



Hakmilik Kumpulan Telegram Guru KIMIA MALAYSIA
untuk kecemerlangan pelajar KIMIA

Nama pelajar : _____

Sekolah : _____

Guru Pembimbing : _____



KOLEKSI SPM TOPIKAL KIMIA SPM

PENGENALAN KEPADA KIMIA JIRIM DAN STRUKTUR ATOM

1. Rajah 1 menunjukkan lengkung pemanasan bagi pepejal Z.
Diagram 1 shows the heating curve of solid Z.

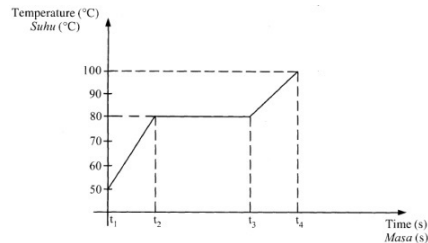


Diagram 1 *Rajah 1*

Penyataan manakah boleh dideduksikan daripada Rajah 1?
Which statement can be deduced from Diagram 1?

- A The melting point of substance Z is 100 °C.
Takat lebur bagi bahan Z ialah 100 °C.
- B All the substance Z is in liquid state at t_2 .
Semua bahan Z adalah dalam keadaan cecair pada t_2 .
- C The kinetic energy of particles in substance Z decreases from t_1 to t_2 .
Tenaga kinetik zarah-zarah dalam bahan Z berkurangan dari t_1 kepada t_2 .
- D Heat is absorbed to overcome the intermolecular forces from t_1 to t_2 .
Haba diserap untuk mengatasi daya antara molekul dari t_1 kepada t_2 .

2. Diagram 2 shows a graph of reactivity of elements against the proton number of elements X, Y and Z from the same group.
Rajah 2 menunjukkan graf kereaktifan unsur melawan nombor proton bagi unsur X, Y dan Z daripada kumpulan yang sama.

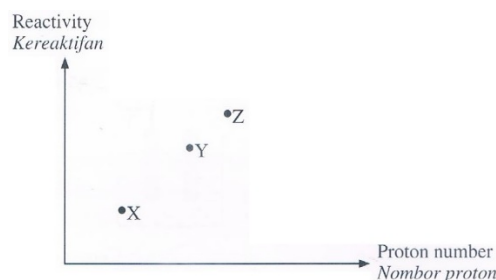


Diagram 2
Rajah 2

Which of the following is correct about the elements?
Antara yang berikut, yang manakah betul tentang unsur tersebut?

- A React with water to form acidic solution
Bertindak balas dengan air untuk membentuk larutan berasid
- B React with sulphuric acid to form white precipitate
Bertindak balas dengan asid sulfurik untuk membentuk mendakan putih
- C React in chlorine gas to form white solid
Bertindak balas dalam gas klorin untuk membentuk pepejal putih
- D React with sodium hydroxide solution to form sodium halide
Bertindak balas dengan larutan natrium hidroksida untuk membentuk natrium halida

3. Diagram 3 shows a compound that formed from three atoms Q and one atom R through sharing of electrons.

Rajah 3 menunjukkan sebatian yang terbentuk daripada tiga atom Q dan satu atom R melalui perkongsian elektron.

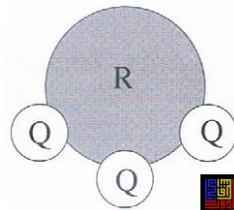


Diagram 3
Rajah 3

What is the property of the compound?
Apakah sifat bagi sebatian tersebut?

- | | |
|---|---|
| A Dissolves in dry propanone
Larut dalam propanon kering | C Dissolves in water to produce acidic solution
Larut dalam air untuk menghasilkan larutan berasid |
| B High melting point
Takat lebur yang tinggi | D Conducts electricity in molten state
Mengalirkan arus elektrik dalam keadaan leburan |

4. Diagram 4 shows an interconversion of the state of matter.
Rajah 4 menunjukkan satu perubahan keadaan jirim

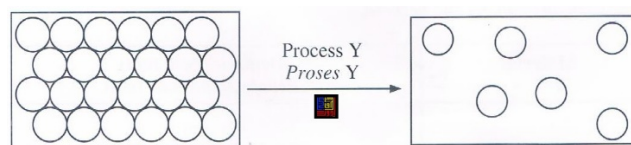


Diagram 4
Rajah 4

Which substance undergoes process Y?
Bahan manakah yang mengalami proses Y?

- | | |
|-------------------|---|
| I Iodine
Iodin | III Magnesium chloride
Magnesium klorida |
|-------------------|---|

II Sulphur
Sulfur

IV Ammonium chloride
Ammonium klorida

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

5. Diagram 5 shows the cooling curve of liquid X.
Rajah 5 menunjukkan lengkung penyejukan bagi cecair X.

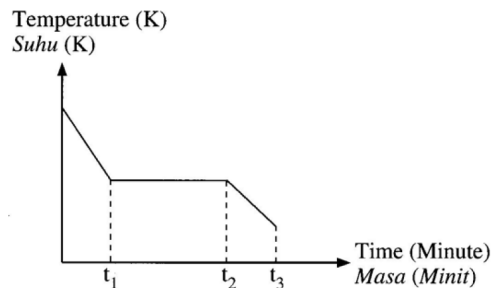


Diagram 5 / Rajah 5

Which of the following statements is correct?
Antara pernyataan berikut, yang manakah yang betul?

- A All particles vibrate at t_1
Semua zarah bergetar pada t_1
- B From t_1 to t_2 , particles do not release heat energy
Dari t_1 hingga t_2 , zarah-zarah tidak membebaskan tenaga haba
- C From t_2 to t_3 , particles are packed closely together
Dari t_2 hingga t_3 , zarah-zarah tersusun rapat dengan mampat
- D Forces of attraction between particles is overcome at t_2
Daya tarikan antara zarah-zarah diatasi pada t_2

6. Table 1 shows the boiling point and melting point of substances V, W, X and Y.
Jadual 1 menunjukkan takat didih dan takat lebur bagi bahan-bahan V, W, X dan Y.

Substance <i>Bahan</i>	Boiling point ($^{\circ}\text{C}$) <i>Takat didih ($^{\circ}\text{C}$)</i>	Melting point ($^{\circ}\text{C}$) <i>Takat lebur ($^{\circ}\text{C}$)</i>
V	268	197
w	170	150
X	130	80
Y	17	8

Table 1 *Jadual 1*

Which substance is a liquid at 100°C ?
Bahan manakah adalah cecair pada suhu 100°C ?

- A V
B W
- C X
D Y

7. Which substance consists of ion?
Bahan yang manakah terdiri daripada ion?

- A Carbon dioxide
Karbon dioksida
- B Sulphur dioxide
Sulfur dioksida
- C Calcium chloride
Kalsium klorida
- D Hydrogen chloride
Hidrogen klorida

8. Which substances are classified correctly?
Bahan-bahan yang manakah dikelaskan dengan betul?

	Electrolyte Elektrolit	Non-electrolyte Bukan elektrolit
A	Glucose solution Larutan glukosa	Tetrachloromethane Tetraklorometana
B	Tetrachloromethane Tetraklorometana	Sodium hydroxide solution Larutan natrium hidroksida
C	Magnesium nitrate solution Larutan magnesium nitrat	Glucose solution Larutan glukosa
D	Sodium hydroxide solution Larutan natrium hidroksida	Magnesium nitrate solution Larutan magnesium nitrat

9. Diagram 9 shows the apparatus set-up to study the reactivity of a metal with oxygen. The colour of the product formed is yellow when hot and white when cold.

Rajah 9 menunjukkan susunan radas untuk mengkaji kereaktifan suatu logam dengan oksigen. Warna hasil yang terbentuk adalah kuning apabila panas dan putih apabila sejuk.

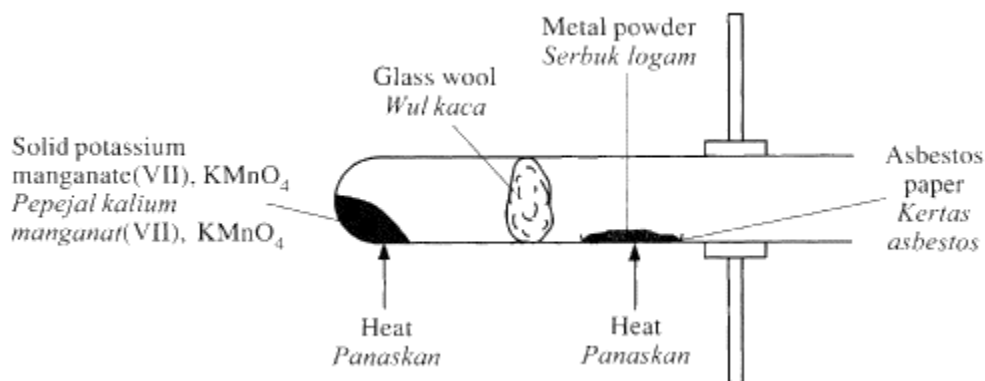


Diagram 9 Rajah 9

What is the metal?
Apakah logam itu?

- A Iron
Ferum
- B Lead
Plumbum
- C Zinc
Zink
- D Copper
Kuprum

15. Which of the following shows sublimation process?

Antara yang berikut, yang manakah menunjukkan proses pemejalwapan?

- A Bromine vapour spreads throughout gas jar
Wap bromin tersebar ke seluruh balang gas
- B Water changes into ice in the refrigerator
Air bertukar menjadi ais dalam peti sejuk
- C Naphthalene ball in cupboard becomes smaller
Bebola naftalena dalam almari menjadi lebih kecil
- D Volume of perfume decreases in an opened bottle
Isi padu minyak wangi berkurang dalam botol yang terbuka

16. What is the meaning of isotopes?

Apakah maksud isotop?

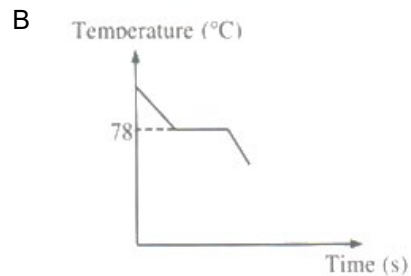
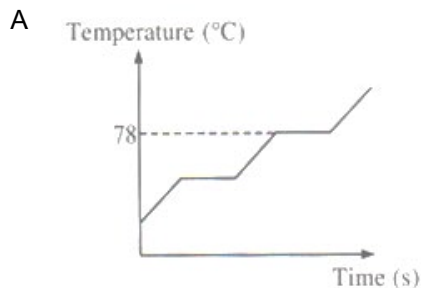
- A Atoms of the same element with the same nucleon number
Atom-atom unsur yang sama dengan nombor nukleon yang sama
- B Atoms of the same element with different of neutrons
Atom-atom unsur yang sama dengan bilangan neutron yang berbeza
- C Atoms of different elements with different proton numbers
Atom-atom unsur yang berbeza dengan nombor proton yang berbeza
- D Atoms of different elements with the same nucleon number
Atom-atom unsur yang berbeza dengan nombor nukleon yang sama

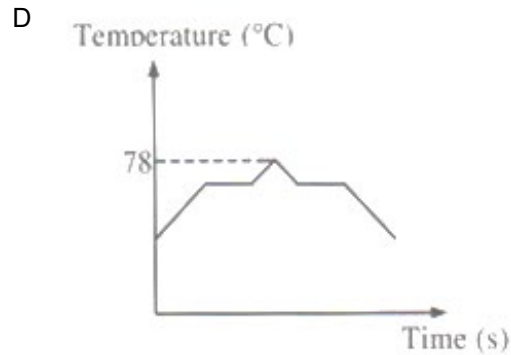
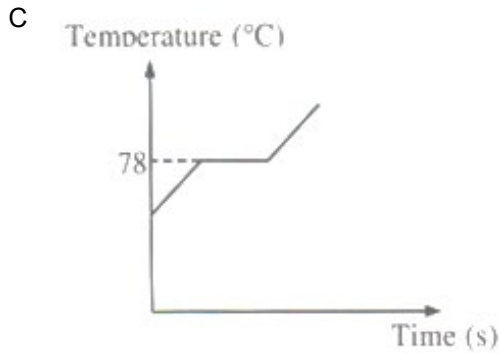
17.

Solid x is heated in a boiling tube and the temperature is recorded at regular time intervals. If the melting point of X is 78 °C, which graph represents the heating curve of X?

Pepejal X dipanaskan dalam sebuah tabung didih dan suhu direkodkan pada sela masa yang sekata.

Jika takat lebur X ialah 78 °C, graf manakah yang mewakili lengkung pemanasan bagi X?

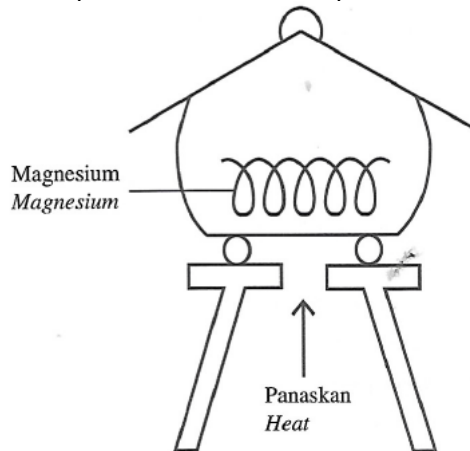




18. What is the number of atoms in 0.5 mol of ammonia gas, NH_3 ?
 [Avogadro constant = $6.02 \times 10^{23} \text{ mol}^{-1}$]
 Berapakah bilangan atom dalam 0.5 mol gas ammonia, NH_3 ?
 [Pemalar Avogadro = $6.02 \times 10^{23} \text{ mol}^{-1}$]

- | | | | |
|---|----------------------------------|---|---|
| A | 6.02×10^{23} | C | $0.5 \times 2 \times 6.02 \times 10^{23}$ |
| B | $0.5 \times 6.02 \times 10^{23}$ | D | $0.5 \times 4 \times 6.02 \times 10^{23}$ |

19. Rajah 19 menunjukkan susunan radas untuk menentukan formula empirik bagi suatu logam oksida.
 Diagram 19 shows the apparatus set-up to determine the empirical formula of a metal oxide.



Rajah 19 Diagram 19

Antara yang berikut, logam manakah yang menggunakan kaedah yang sama untuk menentukan formula empiriknya?

Which of the following metals uses the same method to determine its empirical formula?

- | | |
|-----------------|--------------------|
| A Stanum
Tin | C Zink
Zinc |
| B Ferum
Iron | D Kuprum
Copper |

20. Which particles are produced when an electrolyte dissolves in water?
Zarah manakah yang terhasil apabila elektrolit melarut dalam air?

- | | | | |
|---|----------------------|---|------------------------------|
| A | Ions
<i>Ion</i> | C | Electrons
<i>Elektron</i> |
| B | Atoms
<i>Atom</i> | D | Molecules
<i>Molekul</i> |

21. Diagram 21 shows the apparatus set-up to study the reactivity of a metal with oxygen. The colour of the product formed is yellow when hot and white when cold.

Rajah 21 menunjukkan susunan radas untuk mengkaji kereaktifan suatu logam dengan oksigen. Warna hasil yang terbentuk adalah kuning apabila panas dan putih apabila sejuk.

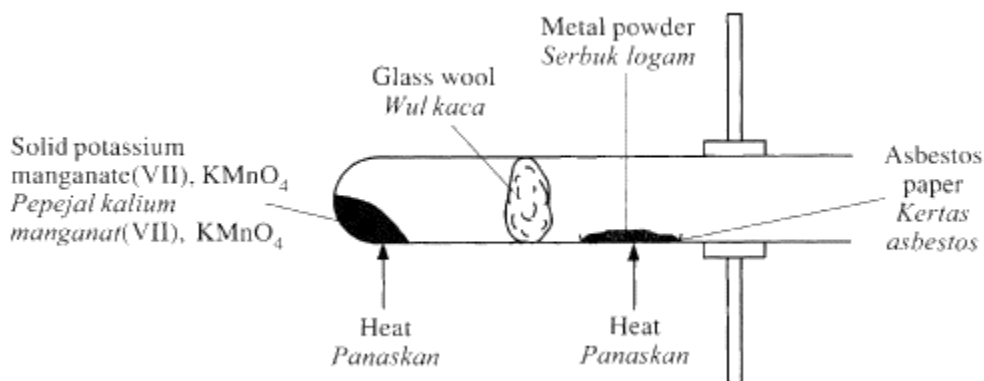


Diagram 21 Rajah 21

What is the metal?
Apakah logam itu?

