhu bilik?

	X	Y	Z
A	Bromine Bromin	Naphthalene Naftalena	Nitrogen Nitrogen
B	Naphthalene Naftalena	Nitrogen Nitrogen	Bromine Bromin
C	Nitrogen Nitrogen	Bromine Bromin	Naphthalene Naftalena
D	Bromine Bromin	Nitrogen Nitrogen	Naphthalene Naftalena

25 Which equation represents a redox reaction?

Persamaan manakah yang mewakili suatu tindak balas redoks?

- A $\text{NaOH} + \text{HNO}_3 \rightarrow \text{NaNO}_3 + \text{H}_2\text{O}$
- B $2\text{AgNO}_3 + \text{Zn} \rightarrow \text{Zn}(\text{NO}_3)_2 + 2\text{Ag}$
- C $2\text{NaCl} + \text{Pb}(\text{NO}_3)_2 \rightarrow \text{PbCl}_2 + 2\text{NaNO}_3$
- D $\text{CaCO}_3 + 2\text{HCl} \rightarrow \text{CaCl}_2 + \text{H}_2\text{O} + \text{CO}_2$

26 Diagram 7 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 7 menunjukkan satu graf isi padu gas oksigen yang terkumpul melawan masa dalam tindak balas penguraian hidrogen peroksida apabila menggunakan mangkin mangan dioksida.

Volume of oxygen gas collected (cm^3)
Isi padu gas oksigen terkumpul (cm^3)

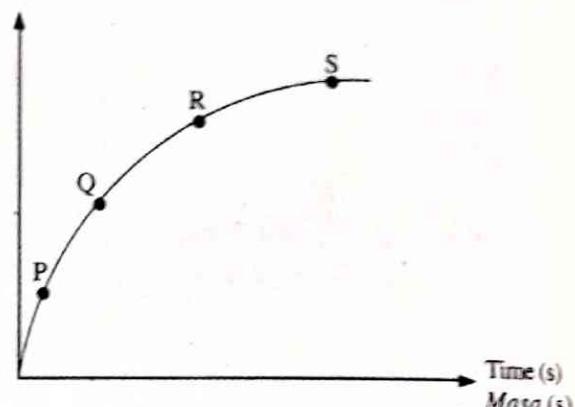


Diagram 7
Rajah 7

Which point shows the highest rate of reaction?

Titik manakah yang menunjukkan kadar tindak balas paling tinggi?

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

27 Table 1 shows the observation for two tests on solution T.

Jadual 1 memunjukkan pemerhatian bagi dua ujian ke atas larutan T.

Test Ujian		Observation Pemerhatian
I	Add sodium hydroxide solution until excess Tambah larutan natrium hidroksida sehingga berlebihan	White precipitate formed and insoluble in excess sodium hydroxide solution Mendakan putih terbentuk dan tidak larut dalam larutan natrium hidroksida berlebihan
II	Add ammonia solution until excess Tambah larutan ammonia sehingga berlebihan	White precipitate formed and insoluble in excess ammonia solution Mendakan putih terbentuk dan tidak larut dalam larutan ammonia berlebihan

Table 1
Jadual 1

Which ion is present in solution T?

Ion manakah yang hadir dalam larutan T?

A Zn^{2+}

C Pb^{2+}

B Mg^{2+}

D Ca^{2+}

- 28 Diagram 8 shows the change in thermometer readings for a reaction that occurs when two different substances are mixed.

Rajah 8 menunjukkan perubahan bacaan termometer bagi satu tindak balas yang berlaku apabila dua bahan berbeza dicampur.

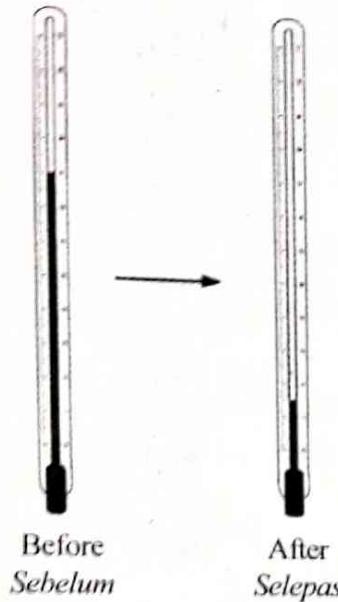


Diagram 8

Rajah 8

What are the substances?