- | | | | |
|---|------------------------|---|-------------------------|
| A | Iron
<i>Ferum</i> | C | Zinc
<i>Zink</i> |
| B | Lead
<i>Plumbum</i> | D | Copper
<i>Kuprum</i> |

22. 0.58 g flavouring substance is used to improve the taste of a pineapple cake. What is the number of molecules of the flavouring substance?

[Relative molecular mass of flavouring substance = 116 g mol⁻¹;
Avogadro constant = 6.02 x 10²³ mol⁻¹]

0.58 g bahan perisa digunakan untuk memperbaiki rasa sebiji kek nanas. Berapakah bilangan molekul bahan perisa itu?

[Jisim molekul relatif bahan perisa = 116 g mol⁻¹;
Pemalar Avogadro = 6.02 x 10²³ mol⁻¹]

- | | | | |
|---|------------------------|---|-----------------------|
| A | 8.31×10^{-27} | C | 3.01×10^{21} |
| B | 3.32×10^{-22} | D | 1.20×10^{26} |

23. Diagram 23 shows the arrangement of particles in three states of matter at room temperature.
Rajah 23 menunjukkan susunan zarah dalam tiga keadaan jirim pada suhu bilik.

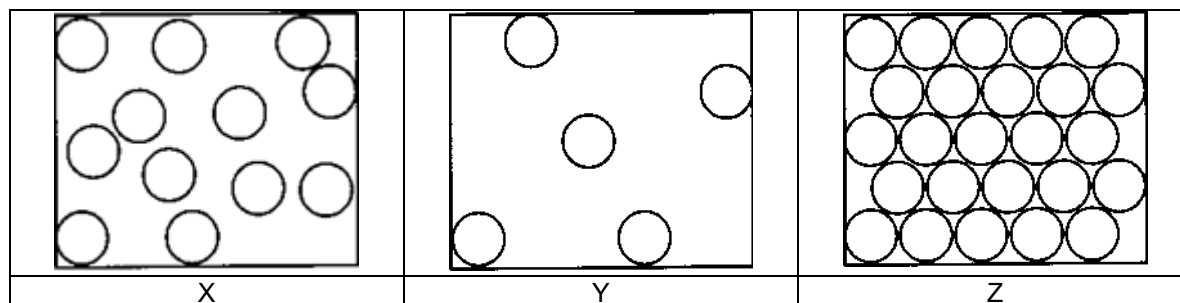


Diagram 23 / Rajah 23

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

Apakah bahan X, Y dan Z pada suhu bilik?

	X	Y	Z
A	Bromine <i>Bromin</i>	Naphthalene <i>Naftalena</i>	Nitrogen <i>Nitrogen</i>
B	Naphthalene <i>Naftalena</i>	Nitrogen <i>Nitrogen</i>	Bromine <i>Bromin</i>
C	Nitrogen <i>Nitrogen</i>	Bromine <i>Bromin</i>	Naphthalene <i>Naftalena</i>
D	Bromine <i>Bromin</i>	Nitrogen <i>Nitrogen</i>	Naphthalene <i>Naftalena</i>

24. The boiling point of chlorine is lower than bromine. Which statement best explains this phenomena?
Takat didih klorin lebih rendah daripada bromin. Pernyataan manakah yang paling baik menerangkan fenomena ini?

- A The atomic size of chlorine is smaller
Saiz atom klorin lebih kecil
- B The number of electrons in chlorine is smaller
Bilangan elektron dalam klorin lebih kecil
- C The covalent bond between chlorine atoms is weaker
Ikatan kovalen antara atom klorin lebih lemah
- D The force of attraction between chlorine molecules is weaker
Daya tarikan antara molekul klorin lebih lemah

KONSEP MOL, FORMULA KIMIA DAN PERSAMAAN KIMIA

25. What is the percentage of composition by mass of carbon atoms per molecule in octane, C_8H_{18} ?

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

Apakah peratus komposisi mengikut jisim bagi atom karbon per molekul dalam oktana, C_8H_{18} ?

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

- | | | | |
|---|--------|---|--------|
| A | 15.79% | C | 69.32% |
| B | 30.80% | D | 84.21% |

26. Diagram 26 shows the percentage by mass of elements in the allicin, which is a compound that causes the smell in garlic.

Rajah 26 menunjukkan peratusan mengikut jisim bagi unsur dalam alisin iaitu sebatian yang menyebabkan bau pada bawang putih.

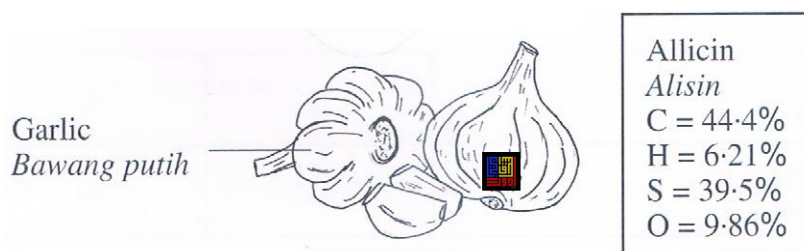


Diagram 26 Rajah 26

What is the empirical formula of allicin?

[Relative atomic mass : H = 1, C = 12, O = 16, S = 32]

Apakah formula empirik bagi alisin?

[Jisim atom relatif: H = 1, C = 12, O = 16, S = 32]

- | | | | |
|---|-----------------|---|--------------------|
| A | CHSO | C | $C_{12}H_5S_2O$ |
| B | $C_6H_{10}S_2O$ | D | $C_{12}H_{10}S_4O$ |

27. Diagram 27 shows a bulb filled with gas Y

Rajah 27 menunjukkan satu mentol berisi gas Y.

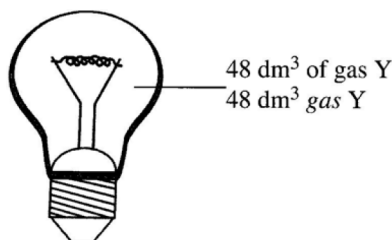


Diagram 27 Rajah 27

What is the number of atoms for gas Y?

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

Berapakah bilangan atom bagi gas Y?

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

- | | | | |
|---|----------------------------------|---|----------------------------------|
| A | $0.5 \times 6.02 \times 10^{23}$ | C | $1.2 \times 6.02 \times 10^{23}$ |
| B | $1.0 \times 6.02 \times 10^{23}$ | D | $2.0 \times 6.02 \times 10^{23}$ |

28. Ahmad filled four different types of gases into four balloons as shown in Diagram 28
Ahmad mengisi empat jenis gas yang berlainan ke dalam empat belon seperti yang ditunjukkan dalam Rajah 28

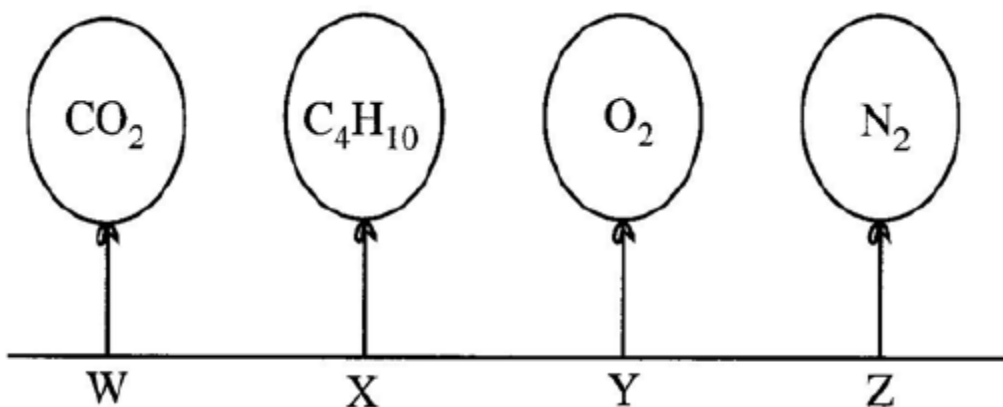


Diagram 28 Rajah 28

Which balloon becomes the smallest after one day?
[Relative atomic mass: H = 1, C = 12, N = 14, O = 16]
Belon manakah menjadi paling kecil selepas satu hari?
[Jisim atom relatif: H = 1, C = 12, N = 14, O = 16]

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

29. Diagram 29 shows a pack of fertiliser.
Rajah 29 menunjukkan sebungkus baja.

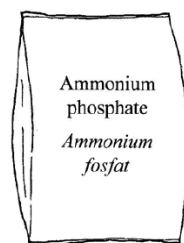


Diagram 29 Rajah 29

What is the total percentage of nitrogen and phosphorus in the fertiliser?
[Relative atomic mass: H = 1, N = 14, O = 16, P = 31]
Berapakah jumlah peratus nitrogen dan fosforus di dalam baja tersebut?
[Jisim atom relatif: H = 1, N = 14, O = 16, P = 31]

- | | | | |
|---|--------|---|--------|
| A | 20.81% | C | 39.82% |
| B | 28.19% | D | 48.99% |

30. What is the percentage of composition by mass of nitrogen atom in ammonium sulphate, $(\text{NH}_4)_2\text{SO}_4$?

[Relative atomic mass: H = 1, N = 14, O = 16, S = 32]

Apakah peratus komposisi mengikut jisim bagi atom nitrogen dalam ammonium sulfat, $(\text{NH}_4)_2\text{SO}_4$?

[Jisim atom relatif: H = 1, N = 14, O = 16, S = 32]

- | | | | |
|---|--------|---|--------|
| A | 10.61% | C | 21.21% |
| B | 12.28% | D | 24.56% |

31. Which substance has a different mass from 1 mol of glucose, $\text{C}_6\text{H}_{12}\text{O}_6$?

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

Bahan manakah mempunyai jisim yang berbeza daripada 1 mol glukosa, $\text{C}_6\text{H}_{12}\text{O}_6$?

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

- | | | | |
|---|---|---|--|
| A | 1 mol of naphthalene, C_{10}H_8
1 mol naftalena, C_{10}H_8 | C | 6 mol of ethane, C_2H_6
6 mol etana, C_2H_6 |
| B | 3 mol of propanol, $\text{C}_3\text{H}_7\text{OH}$
3 mol propanol, $\text{C}_3\text{H}_7\text{OH}$ | D | 10 mol of water, H_2O
10 mol air, H_2O |

32. What is the mass of oxygen in 88 g of carbon dioxide?

[Relative atomic mass: C = 12, O = 16]

Berapakah jisim oksigen dalam 88 g karbon dioksida?

[Jisim atom relatif C = 12, O = 16]

- | | | | |
|---|------|---|------|
| A | 16 g | C | 50 g |
| B | 32 g | D | 64 g |

33. Antara yang berikut, bahan manakah yang bersamaan dengan 1 mol? Which of the following substances equal to 1 mole?

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

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

[Jisim atom relatif: Na = 23, Cl = 35.5]

[Relative atomic mass: Na = 23, Cl = 35.5]

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

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

I Zink klorida mengandungi 6.02×10^{24} formula unit
Zinc chloride has 6.02×10^{24} formula units

II Natrium klorida mempunyai jisim 58.5 g
Sodium chloride has mass of 58.5 g

III Isi padu gas karbon dioksida pada keadaan bilik adalah 2400 cm^3
The volume of carbon dioxide gas at room conditions is 2400 cm^3

IV Ferum mengandungi 6.02×10^{23} atom
Iron has 6.02×10^{23} atoms

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

34. Diagram 34 shows the apparatus set-up to determine the empirical formula of lead(II) oxide.
Rajah 34 menunjukkan susunan radas untuk menentukan formula empirik plumbum(II) oksida.

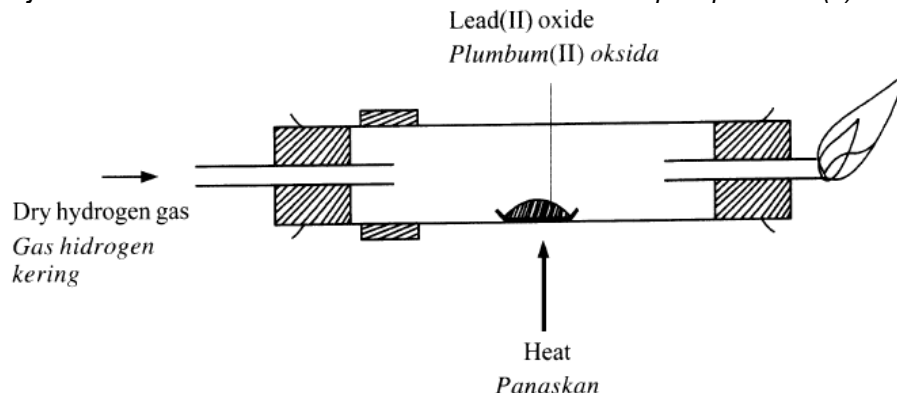


Diagram 34/ Rajah 34

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

Penyataan 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

1. Which atom forms a cation?

Atom manakah yang membentuk kation?

- A Chlorine
Klorin
- B Hydrogen
Hidrogen
- C Nitrogen
Nitrogen
- D Oxygen
Oksigen

35. Which information are needed to determine the empirical formula of a compound?
Maklumat manakah diperlukan untuk menentukan formula empirik bagi suatu sebatian?

- | | | | |
|-----|--|---|--------------------------|
| I | Relative atomic mass of element
Jisim atom relatif bagi unsur | | |
| II | Mass of elements in a compound
Jisim unsur dalam suatu sebatian | | |
| III | Proton number of atoms of elements
Nombor proton bagi atom unsur | | |
| IV | Number of atoms of elements in a compound
Bilangan atom bagi unsur dalam sebatian | | |
| A | I and II
I dan II | C | II and III
II dan III |
| B | I and IV
I dan IV | D | III and IV
III dan IV |

36. Diagram 11 shows a bottle of ascorbic used to treat scurvy.
Rajah 11 menunjukkan satu botol asid askorbik yang digunakan untuk merawat skurvi.

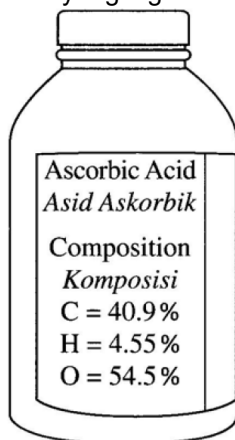


Diagram 36 Rajah 36

What is the empirical formula of ascorbic acid?
[Relative atomic mass: H = 1, C = 12, O = 16]
Apakah formula empirik bagi asid askorbik itu!
[Jisim atom relatif: H = 1, C = 12, O = 16]

- | | |
|---|--------------|
| A | $C_3H_4O_3$ |
| B | $C_3H_5O_3$ |
| C | $C_6H_4O_3$ |
| D | C_8HO_{11} |

37. Diagram 37 shows the apparatus set-up to determine the empirical formula of magnesium oxide. Rajah 37 menunjukkan susunan radas untuk menentukan formula empirik magnesium oksida.

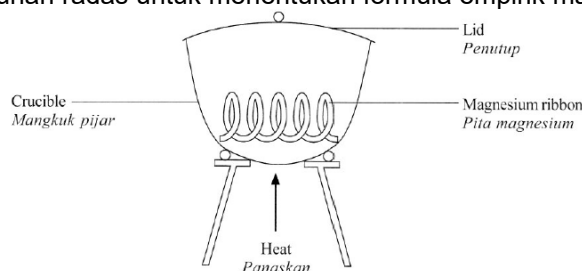


Diagram 37 / Rajah 37

Which step is correct to ensure the magnesium ribbon burnt completely?

Langkah manakah yang betul untuk memastikan pita magnesium itu terbakar dengan lengkap?

- A Raise the crucible lid once in a while during heating
Buka penutup mangkuk pijar sekali-sekala semasa pemanasan
- B Heat the magnesium ribbon strongly in the crucible without its lid
Panasakan pita magnesium itu dengan kuat dalam mangkuk pijar tanpa penutupnya
- C Cover the crucible with its lid as soon as the magnesium ribbon starts burning
Tutup mangkuk pijar dengan penutupnya sebaik sahaja pita magnesium itu mula terbakar
- D Repeat the process of heating, cooling and weighing until a constant mass is obtained
Ulang proses pemanasan, penyejukan dan penimbangan sehingga jisim tetap diperolehi

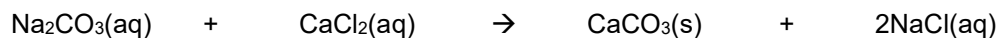
38. What is the meaning of Avogadro constant?

Apakah yang dimaksudkan dengan pemalar Avogadro?

- A Mass of one mole of a substance
Jisim bagi satu mol bahan
- B Pressure of one mole of a substance
Tekanan bagi satu mol bahan
- C Volume occupied by one mole of gas
Isi padu yang dipenuhi oleh satu mol gas
- D Number of particles in one mole of a substance
Bilangan zarah dalam satu mol Bahan

39. The following equation represents a chemical reaction.

Persamaan berikut mewakili satu tindak balas kimia.



Which statement is correct?

Penyataan manakah yang betul?

- A Two moles of sodium carbonate react with one mole of calcium chloride
Dua mol natrium karbonat bertindak balas dengan satu mol kalsium klorida
- B The products are calcium carbonate precipitate and sodium chloride solution
Hasil tindak balas ialah mendakan kalsium karbonat dan larutan natrium klorida
- C The reactants are solid sodium carbonate and calcium chloride solution
Bahan tindak balas ialah pepejal natrium karbonat dan larutan kalsium klorida
- D Two moles of calcium carbonate and one mole of sodium chloride are formed
Dua mol kalsium karbonat dan satu mol natrium klorida terbentuk

40. Which of the following contains the same number of molecules as in 8.8 g carbon dioxide gas?.

[Relative atomic mass : H = 1; C = 12; O = 16; S = 32; I = 127]

Antarayang berikut, yang manakah mempunyai bilangan molekul yang sama seperti yang terdapat dalam 8.8 g gas karbon dioksida?

[Jisim atom relatif : H = 1; C = 12; O = 16; S = 32; I = 127]

- | | | | |
|---|----------------------------------|---|---|
| A | 3.6 g of water
3.6 g air | C | 3.2 g of oxygen gas
3.2 g gas oksigen |
| B | 25.4 g of iodine
25.4 g iodin | D | 9.6 g of sulphur dioxide
9.6 g sulfur dioksida |

41. Eight atoms of element X has the same mass as two atoms of Tellurium, Te.

What is the relative atomic mass of X?

[Relative atomic mass: Te = 128]

Lapan atom unsur X mempunyai jisim yang sama dengan dua atom Telurium, Te. Berapakah jisim atom relatif X?

[Jisim atom relatif: Te = 128]

- | | | | |
|---|----|---|----|
| A | 8 | C | 32 |
| B | 16 | D | 64 |

42. What is the percentage composition by mass of water in hydrated iron(II) sulphate, $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$?

[Relative atomic mass: H = 1, O = 16, S = 32, Fe = 56]

Berapakah peratus komposisi jisim bagi air dalam ferum(II) sulfat terhidrat, $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$?

[Jisim atom relatif: H = 1, O = 16, S = 32, Fe = 56]

- | | | | |
|---|---------|---|---------|
| A | 9.00 % | C | 45.32 % |
| B | 14.12 % | D | 71.20 % |

43. A compound of magnesium nitrite contains 72 % of magnesium and 28 % of nitrogen.

What is the empirical formula of magnesium nitrite?

[Relative atomic mass: N = 14; Mg = 24]

Suatu sebatian magnesium nitrit mengandungi 72% magnesium dan 28% nitrogen.

Apakah formula empirik bagi magnesium nitrit?

[Jisim atom relatif. N = 14; Mg = 24]

- | | | | |
|---|-----------------------|---|-------------------------|
| A | MgN_2 | C | Mg_2N_3 |
| B | Mg_2N | D | Mg_3N_2 |

43. 3.2 g of gas X occupies 1120 cm^3 at standard temperature and pressure(STP). What is the relative molecular mass of X?

[Molar volume of gas at STP = $224 \text{ dm}^3 \text{ mol}^{-1}$]

3.2 g gas X menempati 1120 cm^3 pada suhu dan tekanan piawai(STP). Berapakah jisim molekul relatif bagi X?

[Isi padu molar gas pada STP = $224 \text{ dm}^3 \text{ mol}^{-1}$]

- | | | | |
|---|----|---|----|
| A | 16 | C | 64 |
| B | 32 | D | 70 |

44. The following equation represents the reaction between sodium and oxygen.
 Persamaan berikut mewakili tindak balas antara natrium dan oksigen.



What is the maximum mass of sodium oxide formed when 11.5 g of sodium is heated completely in oxygen?

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

Berapakah jisim maksimum natrium oksida yang terbentuk apabila 11.5 g natrium dipanaskan dengan lengkap dalam oksigen?

[Jisim atom relatif. Na = 23, O=16]

- A 15.5 g C 31.0 g
 B 19.5 g D 62.0 g

45. Why carbon-12 was chosen as a reference standard for relative atomic mass and relative molecular mass?

Mengapakah karbon-12 telah dipilih sebagai rujukan piawai untuk jisim atom relatif dan jisim molekul relatif?

- A Carbon has three isotopes
Carbon mempunyai tiga isotop
- B Carbon is non-metal element
Karbon merupakan unsur bukan logam
- C Carbon is a solid and easier to be handle
Karbon adalah pepejal dan lebih senang dikendalikan
- D Carbon is located in Group 14 in the Periodic Table of Elements
Karbon terletak dalam Kumpulan 14 dalam Jadual Berkala Unsur

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

	Chemical formula <i>Formula kimia</i>	Name <i>Nama</i>
A	MgO	magnesium oxide <i>magnesium oksida</i>
B	SO ₃	sulphur oxide <i>sulfur oksida</i>
C	CO	carbon oxide <i>karbon oksida</i>
D	Fe ₂ O ₃	iron oxide <i>ferum oksida</i>

47. The formula for potassium hexacyanoferrate(II) is given as $K_yFe(CN)_6$. Its relative formula mass is 368. What is the value of y ?

[Relative atomic mass: C = 12, N = 14, K = 39, Fe = 56]

Formula bagi kalium heksasianoferat(II) diberi sebagai $K_yFe(CN)_6$. Jisim formula relatif sebatian ini ialah 368. Apakah nilai y ?

[Jisim atom relatif. C = 12, N = 14, K = 39, Fe = 56]

- | | | | |
|---|---|---|---|
| A | 2 | C | 4 |
| B | 3 | D | 5 |

48. Which of the following particles equal to 1 mole?

Antara zarah yang berikut, yang manakah bersamaan dengan 1 mol?

- A The number of atom in 1 g of hydrogen gas
Bilangan atom dalam 1 g gas hidrogen
- B The number of molecule in 1 g of hydrogen gas
Bilangan molekul dalam 1 g gas hidrogen
- C 6.02×10^{23} of hydrogen atoms in hydrogen gas
 6.02×10^{23} atom hidrogen dalam gas hidrogen
- D 6.02×10^{23} of hydrogen molecule in hydrogen gas
 6.02×10^{23} molekul hidrogen dalam gas hidrogen

49. Which chemical formula is correctly named according to the IUPAC nomenclature system?

Formula kimia manakah yang dinamakan dengan betul berdasarkan sistem penamaan IUPAC?

	Chemical formula <i>Formula kimia</i>	Name <i>Nama</i>
A	MgO	magnesium oxide <i>magnesium oksida</i>
B	SO ₃	sulphur oxide <i>sulfur oksida</i>
C	CO	carbon oxide <i>karbon oksida</i>
D	Fe ₂ O ₃	iron oxide <i>ferum oksida</i>

50. The molecular formula of ethanoic acid is CH₃COOH. What is the empirical formula of ethanoic acid?

Formula molekul asid etanoik ialah CH₃COOH. Apakah formula empirik asid etanoik?

- | | | | |
|---|-------------------|---|--|
| A | CHO | C | C ₂ H ₂ O ₂ |
| B | CH ₂ O | D | C ₂ H ₄ O ₂ |

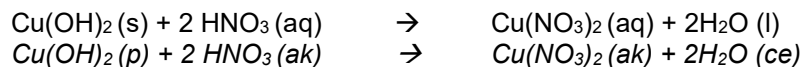
51. The proton number of atom R is 14 and its relative atomic mass is 28. Which statement is correct about R?

Nombor proton bagi atom R ialah 14 dan jisim atom relatifnya ialah 28. Pernyataan manakah yang betul tentang R?

- A The mass of 1 atom R is 28 g
Jisim bagi 1 atom R ialah 28 g
- B The molar mass of R is 28 g mol⁻¹
Jisim molar bagi R ialah 28 g mol⁻¹
- C 14 g of R contains 6.0 x 10²³ atoms
R mengandungi 6.0 x 10²³ atom
- D Atom R has 14 protons, 14 electron and 28 neutrons
Atom R mempunyai 14 proton, 14 elektron dan 28 neutron

52. The following equation represents a reaction.

Persamaan berikut mewakili satu tindak balas.



What are the reactants in this equations?

Apakah bahan-bahan tindak balas dalam persamaan ini?

- A Copper(II) nitrate and water
Kuprum(II) nitrat dan air
- B Copper(II) nitrate and nitric acid
Kuprum(II) nitrat dan asid nitrik
- C Copper(II) hydroxide and nitric acid
Kuprum(II) hidroksida dan asid nitrik
- D Copper(II) hydroxide and copper(II) nitrate
Kuprum(II) hidroksida dan kuprum(II) nitrat

53. Which of the following particles equal to 1 mole?

Antara zarah yang berikut, yang manakah bersamaan dengan 1 mol?

- A The number of atom in 1 g of hydrogen gas
Bilangan atom dalam 1 g gas hidrogen
- B The number of molecule in 1 g of hydrogen gas
Bilangan molekul dalam 1 g gas hidrogen
- C 6.02 x 10²³ of hydrogen atoms in hydrogen gas
6.02 x 10²³ atom hidrogen dalam gas hidrogen
- D 6.02 x 10²³ of hydrogen molecule in hydrogen gas
6.02 x 10²³ molekul hidrogen dalam gas hidrogen

54. Which process occurs when iodine crystals are heated at room temperature and pressure?
Proses manakah yang berlaku apabila hablur iodin dipanaskan pada suhu dan tekanan bilik

- A Melting
Peleburan
- B Freezing
Pembekuan
- C Evaporation
Penyejatan
- D Sublimation
Pemejalwapan

55. Diagram 55 is a graph of temperature-time for the heating of substance Q.
Rajah 55 adalah graf suhu-masa bagi pemanasan bahan Q.

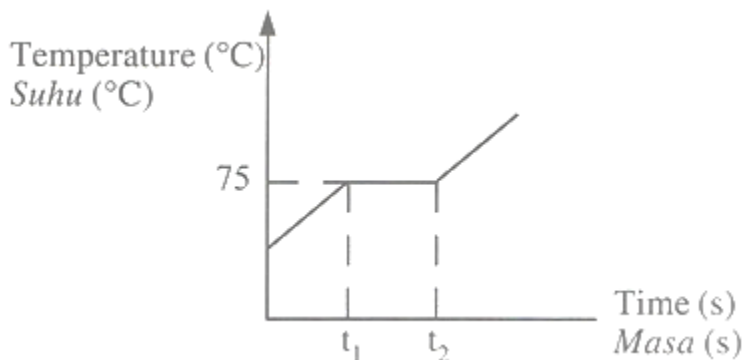


Diagram 55 *Rajah 55*

Which statement is correct about the property of substance Q based on the graph?
Pernyataan manakah yang betul mengenai sifat bahan Q berdasarkan graf itu?

- A Is a gas at room temperature
Adalah gas pada suhu bilik
- B Experiences physical changes at temperature 75 °C
Mengalami perubahan keadaan fizik pada suhu 75 °C
- C Releases heat at time interval t_1 and t_2
Membebaskan haba pada sela masa t_1 dan t_2
- D Only in liquid condition at time interval t_1 and t_2
Berada dalam keadaan cecair sahaja pada sela masa t_1 dan t_2

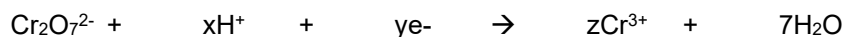
56. The following statements are the properties of compound M.
Penyataan berikut adalah sifat-sifat sebatian M.

- Has high melting point and boiling point.
 Mempunyai takat lebur dan takat didih yang tinggi.
- Conducts electricity in aqueous solution or molten state.
 Mengkonduksikan elektrik dalam larutan akueus atau dalam keadaan leburan.
- Dissolves in water but does not dissolve in organic solvents.
 Larut dalam air tetapi tidak larut dalam pelarut organik.

Which substance is compound M?
Bahan manakah sebatian M?

- | | | | |
|---|--|---|-------------------------------------|
| A | Cyclohexane
<i>Sikloheksana</i> | C | Diethyl ether
<i>Dietil eter</i> |
| B | Naphthalene
<i>Naftalena</i> | | |
| D | Sodium sulphate
<i>Natrium sulfat</i> | | |

57. 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 values 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

58. 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 fluorida. Apakah formula empirik bagi X fluorida itu?

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

- A XF
- B XF₂
- C X₂F
- D XF₄

59. Diagram 59 shows two types of gases filled in two balloons.
Rajah 59 menunjukkan dua jenis gas yang diisi ke dalam dua biji belon.

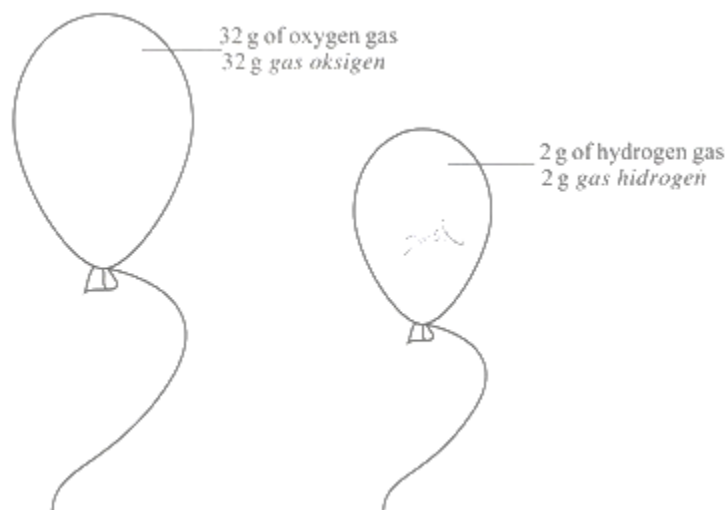


Diagram 59 / *Rajah 59*

Which statement is correct about the number of particles in oxygen gas?

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

Pernyataan manakah yang betul tentang bilangan zarah dalam gas oksigen?

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

- A Same as in hydrogen gas
Sama seperti dalam gas hidrogen
- B More than in hydrogen gas
Lebih banyak daripada dalam gas hidrogen
- C Two times more than in hydrogen gas
Dua kali lebih banyak daripada dalam gas hidrogen
- D 16 times more than in hydrogen gas
16 kali lebih banyak daripada dalam gas hidrogen

60. . Element M is in the same group as magnesium in the Periodic Table. It reacts with oxygen gas to form a compound with the formula MO.

Unsur M berada dalam kumpulan yang sama dengan magnesium dalam Jadual Berkala. Ia boleh bertindak balas dengan gas oksigen untuk membentuk satu sebatian yang mempunyai formula MO.

What is the formula of the fluoride of element M?

[Proton number : F = 9, Mg = 12]

Apakah formula bagi fluorida bagi unsur M?