Apakah bahan tersebut?

A HNO_3 and $NaOH$

HNO_3 dan $NaOH$

B $NaCl$ and $AgNO_3$

$NaCl$ dan $AgNO_3$

C $NaHCO_3$ and HCl

$NaHCO_3$ dan HCl

D $CuSO_4$ and $BaCl_2$

$CuSO_4$ dan $BaCl_2$

- 29 Table 2 shows the observation for the reactions between metal X with two different salt solutions.

Jadual 2 menunjukkan pemerhatian bagi tindak balas di antara logam X dengan dua larutan garam yang berbeza.

Salt solution Larutan garam	Observation Pemerhatian
Copper(II) sulphate <i>Kuprum(II) sulfat</i>	Brown deposit is formed <i>Enapan perang terbentuk</i>
Zinc sulphate <i>Zink sulfat</i>	No change <i>Tiada perubahan</i>

Table 2

Jadual 2

Which of the following is the correct descending order of metal X, copper and zinc in the electrochemical series?

Antara yang berikut, yang manakah susunan secara menurun yang betul bagi logam X, kuprum dan zink dalam siri elektrokimia?

A X, copper, zinc

X, kuprum dan zink

B X, zinc, copper

X, zink, kuprum

C Zinc, copper, X

Zink, kuprum, X

D Zinc, X, copper

Zink, X, kuprum

- 30 Diagram 9 shows the apparatus set-up to determine the empirical formula of lead(II) oxide.

Rajah 9 menunjukkan susunan radas untuk menentukan formula empirik plumbum(II) oksida.

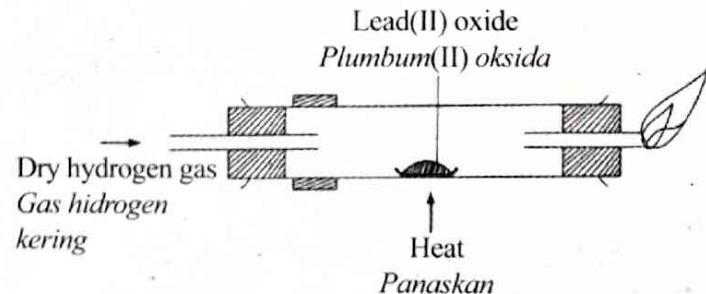


Diagram 9

Rajah 9

Which statement explains why the method is **not** suitable to determine the empirical formula of magnesium oxide?

Pernyataan manakah yang menerangkan mengapa kaedah ini **tidak** sesuai untuk menentukan formula empirik magnesium oksida?

A Magnesium burns vigorously in oxygen

Magnesium terbakar dengan sangat cergas dalam oksigen

B Magnesium explodes when it is heated

Magnesium meletup apabila dipanaskan

C Magnesium is more electropositive than lead

Magnesium lebih elektropositif daripada plumbum

D Magnesium is more reactive than hydrogen

Magnesium lebih reaktif daripada hidrogen

- 31 The following information is about compound R. Maklumat berikut adalah tentang sebatian R.

• Organic compound

Sebatian organik

• Has a hydroxyl group

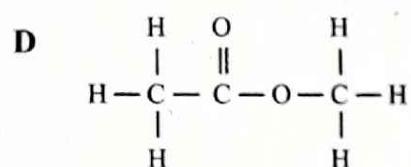
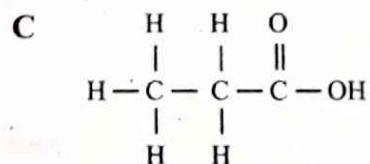
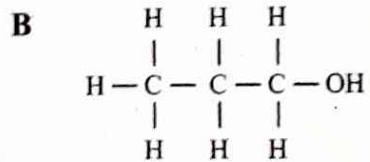
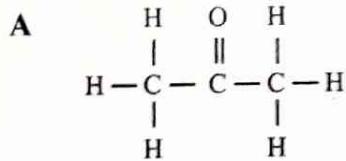
Mempunyai kumpulan hidroksil

• Produced by addition reaction

Dihasilkan daripada tindak balas penambahan

Which structural formula represent compound R?