[Nombor proton : F = 9, Mg = 12]

- A MF
- B MF₂
- C M₂F
- D M₂F₂

61. Rate of diffusion depends on the mass of the gas particles. Which gas has the highest rate of diffusion? [Molar mass: $\text{CH}_4 = 16 \text{ g mol}^{-1}$, $\text{NH}_3 = 17 \text{ g mol}^{-1}$, $\text{CO} = 28 \text{ g mol}^{-1}$, $\text{SO}_2 = 64 \text{ g mol}^{-1}$]

Kadar resapan bergantung kepada jisim zarah-zarah gas. Gas manakah mempunyai kadar resapan paling tinggi?

[Jisim molar: $\text{CH}_4 = 16 \text{ g mol}^{-1}$, $\text{NH}_3 = 17 \text{ g mol}^{-1}$, $\text{CO} = 28 \text{ g mol}^{-1}$, $\text{SO}_2 = 64 \text{ g mol}^{-1}$]

- A CO C NH₃
B SO₂ D CH₄

62. When copper(II) carbonate, CuCO_3 is heated, the gas released turns the lime water chalky. What is the volume of gas released when 0.62 g of copper(II) carbonate is heated at room conditions?

[Relative atomic mass: C = 12, O = 16, Cu = 64; Molar volume of gas = $24 \text{ dm}^3 \text{ mol}^{-1}$ at room conditions]

Apabila kuprum(II) karbonat, CuCO_3 dipanaskan, gas yang terbebas menukarkan air kapur menjadi keruh. Berapakah isi padu gas yang terbebas apabila 0.62 g kuprum(II) karbonat dipanaskan pada keadaan bilik? [jisim atom relatif : C =12, O =16, Cu =64; Isi padu molar gas = $24 \text{ dm}^3 \text{ mol}^{-1}$ pada keadaan bilik]

- A 5 cm^3 C 240 cm^3
B 120 cm^3 D 360 cm^3

63. Thiosulphate ion, $\text{S}_2\text{O}_3^{2-}$ reacts with an element M in Group 1 to form a compound. M is not the actual symbol of the element. What is the formula of the compound?

Ion tiosulfat, $\text{S}_2\text{O}_3^{2-}$ bertindak balas dengan suatu unsur M dalam Kumpulan 1 untuk membentuk suatu sebatian. M bukan simbol sebenar unsur itu. Apakah formula bagi sebatian tersebut?

- A MS_2O_3 C $\text{M}(\text{S}_2\text{O}_3)_2$
B $\text{M}_2\text{S}_2\text{O}_3$ D $\text{M}_2(\text{S}_2\text{O}_3)_3$

JADUAL BERKALA UNSUR DAN IKATAN KIMIA

64. Table 2 shows the time taken for the metal powder P, Q and R of the same mass to dissolve in dilute nitric acid.

Jadual 2 menunjukkan masa yang diambil bagi serbuk logam P, Q dan R dengan jisim yang sama untuk melarut dalam asid nitrik cair.

Metal Logam	P	Q	R
Time (s) Masa (s)	25	15	40

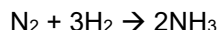
Table 64 Jadual 64

What are metals P, Q and R?

Apakah logam P, Q dan R?

	P	Q	R
A	Aluminium	Zink	Ferum
B	Zink	Aluminium	Ferum
C	Ferum	Zink	Aluminium
D	Zink	Ferum	Aluminium

65. Persamaan kimia berikut mewakili penyediaan gas ammonia.
The following chemical equation represents the preparation of ammonia gas.



Antara berikut pernyataan manakah yang betul?
Which of the following is the correct statement?

- A Dua molekul nitrogen bertindak balas dengan enam molekul hidrogen untuk menghasilkan enam molekul ammonia
Two nitrogen molecules react with six hydrogen molecules to produce six ammonia molecules
- B 1.0 g gas nitrogen bertindak balas dengan 3.0 g gas hidrogen untuk menghasilkan 2.0 g gas ammonia
1.0 g of nitrogen gas reacts with 3.0 g of hydrogen gas to produce 2.0 g of ammonia gas
- C 1 mol gas ammonia dihasilkan apabila 0.5 mol gas nitrogen bertindak balas dengan 1.5 mol gas hidrogen
1 mol of ammonia gas is produced when 0.5 mol of nitrogen gas reacts with 1.5 mol of hydrogen gas
- D Bilangan atom dalam gas ammonia terhasil adalah dua kali bilangan atom gas nitrogen yang digunakan
Number of atoms in ammonia gas produced is twice the number of atoms in nitrogen gas used

66. Rajah 66 menunjukkan satu invertebrata yang dijumpai dalam laut.
Diagram 66 shows an invertebrate found in the sea.

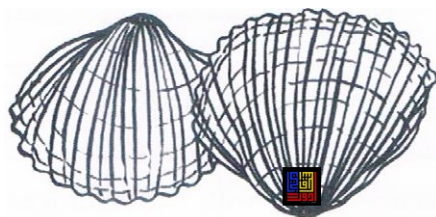


Diagram 66 Rajah 66

Cengkerang invertebrata adalah satu sebatian kimia.
 Bahan manakah mempunyai sifat fizik yang sama dengan sebatian tersebut?
The invertebrate's shell is a chemical compound.
Which substance has the same physical properties as the compound?

- | | |
|--------------------------------------|----------------------------|
| A Barium sulphate
Barium sulfat | C Naphthalene
Naftalena |
| B Sodium chloride
Natrium klorida | D Glucose
Glukosa |

67. Which of the following is the special characteristic of transition metals?
Antara yang berikut, yang manakah sifat istimewa bagi logam peralihan?

A Soft solid
Pepejal lembut

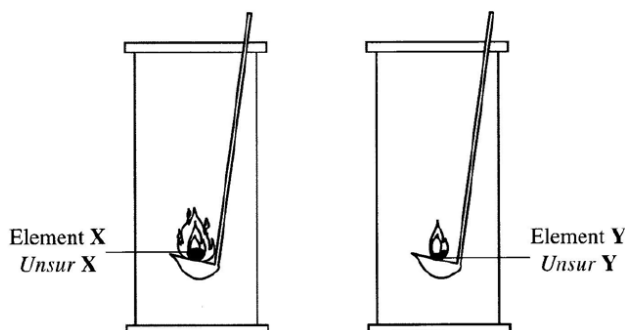
C Low melting point
Takat lebur rendah

B Soluble in water
Larut dalam air

D Form coloured ions
Membentuk ion berwarna

68. Rajah 68 menunjukkan susunan radas untuk mengkaji tindak balas dua unsur Kumpulan 1 yang berturutan dalam Jadual Berkala dengan gas oksigen.

Diagram 68 shows the apparatus set-up to study the reaction of two consecutive Group 1 elements in the Periodic Table with oxygen.



Apakah yang dapat diperhatikan apabila unsur-unsur itu dimasukkan ke dalam besen berisi air secara berasingan?

What can be observed when the elements are put into basins containing water separately?

	X	Y
A	Produce hiss sound Menghasilkan bunyi hiss	Produce pop sound Menghasilkan bunyi pop
B	Moves slowly on the surface of water Bergerak perlahan di atas permukaan air	Moves vigorously on the surface of water Bergerak cergas di atas permukaan air
C	Burns on the surface of water with purple flame Terbakar di atas permukaan air dengan nyalaan ungu	Burns on the surface of water with yellow flame Terbakar di atas permukaan air dengan nyalaan kuning
D	Turns universal indicator blue when dipped into the solution Menukarkan penunjuk semesta kepada biru bila dicelupkan ke dalam larutan	Turns universal indicator red when dipped into the solution Menukarkan penunjuk semesta kepada merah bila dicelupkan ke dalam larutan

69. Diagram 69 shows a group of elements in the Periodic Table of Elements.
Rajah 69 menunjukkan satu kumpulan unsur dalam Jadual Berkala Unsur.

↑	¹⁹ F 9
	³⁵ Cl 17
	⁸⁰ Br 35
	¹²⁷ I 53

Diagram 69 Rajah 69

Which of the following is correct about the elements from iodine to fluorine?
Antara yang berikut, yang manakah betul tentang unsur tersebut daripada iodin ke fluorin ?

A Density increases
Ketumpatan bertambah

C Boiling point increases
Takat didih meningkat

B Atomic size increases
Saiz atom bertambah

D Reactivity increases
Kereaktifan meningkat

70. Diagram 70 represents the electron arrangement of a compound formed between magnesium and fluorine.

Rajah 70 mewakili susunan elektron bagi satu sebatian yang terbentuk antara magnesium dengan fluorin.

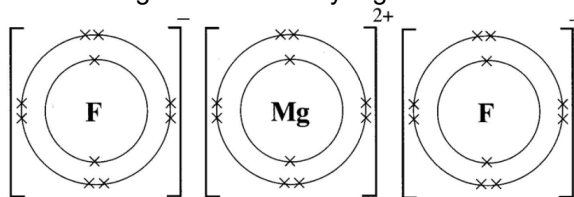


Diagram 70 Rajah 70

What is the property of the compound?
Apakah sifat bagi sebatian itu?

A Can conduct electricity in aqueous state
Boleh mengkonduksi elektrik dalam keadaan akueus

B Exists as liquid at room temperature
Wujud sebagai cecair pada suhu bilik

C Has low melting and boiling points
Mempunyai takat lebur dan takat didih yang rendah

D Soluble in organic solvent
Larut dalam pelarut organik

71. Jadual 71 menunjukkan nombor proton bagi dua unsur dalam Kumpulan 18 dalam Jadual Berkala Unsur.
 Table 71 shows the proton number of two elements in Group 18 of The Periodic Table of Elements.

Unsur Elements	Nombor proton Proton number
X	2
Y	18

Jadual 71 Table 71

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 Takat lebur Y lebih tinggi daripada X
 Melting point of Y is higher than X

C Daya tarikan antara atom X lebih kuat daripada Y
 Forces of attraction between atoms X are stronger than Y

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

72. Diagram 72 shows the electron arrangement for X^{2+} ion.
 Rajah 72 menunjukkan susunan elektron bagi ion X^{2+} .

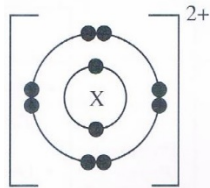
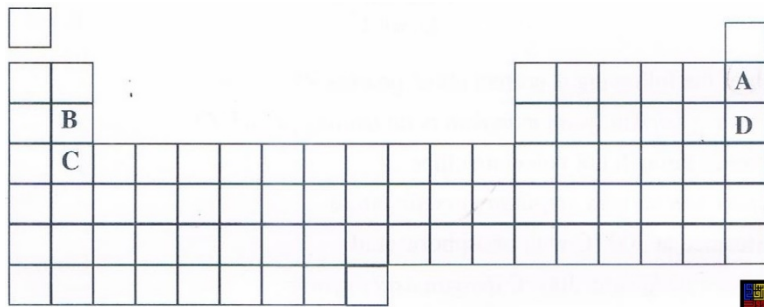


Diagram 72 Rajah 72

Which of the following is the position of element X in the Periodic Table of Element?
 Antara yang berikut, yang manakah kedudukan unsur X dalam Jadual Berkala Unsur?



73. Vinegar contains ethanoic acid, CH_3COOH .

What is the molarity of the vinegar with concentration of 40 g dm^{-3} ?

Cuka mengandungi asid etanoik, CH_3COOH .

Berapakah kemolaran cuka dengan kepekatan 40 g dm^{-3} ?

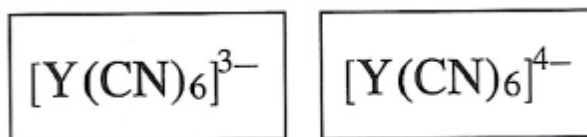
[Relative atomic mass: H = 1, C = 12, O = 16]

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

- | | | | |
|---|-------------------------------------|---|---|
| A | $\frac{40}{60} \text{ mol dm}^{-3}$ | C | $\frac{40}{60} \times 1000 \text{ mol dm}^{-3}$ |
| B | $\frac{60}{40} \text{ mol dm}^{-3}$ | D | $\frac{60}{40} \times 1000 \text{ mol dm}^{-3}$ |

74. Rajah 74 menunjukkan formula dua ion bagi unsur Y.

Diagram 74 shows the formulae of two ions of element Y.



Rajah 74 / Diagram 74

Antara yang berikut, logam manakah ialah unsur Y?

Which of the following metals is element Y?

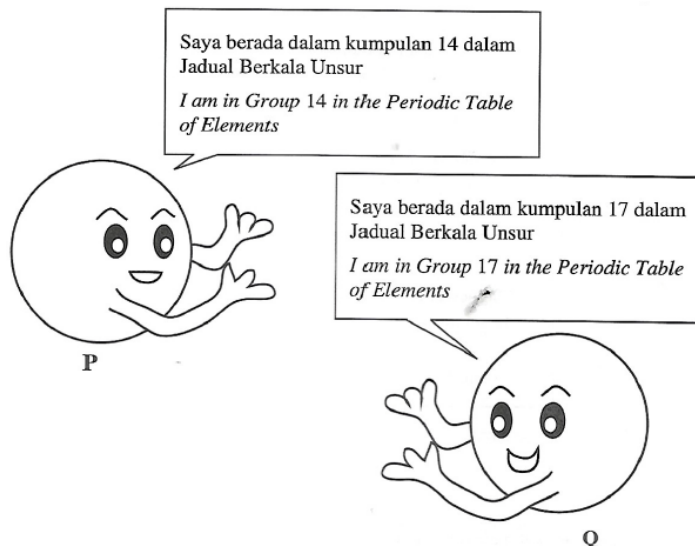
- | | |
|-----------------|--------------------------|
| A Ferum
Iron | C Kalsium
Calcium |
| B Zink
Zinc | D Aluminium
Aluminium |

75. Which of the following Group 1 elements has the smallest atomic size?

Antara unsur Kumpulan 1 berikut, yang manakah mempunyai saiz atom paling kecil

- | | |
|---------------------|------------------------|
| A Lithium
Litium | C Rubidium
Rubidium |
| B Sodium
Natrium | D Potassium
Kalium |

76. Rajah 76 menunjukkan satu ilustrasi perbualan antara atom P dan atom Q.
Diagram 76 shows an illustration of conversation between atom P and atom Q.



Rajah 76 Diagram 76

Apakah jenis ikatan kimia yang akan terbentuk antara atom P dan atom Q?
What is the type of chemical bond that will be formed between atom P and atom Q?

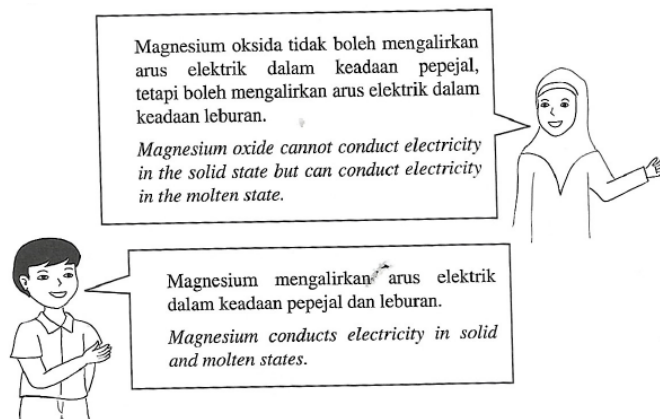
A Ion
Ionic

C Datif
Dative

B Logam
Metallic

D Kovalen
Covalent

77. Rajah 77 menunjukkan perbualan antara dua orang murid.
Diagram 77 shows a conversation between two students.



Rajah 77 Diagram 77

Antara yang berikut, penerangan manakah yang betul?
Which of the following explanations are correct?

	Magnesium Magnesium	Magnesium oksida Magnesium oxide
A	Terdiri daripada atom-atom Made up of atoms	Terdiri daripada ion-ion Made up of ions
B	Mengandungi elektron yang dinyahsetempat dalam keadaan pepejal Contains delocalised electrons in solid state	Mengandungi ion yang bebas bergerak dalam keadaan leburan Contains freely moving ions in molten state
C	Atom-atom diikat oleh ikatan logam yang kuat Atoms are held by strong metallic bond	Ion-ion dipegang oleh daya elektrostatik yang kuat Ions are held by strong electrostatic force
D	Mempunyai struktur kekisi yang kuat Has strong lattice structure	Mempunyai struktur kekisi yang lemah Has weak lattice structure

78. Rajah 78 menunjukkan pembentukan sejenis ikatan.
Diagram 78 shows the formation of a type of bond.



Rajah 78 Diagram 78

Antara yang berikut, pernyataan manakah yang betul tentang ikatan itu?
Which of the following statements is correct about the bond?

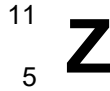
- A Pemindahan elektron antara atom logam dengan atom bukan logam
Transfer of electrons between metal atoms and non-metal atoms
- B Perkongsian elektron antara atom-atom bukan logam yang berasal daripada satu atom sahaja
Sharing of electrons between non-metal atoms that come from one atom only
- C Daya tarikan antara atom hidrogen yang terikat dengan satu atom yang lebih elektronegatif dalam molekul lain
The forces of attraction between hydrogen atoms that have bonded with an atom of high electronegativity in another molecule
- D Daya elektrostatik antara lautan elektron dengan ion logam bercas positif
The electrostatic forces between the sea of electrons and the positively-charged metal ions

79. An atom of element E has 16 neutrons. The nucleon number of element E is 31. Atom E receives electrons to form ion E. How many electrons in ion E?

Suatu atom bagi unsur E mempunyai 16 neutron. Nombor nukleon bagi unsur E ialah 31. Atom E menerima elektron untuk membentuk ion E. Berapakah bilangan elektron dalam ion E?

- A 10 C 16
 B 15 D 18

80. Rajah 80 menunjukkan perwakilan piawai bagi atom Z.
 Diagram 80 shows the standard representation of the atom Z.



Rajah 80 Diagram 80

Antara yang berikut, rajah manakah yang menunjukkan struktur atom yang betul untuk atom itu?
 Which of the following diagrams shows the correct atomic structure of the atom?

A		C	
B		D	

82. Antara yang berikut, model atom yang manakah dikemukakan oleh Rutherford?
 Which of the following atomic models was presented by Rutherford?

A		C	
B		D	

83. Which of the following is a monoatomic gas?
 Antara yang berikut, yang manakah adalah satu gas monoatom?

- | | | | |
|---|---------------------|---|----------------------|
| A | Oxygen
Oksigen | C | Helium
Helium |
| B | Fluorine
Fluorin | D | Nitrogen
Nitrogen |

84. Who discovered neutrons?
 Siapakah yang menjumpai neutron?

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

84. Seorang penduduk di Kampung Sentosa membuat aduan kepada Jabatan Air bahawa bil air rumahnya melonjak naik secara drastik. Pegawai jabatan itu mendapati terdapat kebocoran paip air bawah tanah di kawasan rumahnya dengan menggunakan sebuah alat pengesan.

Apakah bahan dalam alat pengesan yang digunakan oleh pegawai itu?

A resident in Kampung Sentosa made a complaint to the Water Department because his water bill increased drastically. The officer of the department found that there was an underground water pipe leakage in the house area by using a detector.

What is the substance in the detector used by the officer?

- | | | | |
|---|------------------------|---|------------------------------|
| A | Karbon-14
Carbon-14 | C | Fosforus-32
Phosphorus-32 |
| B | Kobalt-60
Cobalt-60 | D | Natrium-24
Sodium-24 |

85. Table 85 shows the electron arrangement for element W, X, Y and Z.
 Jadual 85 menunjukkan susunan elektron bagi unsur W, X, Y dan Z.

Element Unsur	Electron arrangement Susunan elektron
W	2.4
X	2.8
Y	2.8.2
Z	2.8.7

Table / Jadual 85

Which element is a metal?
 Unsur yang manakah merupakan suatu logam?

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

86. Table 86 shows the nucleon number and the number of neutrons for atoms W, X, and Z.
Jadual 86 menunjukkan nombor nukleon dan bilangan neutron bagi atom W, X, dan Z.

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

Table 86 / *Jadual 86*

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

- A W_2 C Y_2
 B X_2 D Z_2

87. 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 III Physical properties
Sifat fizik
 II Number of neutrons
Bilangan neutron 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

88. Diagram 88 shows the electron arrangement of a compound formed between atom W and atom Y.
Rajah 88 menunjukkan susunan elektron bagi sebatian yang terbentuk antara atom W dengan atom Y.

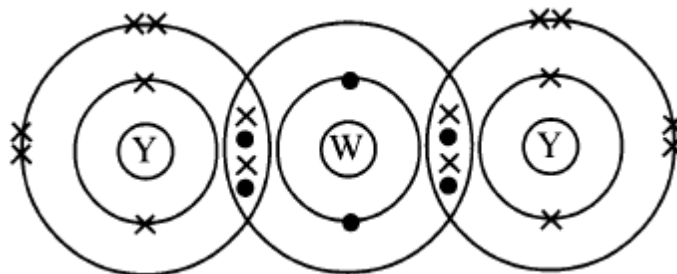
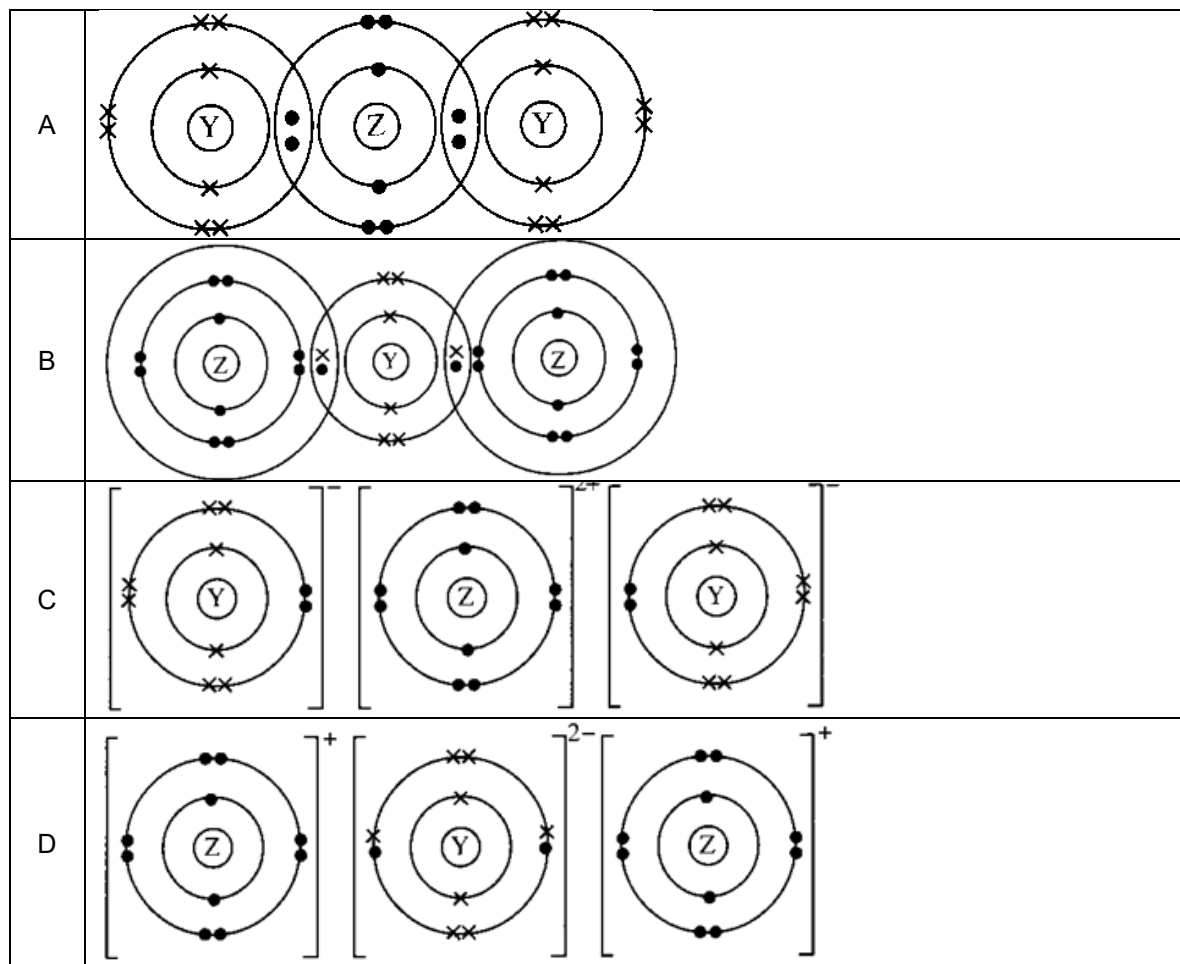


Diagram / *Rajah 88*

Atom Y juga membentuk satu sebatian dengan atom Z.
Antara yang berikut, yang manakah susunan elektron bagi sebatian yang terbentuk?
 [Nombor proton Z = 11]

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]



89. 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 Al₂O₃
 B AlO₂ D Al₃O₂

90. Eight atoms of element X has the same mass as two atoms of Tellurium, Te.
 What is the relative atomic mass of X?

[Relative atomic mass: Te = 128]

Lapan atom unsur X mempunyai jisim yang sama dengan dua atom Telurium, Te. Berapakah jisim atom relatif X?

[Jisim atom relatif: Te = 128]

- A 8 C 32
 B 16 D 64

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

A Ether
Eter

B Water
Air

C Hexane
Heksana

D Methylbenzene
Metilbenzena

92. What is the percentage composition by mass of water in hydrated iron(II) sulphate, $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$?
[Relative atomic mass: H = 1, O = 16, S = 32, Fe = 56]

Berapakah peratus komposisi jisim bagi air dalam ferum(II) sulfat terhidrat, $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$?
[Jisim atom relatif: H = 1, O = 16, S = 32, Fe = 56]

A 9.00 % C 45.32 %
B 14.12 % D 71.20 %

93. Table 93 shows the electron arrangement of element Y and element Z.
Jadual 93 menunjukkan susunan elektron bagi unsur Y dan unsur Z.

Element Y Unsur Y	Element Z Unsur Z
2.4	2.6

Table / Jadual 93

What is the formula and the type of bond of the compound formed from the reaction between Y and Z?
Apakah formula dan jenis ikatan bagi sebatian yang terbentuk daripada tindak balas antara Y dan Z?

	Formula Formula	Type of bond Jenis ikatan
A	Y_2Z	Covalent Kovalen
B	Y_2Z	Ionic Ionik
C	YZ_2	Covalent Kovalen
D	YZ_2	Ionic Ionik

94. Element X reacts with sulphur to form a compound with formula, X_2S . What is the correct electron arrangement of X?

[Proton number: S = 16]

Unsur X bertindak balas dengan sulfur membentuk satu sebatian dengan formula, X_2S . Apakah susunan elektron yang betul bagi X?

[Nombor proton: S = 16]

- | | | | |
|---|-------|---|-------|
| A | 2.8.1 | C | 2.8.3 |
| B | 2.8.2 | D | 2.8.4 |

95.. Which of the following is the correct change in property of elements across the period in the Periodic Table of Elements?

Antara yang berikut, yang manakah betul mengenai perubahan sifat unsur merentasi kala dalam Jadual Berkala Unsur?

- | | |
|---|--|
| A | The atomic radius increases
Jejari atom meningkat |
| B | The relative atomic mass decreases
Jisim atom relatif berkurang |
| C | The number of proton in each atom increases
Bilangan proton dalam setiap atom meningkat |
| D | The number of valence electrons in each atom decreases
Bilangan elektron valens dalam setiap atom berkurang |

96. Which of the following elements is stored in paraffin oil?

Antara unsur berikut, yang manakah disimpan dalam minyakparafin?

- | | |
|-----------------------|--------------------------|
| A Cadmium
Kadmium | C Chromium
Kromium |
| B Potassium
Kalium | D Magnesium
Magnesium |

97. Element M is located in the same group with iron in the Periodic Table of Elements.

Which of the following are the characteristics of M?

Unsur M terletak dalam kumpulan yang sama dengan ferum dalam Jadual Berkala Unsur.

Antara yang berikut, yang manakah ciri-ciri bagi M?

I Low melting point

Takat lebur yang rendah

II Poor heat conductor

Konduktor baba yang lemah

III Act as a catalyst

Bertindak sebagai pemangkin

IV Has more than one oxidation number

Mempunyai lebih daripada satu nombor pengoksidaan

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

98. Diagram 98 shows the apparatus set-up to study the reactivity of Group 1 elements of the Periodic Table of elements in reaction with oxygen.

Rajah 98 menunjukkan susunan radas untuk mengkaji kereaktifan unsur dalam Kumpulan 1 Jadual Berkala Unsur bertindak balas dengan oksigen.

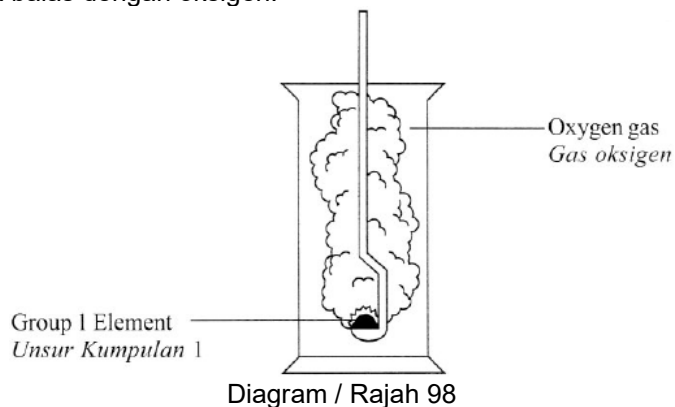


Table 98 shows the observations for each reaction.

Jadual 98 menunjukkan pemerhatian bagi setiap tindak balas.

Element Unsur	Observation Pemerhatian
X	Burns vigorously with purple flame Terbakar sangat cergas dengan nyalaan ungu
Y	Burns slowly with red flame Terbakar perlahan dengan nyalaan merah
Z	Burns vigorously with yellow flame Terbakar sangat cergas dengan nyalaan kuning

Table / Jadual 98

Which of the following is the correct descending order of reactivity of these elements with oxygen?

Antara yang berikut, yang manakah tertib secara menurun yang betul bagi kereaktifan unsur ini dengan oksigen?

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

99. Which characteristic is similar for all elements in Group 17 of the Periodic Table?

Ciri manakah yang sama bagi semua unsur Kumpulan 17 dalam Jadual Berkala?

- A Form coloured ions
Membentuk ion-ion berwarna
- B High melting and boiling points
Takat lebur dan takat didih yang tinggi
- C Exist as gas at room temperature
Wujud sebagai gas pada suhu bilik
- D Dissolve in water to form acidic solution
Larut dalam air untuk membentuk larutan berasid

100. Which statement best explains the formation of a covalent bond?
 Pernyataan manakah yang paling baik menerangkan tentang pembentukan ikatan kovalen?

- A Metal atoms share electrons with non-metal atoms
 Atom logam berkongsi elektron dengan atom bukan logam
- B Non-metal atoms share electrons with non-metal atoms
 Atom bukan logam berkongsi elektron dengan atom bukan logam
- C Metal atoms donate electrons while non-metal atoms accept electrons
 Atom logam menderma elektron manakala atom bukan logam menerima elektron
- D Non-metal atoms donate electrons while metal atoms accept electrons
 Atom bukan logam menderma elektron manakala atom logam menerima elektron

101. Element Y is located in the same group as chlorine in the Periodic Table of Elements. Which of the following is correct about Y?

Unsur Y terletak dalam kumpulan yang sama dengan klorin dalam Jadual Berkala Unsur. Antara yang berikut, yang manakah betul tentang Y?