Formula struktur manakah yang mewakili sebatian R?



32 Diagram 10 shows the apparatus set-up for electroplating of iron plate with silver.

Rajah 10 menunjukkan susunan radas bagi penyaduran plat ferum dengan argentum.

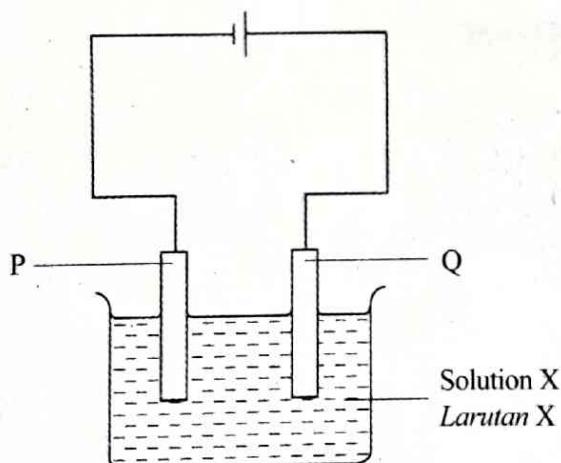


Diagram 10
Rajah 10

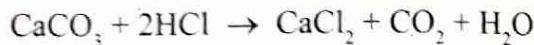
What are P, Q and X?

Apakah P, Q dan X?

	P	Q	X
A	Iron <i>Ferum</i>	Silver <i>Argentum</i>	Silver nitrate <i>Argentum nitrat</i>
B	Iron <i>Ferum</i>	Silver <i>Argentum</i>	Iron(II) nitrate <i>Ferum(II) nitrat</i>
C	Silver <i>Argentum</i>	Iron <i>Ferum</i>	Silver nitrate <i>Argentum nitrat</i>
D	Silver <i>Argentum</i>	Iron <i>Ferum</i>	Iron(II) nitrate <i>Ferum(II) nitrat</i>

33 The following equation represents a chemical reaction.

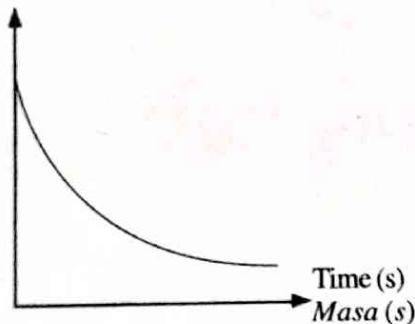
Persamaan berikut mewakili satu tindak balas kimia.



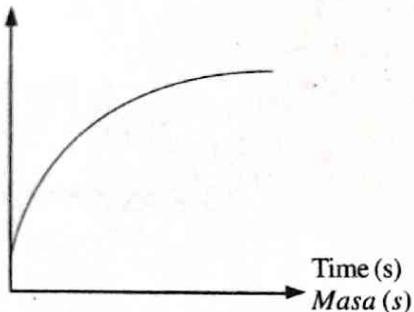
Which graph shows the correct change in mass of reactant used in excess against time?

Graf manakah yang betul menunjukkan perubahan jisim bahan tindak balas yang digunakan secara berlebihan melawan masa?

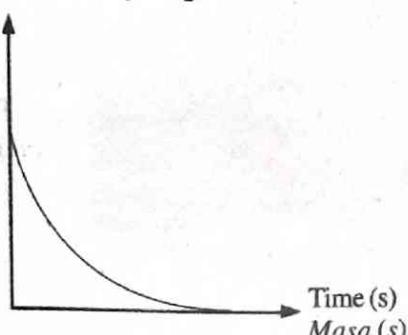
- A** Mass of limestone (g)
Jisim batu kapur (g)



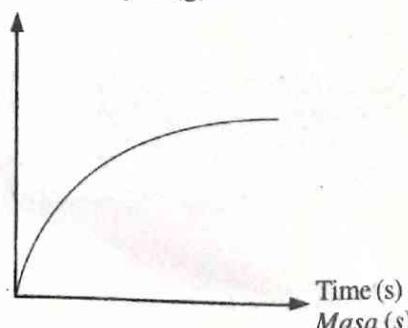
- B** Mass of limestone (g)
Jisim batu kapur (g)



- C** Mass of limestone (g)
Jisim batu kapur (g)



- D** Mass of limestone (g)
Jisim batu kapur (g)



- 34 Diagram 11 shows an energy level diagram.
Rajah 11 menunjukkan satu rajah aras tenaga.

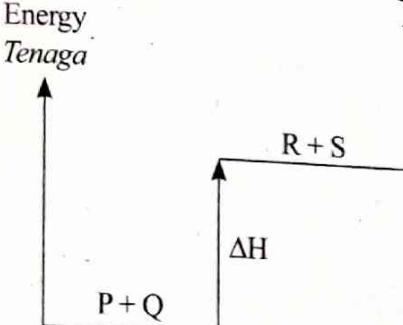


Diagram 11
Rajah 11

Which statement is correct about the energy level diagram?

Penyataan manakah yang betul tentang rajah aras tenaga itu?

- A R and S are the reactants

R dan S adalah bahan tindak balas

- B The reaction releases heat

Tindak balas itu membebaskan haba

- C The reaction is endothermic

Tindak balas itu adalah endotermik

- D The energy content of reactants is higher than the energy content of products

Kandungan tenaga bahan tindak balas lebih tinggi daripada kandungan tenaga hasil tindak balas

- 35 Compound X produces a solution with a pH value less than 7 when it is dissolved in water.

What is compound X?

Sebatian X menghasilkan suatu larutan dengan nilai pH kurang daripada 7 apabila dilarutkan ke dalam air.

Apakah sebatian X?

- A Sodium oxide C Ammonium chloride

Natrium oksida

- B Magnesium oxide D Hydrogen chloride

Magnesium oksida

Ammonium klorida

Hidrogen klorida

- 36 Table 3 shows the nucleon number and the number of neutrons for atoms W, X, Y and Z.

Jadual 3 menunjukkan nombor nukleon dan bilangan neutron bagi atom W, X, Y dan Z.

Atom Atom	Nucleon number Nombor nukleon	Number of neutrons Bilangan neutron
W	1	0
X	14	7
Y	16	8
Z	35	18

Table 3
Jadual 3

Which substance is suitable used as a bleach?
Bahan manakah yang sesuai digunakan sebagai peluntur?

- A W₂

- C Y₂

- B X₂

- D Z₂

- 37 Diagram 12 shows the structural formula of compound T.

Rajah 12 menunjukkan formula struktur satu sebatian T.

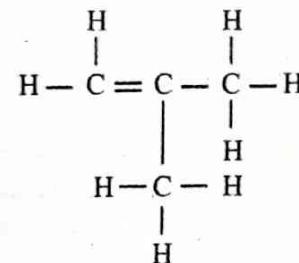


Diagram 12
Rajah 12

What is the percentage of carbon by mass in compound T?

[Relative atomic mass: H = 1; C = 12]

Berapakah peratus jisim karbon dalam sebatian T?

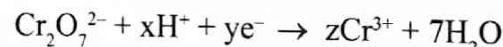
[Jisim atom relatif: H = 1; C = 12]

- A 20.69 % C 82.76 %

- B 21.42 % D 85.71 %

- 38 The half equation represents the reduction reaction of acidified potassium dichromate(VI) solution.

Setengah persamaan mewakili tindak balas penurunan bagi larutan kalium dikromat(VI) berasid.



What are the value of x, y and z?