- A Forms Y^+ ion
 Membentuk ion Y^+
- B Forms basic oxide
 Membentuk oksida bes
- C Exists as monoatomic
 Wujud sebagai monoatom
- D Has seven valence electrons
 Mempunyai tujuh elektron valens

102. Diagram 102 shows a flow chart for a reaction of the oxide of an element in Period 3 of the Periodic Table.

Rajah 102 menunjukkan carta alir bagi tindak balas oksida suatu unsur dalam Kala 3 Jadual Berkala.

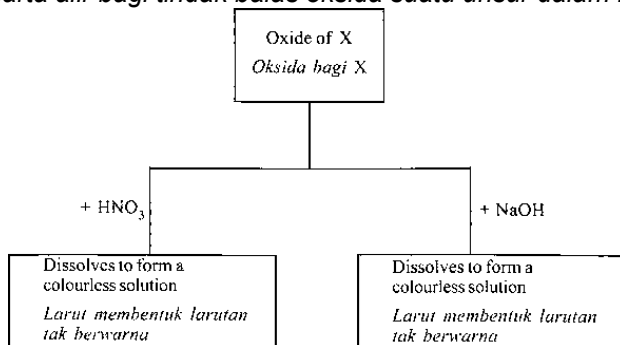
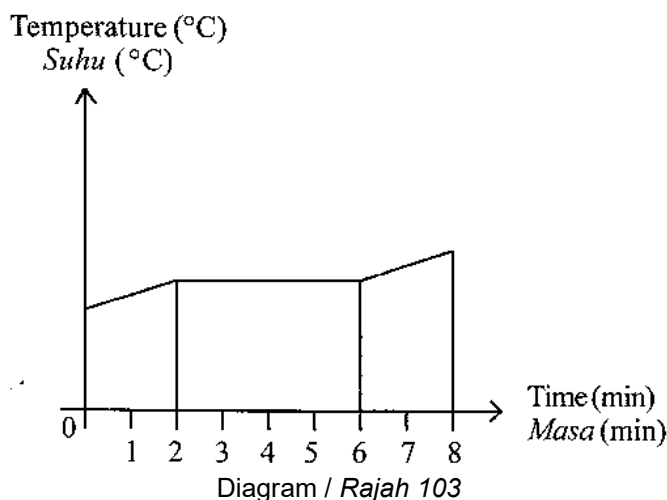


Diagram 102 / RAJAH 102

What is X?
 Apakah X?

- A Sodium
Natrium
- B Sulphur
Sulfur
- C Magnesium
Magnesium
- D Aluminium
Aluminium

103. Diagram 103 shows the heating curve of solid benzoic acid.
Rajah 103 menunjukkan lengkung pemanasan bagi pepejal asid benzoik.



Which statement can be deduced from Diagram 103?
Penyataan manakah yang boleh dideduksikan daripada Rajah 103?

- A No heat is absorbed in the first 2 minutes
Tiada haba diserap dalam 2 minit pertama
- B Benzoic acid needs 8 minutes to melt completely
Asid benzoik memerlukan 8 minit untuk melebur selengkapnya
- C Benzoic acid undergoes physical changes between 2nd minute to 6th minute
Asid benzoik mengalami perubahan fizikal diantara minit ke 2 hingga minit ke 6
- D The attractive forces between particles of benzoic acid become stronger after 6 minutes
Daya tarikan antara zarah-zarah asid benzoik menjadi semakin kuat selepas 6 minit

104. Compound Z has the following properties.
Sebatian Z mempunyai sifat-sifat berikut.

*Takat lebur dan takat didih yang tinggi
 Larut dalam air tetapi tak larut dalam pelarut organik
 Mengkonduksikan elektrik dalam keadaan lebur atau larutan akueus*

What is Z?
Apakah Z?

- A Acetamide
Asetamida
- B Naphthalene
Naftalena
- C Sodium chloride
Natrium klorida
- D Carbon monoxide

Karbon monoksida

105. The nucleon number of element X is 19. Element X has 10 neutrons. Which element has the same chemical properties as element X?

[Proton number: O = 8, Na = 11, Cl = 17, Ar = 18]

Nombor nukleon unsur X ialah 19. Unsur X mempunyai 10 neutron. Unsur manakah yang mempunyai sifat kimia yang sama dengan unsur X?

[Nombor protom O = 8, Na = 11, Cl = 17, Ar = 18]

- | | | | |
|---|--------------------------|---|---------------------------|
| A | Argon
<i>Argon</i> | C | Chlorine
<i>Klorin</i> |
| B | Sodium
<i>Natrium</i> | D | Oxygen
<i>Oksigen</i> |

107. The formula for potassium hexacyanoferrate(II) is given as $K_yFe(CN)_6$. Its relative formula mass is 368. What is the value of y?

[Relative atomic mass: C = 12, N = 14, K = 39, Fe = 56]

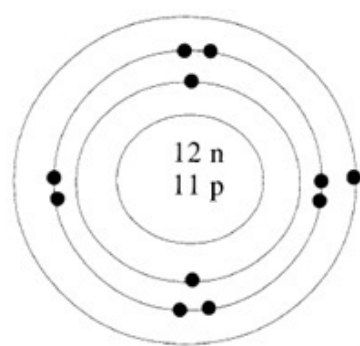
Formula bagi kalium heksasianoferat(II) diberi sebagai $K_yFe(CN)_6$. Jisim formula relatif sebatian ini ialah 368. Apakah nilai y?

[Jisim atom relatif. C = 12, N = 14, K = 39, Fe = 56]

- | | | | |
|---|---|---|---|
| A | 2 | C | 4 |
| B | 3 | D | 5 |

108. Diagram 108 shows electron arrangement of element L.

Rajah 108 menunjukkan susunan elektron bagi unsur L.



Which symbol represents the atom of element L?

Simbol manakah yang mewakili atom bagi unsur L?

- | | | |
|---|--|---|
| A | $\begin{matrix} 23 \\ 11 \end{matrix}$ | L |
| B | $\begin{matrix} 11 \\ 23 \end{matrix}$ | L |
| C | $\begin{matrix} 12 \\ 11 \end{matrix}$ | L |
| D | $\begin{matrix} 11 \\ 11 \end{matrix}$ | L |

109. Diagram 109 shows the method used to store an element.
Rajah 109 menunjukkan kaedah menyimpan satu unsur.



Diagram / Rajah 109

Which of the following explains why the method is used?

Antara yang berikut, yang manakah menerangkan mengapa kaedah ini digunakan?

- A To avoid from reaction with sunlight
Untuk mengelakkan daripada tindak balas dengan cahaya matahari
- B The element is toxic and dangerous
Unsur itu adalah toksik dan berbahaya
- C The element is reactive and volatile
Unsur itu adalah reaktif dan mudah meruap
- D To avoid from reaction with oxygen in the air
Untuk mengelakkan daripada tindak balas dengan oksigen dalam udara

110. Table 2 shows the proton number of elements W, X, Y and Z.

Jadual 2 menunjukkan nombor proton bagi unsur-unsur W, X, Y dan Z.

Element <i>Unsur</i>	W	X	Y	Z
Proton number <i>Nombor proton</i>	3	6	11	12

Table / Jadual 110

Which arrangement shows the atomic size of the elements in ascending order?

Susunan manakah menunjukkan saiz atom unsur-unsur dalam tertib menaik?

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

36. Helium gas is used to fill weather balloons because of its inert property. Which of the following is the best explanation of the property?

Gas helium digunakan untuk mengisi belon kaji cuaca kerana sifat lengainya. Antara yang berikut, penerangan manakah yang paling baik mengenai sifat itu?

- A Has low density
Mempunyai ketumpatan yang rendah
- B Exists as monoatomic gas
Wujud sebagai gas monoatom
- C Achieved stable electron arrangement
Mencapai susunan elektron yang stabil
- D Placed in Group 18 in the Periodic Table
Berada dalam Kumpulan 18 dalam Jadual Berkala

110. Thiosulphate ion, $S_2O_3^{2-}$ reacts with an element M in Group 1 to form a compound. M is not the actual symbol of the element. What is the formula of the compound?

Ion tiosulfat, $S_2O_3^{2-}$ bertindak balas dengan suatu unsur M dalam Kumpulan 1 untuk membentuk suatu sebatian. M bukan simbol sebenar unsur itu. Apakah formula bagi sebatian tersebut?

- A MS_2O_3
- B $M_2S_2O_3$
- C $M(S_2O_3)_2$
- D $M_2(S_2O_3)_3$

111. Uranium-235 and uranium-238 are isotopes. Which statement is correct?

[Proton number of uranium = 92]

Uranium-235 dan uranium-238 adalah isotop. Pernyataan manakah yang betul?

[Nombor proton bagi uranium = 92]

- A Uranium-235 has 92 protons and 143 electrons
Uranium-235 mempunyai 92 proton dan 143 elektron
- B Uranium-238 has 92 electrons and 146 neutrons
Uranium-238 mempunyai 92 elektron dan 146 neutron
- C Uranium-235 has less number of electrons than uranium-238
Uranium-235 mempunyai bilangan elektron kurang daripada uranium-238
- D Uranium-235 has the same number of neutrons as uranium-238
Uranium-235 mempunyai bilangan neutron yang sama dengan uranium-238

112. The following statements are the properties of compound M.

Penyataan berikut adalah sifat-sifat sebatian M.

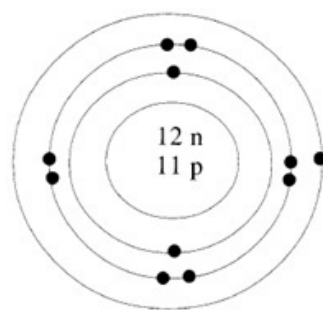
- Has high melting point and boiling point.
Mempunyai takat lebur dan takat didih yang tinggi.
- Conducts electricity in aqueous solution or molten state.
Mengkonduksikan elektrik dalam larutan akueus atau dalam keadaan leburan.
- Dissolves in water but does not dissolve in organic solvents.
Larut dalam air tetapi tidak larut dalam pelarut organik.

Which substance is compound M?

Bahan manakah sebatian M?

- A Cyclohexane
Sikloheksana
- B Naphthalene
Naftalena
- C Diethyl ether
Dietil eter
- D Sodium sulphate
Natrium sulfat

113. Diagram 113 shows electron arrangement of element L.
Rajah 113 menunjukkan susunan elektron bagi unsur L.



Which symbol represents the atom of element L?
 Simbol manakah yang mewakili atom bagi unsur L?

- | | | |
|---|----------|---|
| A | 23
11 | L |
| B | 11
23 | L |
| C | 12
11 | L |
| D | 11
11 | L |

114. The following statements are the properties of compound M.
Penyataan berikut adalah sifat-sifat sebatian M.

- Has high melting point and boiling point.
 Mempunyai takat lebur dan takat didih yang tinggi.
- Conducts electricity in aqueous solution or molten state.
 Mengkonduksikan elektrik dalam larutan akueus atau dalam keadaan leburan.
- Dissolves in water but does not dissolve in organic solvents.
 Larut dalam air tetapi tidak larut dalam pelarut organik.

Which substance is compound M?
Bahan manakah sebatian M?

- | | |
|---|--|
| A | Cyclohexane
<i>Sikloheksana</i> |
| B | Naphthalene
<i>Naftalena</i> |
| C | Diethyl ether
<i>Dietil eter</i> |
| D | Sodium sulphate
<i>Natrium sulfat</i> |

115. The nucleon number of element X is 19. Element X has 10 neutrons. Which element has the same chemical properties as element X?

[Proton number: O = 8, Na = 11, Cl = 17, Ar = 18]

Nombor nukleon unsur X ialah 19. Unsur X mempunyai 10 neutron. Unsur manakah yang mempunyai sifat kimia yang sama dengan unsur X?

[Nombor protom O = 8, Na = 11, Cl = 17, Ar = 18]

- A Argon
Argon
- B Sodium
Natrium
- C Chlorine
Klorin
- D Oxygen
Oksigen

116. Uranium-235 and uranium-238 are isotopes. Which statement is correct?

[Proton number of uranium = 92]

Uranium-235 dan uranium-238 adalah isotop. Pernyataan manakah yang betul?

[Nombor proton bagi uranium = 92]

- A Uranium-235 has 92 protons and 143 electrons
Uranium-235 mempunyai 92 proton dan 143 elektron
- B Uranium-238 has 92 electrons and 146 neutrons
Uranium-238 mempunyai 92 elektron dan 146 neutron
- C Uranium-235 has less number of electrons than uranium-238
Uranium-235 mempunyai bilangan elektron kurang daripada uranium-238
- D Uranium-235 has the same number of neutrons as uranium-238
Uranium-235 mempunyai bilangan neutron yang sama dengan uranium-238

117. Table 117 shows the electron arrangement of four elements in the Periodic Table.

Jadual 117 menunjukkan susunan elektron bagi empat unsur dalam Jadual Berkala.

Element <i>Unsur</i>	Electron arrangement <i>Susunan elektron</i>
W	2.8.1
X	2.8.3
Y	2.8.4
Z	2.8.7

Table / *Jadual 117*

Which pair of elements forms a compound that is insoluble in water?

Pasangan unsur-unsur manakah yang membentuk suatu sebatian yang tak larut dalam air?

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

118. Which characteristic is correct about elements in Group 17 in the Periodic Table as going down the group?

Ciri manakah yang betul tentang umur-unsur dalam Kumpulan 17 dalam Jadual Berkala apabila menuruni kumpulan?

- A The reactivity increases
Kereaktifan bertambah
- B The intensity of colour decreases
Keamatan warna berkurang
- C The tendency to accept an electron decreases
Kecenderungan menerima elektron berkurang
- D The physical state changes from liquid to gas
Keadaan fizikal berubah daripada cecair kepada gas

119. Diagram 4 shows the standard representation of fluorine atom.
Rajah 4 menunjukkan perwakilan piawai bagi atom fluorin

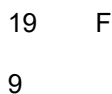


Diagram 119 / Rajah 119

What is the number of valence electrons of the atom?
Apakah bilangan elektron valens bagi atom tersebut?

- A 7 C 9
B 8 D 10

120. Diagram 7 shows the symbols for four different elements. The letters J, L, M and Q, are not the actual symbols of the elements.

Rajah 1 menunjukkan simbol bagi empat unsur yang berlainan. Huruf-huruf J, L, M dan Q, bukan simbol sebenar bagi unsur-unsur itu.



Diagram / Rajah 120

Which is the correct formula and type of bond when two of the elements react?

Formula dan jenis ikatan manakah yang betul apabila dua daripada unsur-unsur itu bertindak balas?

	Formula <i>Formula</i>	Type of bond <i>Jenis ikatan</i>
A	J ₂ L	Ionic <i>Ionik</i>
B	JL ₂	Covalent <i>Kovalen</i>
C	M ₂ Q	Ionic <i>Ionik</i>
D	MQ ₂	Covalent <i>Kovalen</i>

121. Which characteristic is correct about elements in Group 17 in the Periodic Table as going down the group?

Ciri manakah yang betul tentang umur-unsur dalam Kumpulan 17 dalam Jadual Berkala apabila menuruni kumpulan?

- A The reactivity increases
Kereaktifan bertambah
- B The intensity of colour decreases
Keamatan warna berkurang
- C The tendency to accept an electron decreases
Kecenderungan menerima elektron berkurang
- D The physical state changes from liquid to gas
Keadaan fizikal berubah daripada cecair kepada gas

122. Element M and element L are located in Group 1 and Group 16 in the Periodic Table respectively. Element M reacts with element L to form a compound. What is the chemical formula of the compound?

Unsur M dan unsur L masing-masing terletak dalam Kumpulan 1 dan Kumpulan 16 dalam Jadual Berkala. Unsur M bertindak balas dengan unsur L untuk membentuk suatu sebatian. Apakah formula kimia bagi sebatian itu?

- | | | | |
|---|-----------------|---|-------------------------------|
| A | ML | C | M ₂ L |
| B | ML ₂ | D | M ₂ L ₃ |

123. Element J and element Q have proton number of 12 and 9 respectively. What is the relative formula mass of a compound formed between J and Q?

[RAM : J = 24; Q = 19]

Unsur J dan unsur Q masing-masing mempunyai nombor proton 12 dan 9. Berapakah jisim formula relatif bagi sebatian yang terbentuk antara J dan Q?