Apakah nilai bagi x, y dan z?

	x	y	z
A	14	6	2
B	14	5	1
C	7	2	1
D	7	1	2

- 39 0.40 g X metal reacts with fluorine to produce 0.78 g of X fluoride.

What is the empirical formula of the X fluoride?

[Relative atomic mass: F = 19; X = 40]

0.40 g logam X bertindak balas dengan fluorin untuk menghasilkan 0.78 g X fluoride.

Apakah formula empirik bagi X fluoride itu?

[Jisim atom relatif: F = 19; X = 40]

- A XF

- C X₂F

- B XF₂

- D XF₄

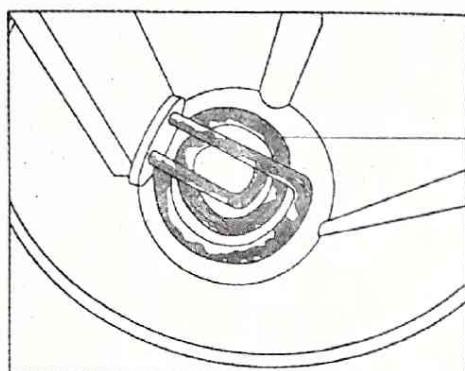
- 40** 1 mol of alcohol is burnt in excess oxygen.
Which alcohol produces carbon dioxide and water in a mol ratio of 3:4?

1 mol alkohol dibakar dalam oksigen berlebihan.
Alkohol manakah yang menghasilkan karbon dioksida dan air dalam nisbah mol 3:4?

- | | |
|-------------------------------------|--------------------------------------|
| A Methanol
<i>Metanol</i> | C Propanol
<i>Propanol</i> |
| B Ethanol
<i>Etanol</i> | D Butanol
<i>Butanol</i> |

- 41** Diagram 13 shows a part of heater found in an electric kettle regularly used by a housewife.

Rajah 13 menunjukkan bahagian pemanas yang terdapat dalam sebuah cerek elektrik yang sering digunakan oleh seorang suri rumah.



White layers contain calcium carbonate
Lapisan putih mengandungi kalsium karbonat

Diagram 13
Rajah 13

In order to remove the white layer, the housewife needs to add a substance into the kettle and leave for one hour before washing it with soap.
What is the substance?

Untuk menanggalkan lapisan putih tersebut, suri rumah perlu memasukkan sejenis bahan ke dalam cerek itu dan dibiarkan selama satu jam sebelum mencucinya dengan sabun.

Apakah bahan itu?

- | | |
|------------------|----------------------|
| A Salt | C Cooking oil |
| B Vinegar | D Wheat flour |

- 42** A child spilled curry gravy on her school uniform. The stain was very hard to be removed after being washed with a type of detergent.

Which additive should be added into a new detergent to make sure the stain can be removed?

Seorang kanak-kanak telah tertumpah kuah kari di atas baju sekolahnya. Kotoran itu sangat sukar ditanggalkan setelah dicuci dengan sejenis detergen.

Bahan tambah manakah yang perlu ditambah ke dalam detergen baharu bagi memastikan kotoran itu dapat ditanggalkan?

- | | |
|--|---|
| A Protease
<i>Protease</i> | C Sodium silicate
<i>Natrium silikat</i> |
| B Sodium carbonate
<i>Natrium karbonat</i> | D Fluorescent dyes
<i>Bahan pendarfluor</i> |

- 43** The reaction between 50 cm³ of 2.0 mol dm⁻³ hydrochloric acid and 50 cm³ of 2.0 mol dm⁻³ sodium hydroxide solution releases 5 040 J of heat. What is the temperature change of the mixture?

[Specific heat capacity of a solution = 4.2 J g⁻¹ °C⁻¹; Density of solution = 1 g cm⁻³]

Tindak balas antara 50 cm³ asid hidroklorik 2.0 mol dm⁻³ dan 50 cm³ larutan natrium hidroksida 2.0 mol dm⁻³ membebaskan 5 040 J haba.