[Jisim atom relatif: J = 24; Q = 19]

- | | | | |
|---|----|---|----|
| A | 30 | C | 62 |
| B | 43 | D | 67 |

124. An oxide of element X has the empirical formula of X₂O₃. 2.24 g of element X reacts completely with 0.96 g of oxygen. What is the relative atomic mass of X?

[RAM : O = 16]

Suatu oksida bagi unsur X mempunyai formula empirik X₂O₃. 2.24 g unsur X bertindak balas lengkap dengan 0.96 g oksigen. Berapakah jisim atom relatif bagi X?

[Jisim atom relatif: O = 16]

- | | | | |
|---|-----|---|----|
| A | 112 | C | 25 |
| B | 56 | D | 17 |

125. The following equation shows the decomposition of hydrogen peroxide, H_2O_2 .
Persamaan berikut menunjukkan penguraian bagi hidrogen peroksida, H_2O_2 .



What is the volume of oxygen gas, O_2 produced from the decomposition of 500 cm^3 of 2 mol dm^{-3} hydrogen peroxide at standard temperature and pressure (STP)?

Berapakah isi padu gas oksigen, O_2 terhasil daripada penguraian 500 cm^3 hidrogen peroksida 2 mol dm^{-3} pada suhu dan tekanan piawai (STP)?

[Isi padu molar gas pada STP = $22.4 \text{ dm}^3 \text{ mol}^{-1}$]

- A 11.2 dm^3 C 33.6 dm^3
 B 22.4 dm^3 D 44.8 dm^3

126. Table 126 shows the observation when oxides of elements in Period 3 of the Periodic Table is added to sodium hydroxide solution and nitric acid. X, Y and Z are not the actual symbols of the elements.

Jadual 126 menunjukkan pemerhatian apabila oksida bagi unsur-unsur dalam Kala 3 bagi Jadual Berkala ditambah kepada larutan natrium hidroksida dan asid nitrik. X, Y dan Z bukan simbol sebenar bagi unsur-unsur itu.

Oxide of element in Period 3 <i>Oksida bagi unsur dalam Kala 3</i>	Observation <i>Pemerhatian</i>	
	Sodium hydroxide solution <i>Larutan natrium hidroksida</i>	Nitric acid <i>Asid nitrik</i>
XO_3	Dissolves to form a colourless solution <i>Larutan membentuk larutan tak berwarna</i>	No changes <i>Tiada perubahan</i>
YO	No changes <i>Tiada perubahan</i>	Dissolves to form a colourless solution <i>Larutan membentuk larutan tak berwarna</i>
Z_2O_3	Dissolves to form a colourless solution <i>Larutan membentuk larutan tak berwarna</i>	Dissolves to form a colourless solution <i>Larutan untuk membentuk larutan tak berwarna</i>

Table 126 / *Jadual 126*

What is the correct arrangement in increasing proton number of the elements?

Apakah susunan yang betul mengikut pertambahan nombor proton unsur-unsur itu?

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

127. The following chemical equation represents the complete combustion of ethanol.

Persamaan kimia berikut mewakili pembakaran lengkap bagi etanol.



What is the mass of ethanol used to produce 960 cm^3 of the gas at room conditions?

[Molar mass of $\text{C}_2\text{H}_5\text{OH} = 46 \text{ g mol}^{-1}$, Molar volume of gas = $24 \text{ dm}^3 \text{ mol}^{-1}$ at room condition]

Berapakah jisim etanol yang digunakan untuk menghasilkan gas 960 cm^3 itu pada keadaan bilik?

[Jisim molar $\text{C}_2\text{H}_5\text{OH} = 46 \text{ g mol}^{-1}$, isi padu molar gas = $24 \text{ dm}^3 \text{ mol}^{-1}$ pada keadaan bilik]

- A 0.92 g
 B 1.84 g
 C 3.68 g

D 10.43 g

128. Diagram 1 show an air balloon filled with gas X.
Rajah 1 menunjukkan sebiji belon udara berisi gas X.

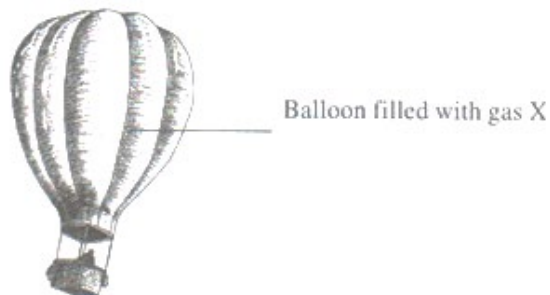


Diagram 128 / Rajah 128

In which group is X located in the Periodic Table?

Dalam kumpulan manakah X terletak dalam Jadual Berkala?

- A Group 15
Kumpulan 15
- B Group 16
Kumpulan 16
- C Group 17
Kumpulan 17
- D Group 18
Kumpulan 18

129. Metal X has the following properties.
Logam X mempunyai sifat-sifat berikut.

- Less reactive than iron.
Kurang reaktif daripada ferum
- Does not react with iron(II) oxide
Tidak bertindak balas dengan ferum(II) oksida

Which metal oxide can react with X?

Oksida logam manakah boleh bertindak balas dengan X?

- A Zinc oxide
Zink oksida
- B Magnesium oxide
Magnesium oksida
- C Copper(II) oxide
Kuprum(II) oksida
- D Aluminium oxide
Aluminium oksida

130. Table 1 shows the property of oxide of elements P, Q and R. These elements are located in the same period in the Period Table.

Jadual 1 menunjukkan sifat oksida bagi unsur-unsur P, Q dan R. Unsur-unsur ini terletak dalam kala yang sama dalam Jadual Berkala.

Element <i>Unsur</i>	Property of oxide <i>Sifat bagi oksida</i>
P	Acidic <i>Berasid</i>
Q	Basic <i>Berbes</i>
R	Amphoteric <i>Amfoterik</i>

Table 130 / *Jadual 130*

Arrange the three elements based on the increasing of proton number.

Susun ketiga-tiga unsur itu berdasarkan pertambahan nombor proton.

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

131. Which statement explains why the reactivity of Group 1 elements increases when going down the group?

Pernyataan manakah yang menerangkan mengapa kereaktifan unsur Kumpulan 1 meningkat apabila menuruni kumpulan itu?

- A The physical state of the elements changes from gas to liquid then to solid at room temperature
Keadaan fizik bagi unsur berubah daripada gas kepada cecair dan kemudian kepada pepejal pada suhu bilik
- B The attractive force between valence electron and the nucleus becomes stronger
Daya tarikan antara elektron valens dengan nukleus semakin kuat
- C The valence electron gets further away from the nucleus
Elektron valens semakin jauh dari nukleus
- D The melting points of the elements decrease
Takat lebur bagi unsur menurun

132. Some transition elements and their compounds are useful catalyst in industries. Which part is correct?

Sebilangan unsur peralihan dan sebatianannya merupakan mangkin yang berguna dalam industri. Pasangan manakah yang betul?

	Catalyst <i>Mangkin</i>	Use in industry <i>Kegunaan dalam industri</i>
A	Iron <i>Besi</i>	Manufacture of nitric acid from ammonia <i>Pembuatan asid nitrik daripada</i>
B	Nickel <i>Nikel</i>	Manufacture of ammonia <i>Pembuatan ammonia</i>
C	Manganese(IV) oxide <i>Mangan(IV) oksida</i>	Manufacture of margarine <i>Pembuatan marjerin</i>
D	Vanadium(V) oxide <i>Vanadium(V) oksida</i>	Manufacture of sulphuric acid <i>Pembuatan asid sulfurik</i>

133. How does a catalyst increase the rate of reaction?

Bagaimanakah mangkin meningkatkan kadar tindak balas?

- A Increase the number of effective collisions
Meningkatkan bilangan perlanggaran berkesan
- B Increase the activation energy of the reaction
Meningkatkan tenaga pengaktifan tindak balas
- C Increase the total number of reactant particles
Meningkatkan jumlah bilangan zarah-zarah bahan tindak balas
- D Increase the kinetic energy of reactant particles
Meningkatkan tenaga kinetik zarah-zarah bahan tindak balas

134. The electron arrangements of atom U is 2.8.1 and atom V is 2.8.7. What is the molar mass of a compound formed when atom U combines with atom V?

[RAM : U = 23 : V = 35.5]

Susunan elektron bagi atom U ialah 2.8.1 dan atom V ialah 2.8.7. Apakah jisim molar bagi sebatian yang terbentuk apabila atom U bergabung dengan atom V?

[Jisim atom relatif: U = 23; V = 35.5]

- A 152.5 g mol⁻¹
- B 94.0 g mol⁻¹
- C 81.5 g mol⁻¹
- D 58.5 g mol⁻¹

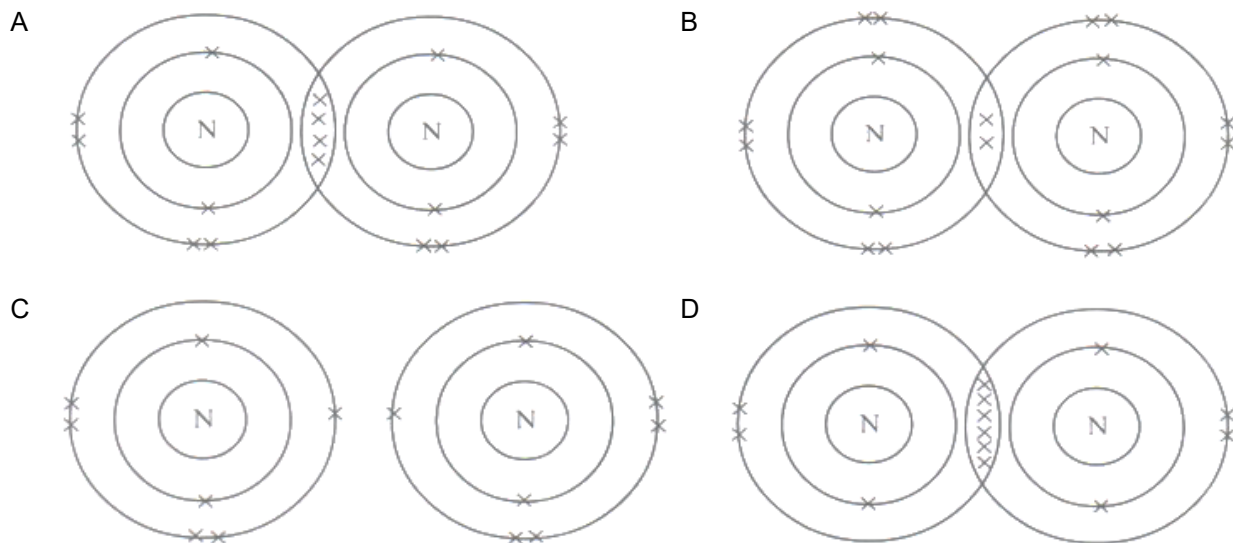
135. Which substance is a covalent compound?

Bahan manakah adalah sebatian kovalen?

- A Phosphorus(V) oxide
Fosforus(V) oksida
- B Sodium sulphate
Natrium sulfat
- C Magnesium chloride
Magnesium klorida
- D Lead(II) bromide
Plumbum(II) bromida

136. Which diagram shows the electron arrangement for the nitrogen molecule, N_2 ?
 [Proton number: N=7]

Rajah manakah menunjukkan susunan elektron bagi molekul nitrogen, N_2 ?
 [Nombor proton: N = 7]



138. Compound X has the following properties.

- Insoluble in water
- *Tak larut dalam air*
- Has a boiling point of $-89\text{ }^{\circ}\text{C}$
- *Mempunyai takat didih - 89 $^{\circ}\text{C}$*

What is compound X?
 Apakah sebatian X?

- A Ethane
Etana
- B Ethanol
Etanol
- C Ethanoic acid
Asid etanoik
- D Ethyl ethanoate
Etil etanoat

139. Table 2 shows the electron arrangements of atoms P, Q, R and S.
Jadual 2 menunjukkan susunan elektron bagi atom P, Q, R dan S.

Atom <i>Atom</i>	Electron arrangement <i>Susunan elektron</i>
P	2.4
Q	2.8.1
R	2.8.2
S	2.8.7

Table 2
Jadual 2

Which pair of atoms forms a compound by sharing electrons?

Pasangan atom manakah yang membentuk sebatian melalui perkongsian elektron?

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

140. The average mass of a magnesium atom is 24 times greater than $\frac{1}{2}$ of the mass of a carbon-12 atom. What is the relative atomic mass of magnesium?

Purata jisim satu atom magnesium adalah 24 kali lebih besar daripada jisim satu atom karbon-12. Apakah jisim atom relatif bagi magnesium?

- A 2
- B 12
- C 24
- D 48

141. Diagram 1 shows the apparatus set-up to determine the empirical formula of copper(II) oxide.
Rajah 1 menunjukkan susunan radas bagi menentukan formula empirik bagi kuprum(II) oksida.

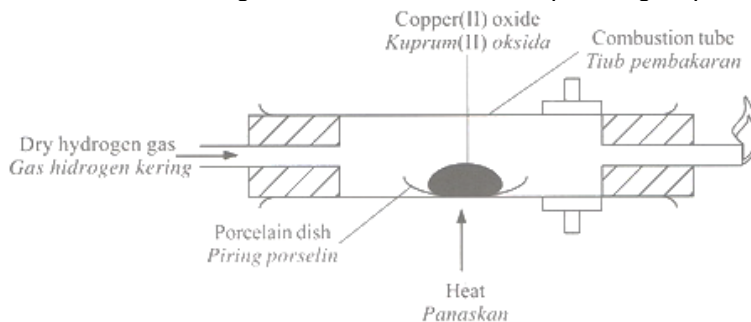


Diagram 1
Rajah 1

The dry hydrogen gas must be flowed through the apparatus for several minutes before heating the copper(II) oxide. What is the reason for this action to be taken?

Gas hidrogen kering mesti dialirkan melalui radas untuk beberapa minit sebelum pemanasan kuprum(II) oksida. Apakah sebab tindakan ini diambil?

- A To ensure all the copper(II) oxide has changed into copper
Untuk memastikan semua kuprum(II) oksida telah bertukar kepada kuprum
- B To ensure all air has been removed so that explosion can be prevented
Untuk memastikan semua udara dikeluarkan supaya letupan dapat dielakkan
- C To prevent copper from reacting with air to form copper(II) oxide
Untuk mengelakkan kuprum daripada bertindak balas dengan udara bagi membentuk kuprum(II) oksida
- D To prevent the water from flowing towards the hot porcelain dish and cracks the combustion tube
Untuk mengelakkan air daripada mengalir ke arah piring porselin yang panas dan meretakkan tiub pembakaran

142. Which elements dissolve in water to produce solution that turns blue litmus paper to red and then decolourised?

Unsur manakah yang larut dalam air untuk menghasilkan larutan yang menukarkan kertas litmus biru ke merah dan kemudian dinyahwarnakan?

- I Chlorine
Klorin
- II Bromine
Bromin
- III Iodine
Iodine
- IV Astatine
Astatin

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

143. Which chemical equation represents the reaction between sodium metal and oxygen gas?
Persamaan kimia manakah yang mewakili tindak balas antara logam natrium dan gas oksigen?

- A Na + O₂ → NaO₂
- B Na + O₂ → Na₂O
- C 2 Na + O₂ → Na₂O
- D 4 Na + O₂ → 2Na₂O

144. Diagram 5 shows the electrons arrangement in compound Z₂Y.
Rajah 5 menunjukkan susunan elektron dalam sebatian Z₂Y.

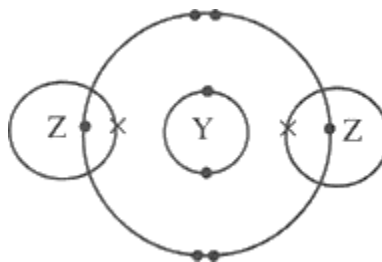


Diagram 5
Rajah 5

Which elements are represented by Y and Z?
[Proton number : H = 1, C = 6, O = 8, Cl = 17]
Unsur manakah yang diwakili oleh Y dan Z?
[Nombor proton : H = 1, C = 6, O = 8, Cl = 17]

	Y	Z
A	Carbon <i>Karbon</i>	Oxygen <i>Oksigen</i>
B	Oxygen <i>Oksigen</i>	Hydrogen <i>Hidrogen</i>
C	Hydrogen <i>Hidrogen</i>	Chlorine <i>Klorin</i>
D	Carbon <i>Karbon</i>	Chlorine <i>Klorin</i>

145. Which substance conducts electric current in aqueous state?
 Bahan manakah yang mengkonduksikan arus elektrik dalam keadaan akueus?