Berapakah perubahan suhu bagi campuran itu?

[Muatan haba tentu larutan = 4.2 J g⁻¹ °C⁻¹; Ketumpatan larutan = 1 g cm⁻³]

- | | |
|-----------------|------------------|
| A 3.0 °C | C 12.0 °C |
| B 6.0 °C | D 24.0 °C |

- 44** Diagram 14 shows the apparatus set-up for the electrolysis of 25.0 cm³ of 1.0 mol dm⁻³ copper(II) sulphate solution using carbon electrodes.

Rajah 14 menunjukkan susunan radas bagi elektrolisis 25.0 cm³ larutan kuprum(II) sulfat 1.0 mol dm⁻³ dengan menggunakan elektrod karbon.

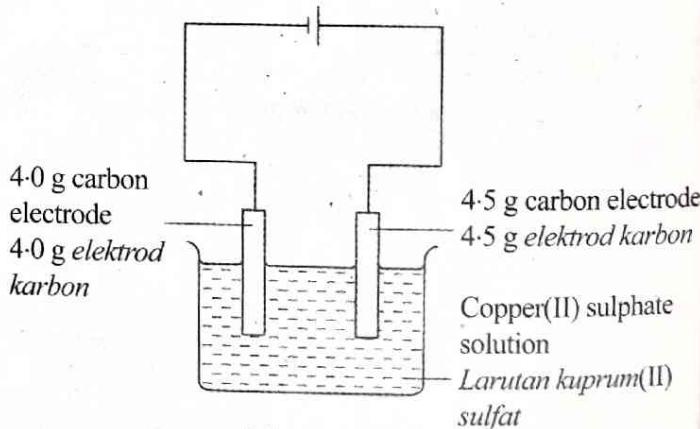


Diagram 14
Rajah 14

After the reaction is completed, the blue copper(II) sulphate solution turns colourless.

What is the mass of the carbon cathode?

[Relative atomic mass: C = 12, O = 16, S = 32, Cu = 64]

Selepas tindak balas selesai, larutan biru kuprumsulfat bertukar menjadi tanpa warna.

Apakah jisim elektrod katod karbon?

[Jisim atom relatif: C = 12, O = 16, S = 32, Cu = 64]

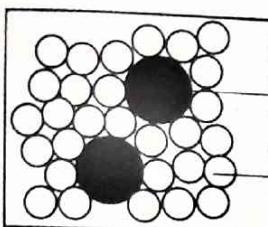
- | | |
|----------------|----------------|
| A 1.6 g | C 5.6 g |
| B 4.0 g | D 6.1 g |

- 45 The frame structure of a bridge bent after 5 months operated. A strong structure which can withstand corrosion is needed to construct a new frame. Which combination of substance is the most suitable to produce the frame?

Struktur kerangka sebuah jambatan telah bengkok selepas 5 bulan beroperasi. Suatu struktur yang kuat yang boleh menahan kakisan diperlukan untuk membina kerangka yang baharu.

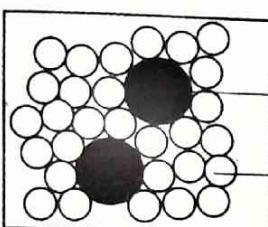
Kombinasi bahan manakah yang paling sesuai untuk menghasilkan kerangka tersebut?

A



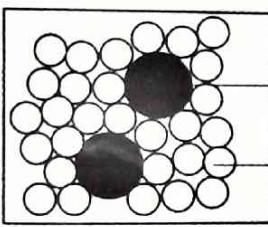
Copper
Kuprum
Nickel
Nikel

B



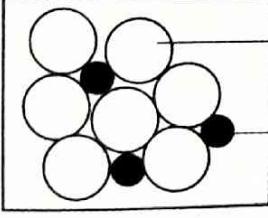
Tin
Timah
Copper
Kuprum

C



Aluminium
Aluminium
Magnesium
Magnesium

D



Ion
Ferum
Carbon
Karbon

- 46 Diagram 15 shows the situation that Ameng has been experiencing for a long time.

Rajah 15 menunjukkan situasi dialami oleh Ameng untuk sekian lama.

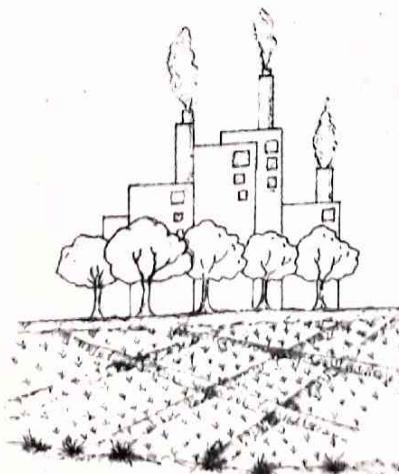


Diagram 15
Rajah 15

He has problem to carry out agricultural activities. Which substance can be used to solve his problem?

Dia telah menghadapi masalah untuk menjalani aktiviti pertanian.

Apakah bahan yang boleh digunakan untuk menyelesaikan masalahnya?

A Table salt

Garam biasa

B Wood ash

Abu kayu

C Rice husk

Sekam padi

D Lake water

Air tasik

- 47 Table 4 shows the information of elements X, Y and Z.

Jadual 4 menunjukkan maklumat bagi unsur X, Y dan Z.

Element/Unsur	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>
Melting point (°C) <i>Takat lebur (°C)</i>	1 285	650	839
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

- 48 What is the number of nitrate ions, NO_3^- in 2 mol of iron(III) nitrate, $\text{Fe}(\text{NO}_3)_3$?

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

Berapakah bilangan ion nitrat, NO_3^- dalam 2 mol ferum(III) nitrat, $\text{Fe}(\text{NO}_3)_3$?

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

A 1.204×10^{24}

B 1.806×10^{24}

C 3.010×10^{24}

D 3.612×10^{24}

- 49 Which sodium hydroxide solution neutralises 10 cm^3 of 0.5 mol dm^{-3} sulphuric acid?

Larutan natrium hidroksida manakah yang meneutralkan 10 cm^3 asid sulfurik 0.5 mol dm^{-3} ?

	Volume (cm^3) Isi padu (cm^3)	Concentration (mol dm^{-3}) Kepekatan (mol dm^{-3})
A	5	0.5
B	10	0.5
C	10	1.0
D	20	1.0

- 50 Diagram 16 shows volcanic eruptions which release gases such as CO_2 , SO_2 , H_2 , steam, H_2S , CO and HCl .

Rajah 16 menunjukkan letusan gunung berapi yang membebaskan gas seperti CO_2 , SO_2 , H_2 , wap air; H_2S , CO dan HCl .



Diagram 16

Rajah 16

To simulate the eruption in the laboratory, a pupil added 12.6 g of ammonium dichromate(VI), $(\text{NH}_4)_2\text{Cr}_2\text{O}_7$ in a mortar and immediately ignited.

The decomposition reaction of ammonium dichromate(VI) produces three substances, chromium(III) oxide, nitrogen gas and steam.

What is the volume of steam produced at room condition?

[Relative atomic mass: H = 1; N = 14; O = 16; Cr = 52;

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

Untuk mensimulasikan letusan di dalam makmal, seorang murid memasukkan 12.6 g ammonium dikromat(VI), $(\text{NH}_4)_2\text{Cr}_2\text{O}_7$ dalam mortar dan dinyalakan dengan serta-merta.

Tindak balas penguraian ammonium dikromat(VI) menghasilkan tiga bahan iaitu kromium(III) oksida, gas nitrogen dan wap air.

Berapakah isi padu wap air yang terhasil pada keadaan bilik?

[Jisim atom relatif: H = 1; N = 14; O = 16; Cr = 52;

Isi padu gas pada keadaan bilik = $24 \text{ dm}^3 \text{ mol}^{-1}$]

A 4.80 dm^3

C 0.30 dm^3

B 1.20 dm^3

D 0.20 dm^3