- A Silver chloride
Argentum klorida
- B Sodium chloride
Natrium klorida
- C Calcium sulphate
Kalsium sulfat
- D Barium sulphate
Barium sulfat

146. Diagram 6 shows the electrons arrangement of the Q⁻ ion.
 Rajah 6 menunjukkan susunan elektron bagi ion Q⁻.

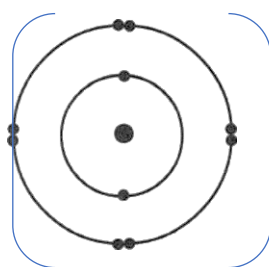


Diagram 6
Rajah 6

What is the number of valence electrons of a Q atom?
 Berapakah bilangan elektron valens bagi satu atom Q?

- | | | | |
|---|---|---|----|
| A | 7 | C | 9 |
| B | 8 | D | 10 |

147. Diagram 7 shows the electrons arrangements of atoms X and Y. X and Y are not the actual symbols of the elements.
 Rajah 7 menunjukkan susunan elektron bagi atom X dan atom Y. X dan Y bukan simbol sebenar bagi unsur tersebut.

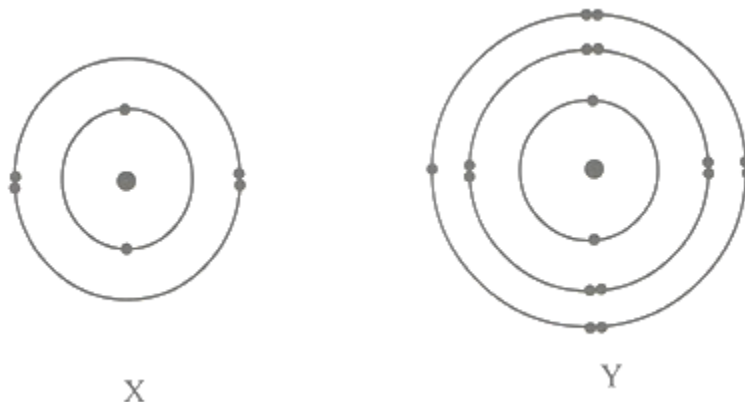


Diagram 7 / Rajah 7

Which pair of formula and the type of compound is correct?
Pasangan formula dan jenis sebatian manakah yang betul?

	Formula <i>Formula</i>	Type of compound <i>Jenis sebatian</i>
A	XY ₄	Ionic <i>ionik</i>
B	XY ₄	covalent <i>kovalen</i>
C	X ₄ Y	Ionic <i>ionik</i>
D	X ₄ Y	Covalent <i>kovalen</i>

148. Table 2 shows the electron arrangement of four elements in the Periodic Table.
Jadual 2 menunjukkan susunan elektron bagi empat unsur dalam Jadual Berkala.

Element <i>Unsur</i>	Electron arrangement <i>Susunan elektron</i>
W	2.8.1
X	2.8.3
Y	2.8.4
Z	2.8.7

Table 2 / *Jadual 2*

Which pair of elements forms a compound that is insoluble in water?
Pasangan unsur-unsur manakah yang membentuk suatu sebatian yang tak larut dalam air?

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

149. The following information is about atom Q and atom P.
Maklumat berikut adalah mengenai atom Q dan atom P.

- Atom Q is located in Period 2 of the Periodic Table.
Atom Q terletak dalam Kala 2 dalam Jadual Berkala
- The electron arrangement of atom P is 2.8.1.
Susunan elektron bagi atom P ialah 2.8.1
- Element Q is located above element P in the same group of the Periodic Table
Unsur Q terletak di atas unsur P dalam kumpulan yang sama dalam Jadual Berkala

Which diagram shows the electrons arrangement of atom Q?
Rajah manakah yang menunjukkan susunan elektron bagi atom Q?

A		B	
C		D	

150. Table 1 shows three atoms of the elements and their electron arrangement respectively. The letters used are not the actual symbol of the elements.
Jadual 1 menunjukkan tiga atom bagi unsur dan susunan elektron masing-masing. Huruf yang digunakan bukan simbol sebenar bagi unsur itu.

Atom of the element <i>Atom unsur</i>	Electron arrangement <i>Susunan elektron</i>
P	2.8.1
Q	2.8.4
R	2.8.7

Table 1 / *Jadual 1*

Which of the following is correct about the three elements according to the sequence, P, Q and R?
Antara yang berikut, yang manakah betul tentang ketiga-tiga unsur itu mengikut urutan P, Q dan R?

- | | |
|---|---|
| A Atomic radius decreases
<i>Jejari atom berkurang</i> | C Metallic properties increases
<i>Sifat kelogaman bertambah</i> |
| B Melting point increases
<i>Takat lebur bertambah</i> | D Electronegativity decreases |

151. Table 2 shows the proton number and the nucleon number of atoms of elements X and Y. X and Y are not the actual symbols of the elements.

Jadual 2 menunjukkan nombor proton dan nombor nukleon bagi atom-atom unsur X dan unsur Y. X dan Y bukan simbol sebenar unsur-unsur itu.

Element Unsur	Proton number Nombor proton	Nucleon number Nombor nukleon
X	13	27
Y	8	16

Table 151 / Jadual 151

Element X reacts with element Y to form a compound. What is the molar mass of the compound?

Unsur X bertindak balas dengan unsur Y untuk membentuk suatu sebatian. Berapa jisim molar bagi sebatian itu?

- A 43 g mol⁻¹ C 102 g mol⁻¹
 B 50 g mol⁻¹ D 113 g mol⁻¹

152. Substance R has a melting point of -100 °C and a boiling point of -35 °C. What is substance R?

Bahan R mempunyai takat lebur -100 °C dan takat didih - 35 °C. Apakah bahan R?

- A Sulphur
Sulfur C Carbon dioxide
Karbon dioksida
B Alcohol
Alkohol D Sodium hydroxide
Natrium hidroksida

153. Table 3 shows the proton numbers of elements, U, V, W and Z.

Jadual 3 menunjukkan nombor proton bagi unsur-unsur U, V, W dan Z,

Element Unsur	U	V	W	Z
Proton number Nombor proton	8	9	10	11

Table 153 / Jadual 153

Which pair of particles has the same number of electrons?

Pasangan zarah manakah yang mempunyai bilangan elektron yang sama?

- A U and V
U dan V C W and V⁻
W dan V⁻
B W and Z
W dan Z D Z and U²⁻
Z dan U²⁻

154. A patient is diagnosed of having cancer. Which isotope is used to treat the patient?

Seorang pesakit didiagnosiskan mempunyai kanser. Isotop manakah yang digunakan untuk merawat pesakit itu?

- A Carbon-14
Karbon-14 C Phosphorus-32
Fosforus-32
B Sodium-24
Natrium-24 D Cobalt-60
Kobalt- 60

ASID, BES DAN GARAM

155. Suhailah received a letter from her best friend, Aisyah. The letter is white in colour without any writing on it. There is a note enclosed as a guide.

Suhailah telah menerima sepucuk surat daripada rakan baiknya, Aisyah. Surat yang diterimanya berwarna putih tanpa tulisan padanya. Terdapat satu nota yang disisipkan sebagai panduan.

Dear friend. Ink that was used:	Kepada sahabat, Dakwat yang digunakan:
Pottasium iodide Formulae : KI	Kalium iodida Formula : KI
To read this letter, spray a solution that will produce yellow writing.	Untuk membaca surat ini, semburkan satu larutan yang akan menghasilkan tulisan berwarna kuning

Which solution should be sprayed to enable Suhailah to read the letter?

Larutan manakah yang perlu disembur bagi membolehkan Suhailah membaca surat tersebut?

- A Zink nitrate
Zink nitrat
- B Barium nitrate
Barium nitrat
- C Lead(II) nitrate
Plumbum(II) nitrat
- D Magnesium nitrate
Magnesium nitrat

155. Which statement is correct about the concentration of a solution in g dm^{-3} ?

Pernyataan manakah yang betul tentang kepekatan suatu larutan dalam g dm^{-3} ?

- A The quantity of solute in a given volume of solution
Kuantiti bahan terlarut dalam suatu isi padu larutan
- B The number of moles of solute in a given volume of solution
Bilangan mol bahan terlarut dalam suatu isi padu larutan
- C The mass of one mole of solution in gram
Jisim bagi satu mol larutan dalam gram
- D The number of solute particles that is present in one mole of solution
Bilangan zarah bahan terlarut yang hadir dalam satu mol larutan

156. The molarity of sulphuric acid used as an electrolyte in a car battery is 2.0 mol dm^{-3} .

What is its concentration in g dm^{-3} ?

[Relative atomic mass: H = 1, O = 16, S = 32]

Kemolaran asid sulfurik yang digunakan sebagai elektrolit dalam suatu bateri kereta ialah 2.0 mol dm^{-3} ?

Apakah kepekataannya dalam g dm^{-3} ?

[Jisim atom relatif: H = 1, O = 16, S = 32]

- A 49.0
- B 98.0
- C 196.0
- D 392.0

157. A student prepares 0.02 mol of magnesium chloride through the reaction between excess magnesium powder and 20.0 cm³ of hydrochloric acid.

The reaction can be represented by the following equation:

Seorang murid menyediakan 0.02 mol magnesium klorida melalui tindak balas antara serbuk magnesium berlebihan dengan 20.0 cm³ asid hidroklorik.

Tindak balas itu boleh diwakili oleh persamaan berikut:



What is the molarity of hydrochloric acid used?

Berapakah kemolaran asid hidroklorik yang digunakan?

- | | | | |
|---|--------------------------|---|--------------------------|
| A | 1.0 mol dm ⁻³ | C | 2.0 mol dm ⁻³ |
| B | 1.5 mol dm ⁻³ | D | 4.0 mol dm ⁻³ |

158. Which of the following will produce an insoluble salt?

Antara yang berikut, yang manakah akan menghasilkan garam tak terlarutkan?

- A Hydrochloric acid and sodium hydroxide
Asid hidroklorik dan natrium hidroksida
- B Hydrochloric acid and copper(II) oxide
Asid hidroklorik dan kuprum(II) oksida
- C Sulphuric acid and barium hydroxide
Asid sulfurik dan barium hidroksida
- D Sulphuric acid and zinc
Asid sulfurik dan zink

158. Diagram 158 shows the apparatus set-up of a reaction.

Rajah 158 menunjukkan susunan radas bagi satu tindak balas.

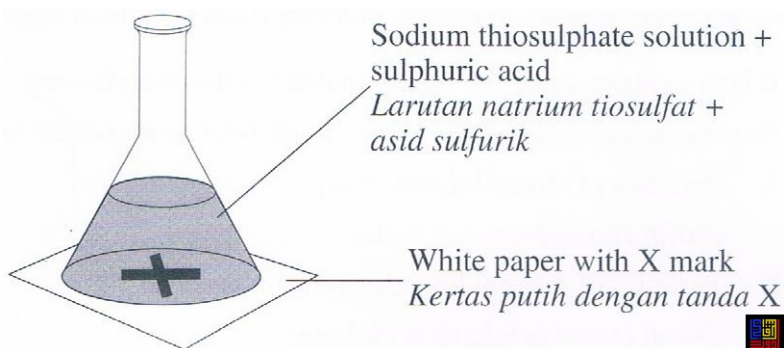


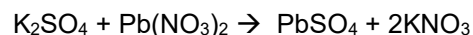
Diagram / Rajah 158

What is the substance that will be formed and covers the X mark?

Apakah bahan yang akan terbentuk dan menutupi tanda X?

- | | | | |
|---|---------------------------------|---|-----------------|
| A | Na ₂ SO ₄ | C | SO ₂ |
| B | H ₂ S | D | S |

159. The following equation represents a reaction between potassium sulphate solution and lead(II) nitrate solution.
 Persamaan berikut mewakili satu tindak balas antara larutan kalium sulfat dengan larutan plumbum(II) nitrat.



Which of the following observations is correct for the reaction?
 Antara pemerhatian berikut, yang manakah betul bagi tindak balas tersebut?

- A Effervescence occurs
Pembuakan berlaku
- B A white precipitate is formed
Mendakan putih terbentuk
- C A yellow solution is produced
Larutan kuning terhasil
- D The volume of the reactants does not change
Isi padu bahan tindak balas tidak berubah

160. Diagram 160 shows a situation at a limestone hill.
 Rajah 160 menunjukkan suatu situasi di bukit batu kapur.

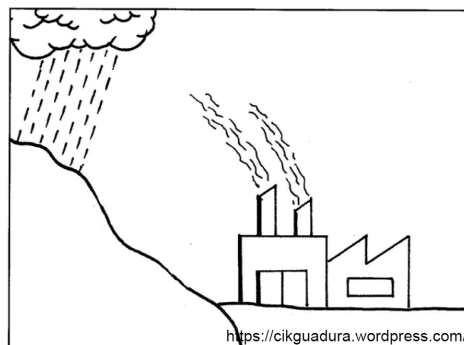


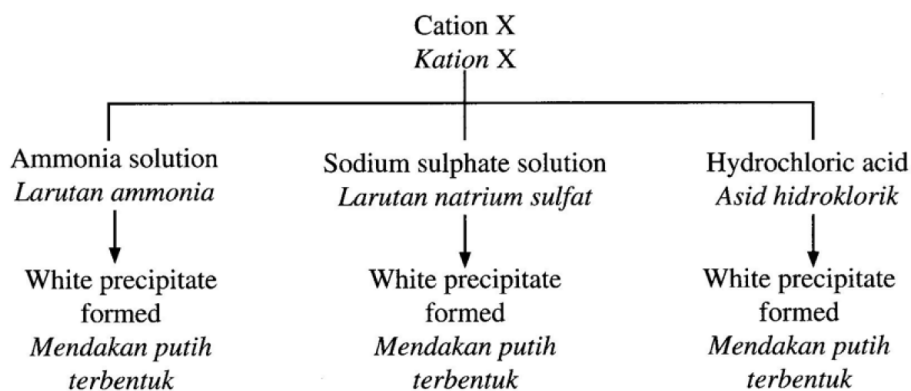
Diagram 160
 Rajah 160

Which of the following situations is similar as Diagram 160?
 Antara situasi berikut, yang manakah sama seperti Rajah 160?

- A Place egg shell in a beaker containing vinegar
Letak cangkerang telur dalam bikar berisi cuka
- B Dissolve table salts in the water
Melarutkan garam biasa di dalam air
- C Remove rust from the iron gate
Menanggalkan karat pada pagar besi
- D Form dental caries
Membentuk karies gigi

161. Diagram 161 shows an observation when a solution containing cation X is added into three different substances.

Rajah 161 menunjukkan suatu pemerhatian apabila larutan yang mengandungi kation X ditambah ke dalam tiga bahan yang berbeza.



What is X?

Apakah X?

- | | | | |
|---|------------------|---|------------------|
| A | Mg ²⁺ | C | Pb ²⁺ |
| B | Ca ²⁺ | D | Zn ²⁺ |

162. Which of the following salt is insoluble in water?

Antara garam berikut, yang manakah tidak larut dalam air?

- A Lead(II) sulphate
Plumbum(II) sulfat
- B Potassium sulphate
Kalium sulfat
- C Copper(II) sulphate
Kuprum(II) sulfat
- D Sodium sulphate
Natrium sulfat

163. Which of the following salt has the highest rate of solubility when dissolved in distilled water?

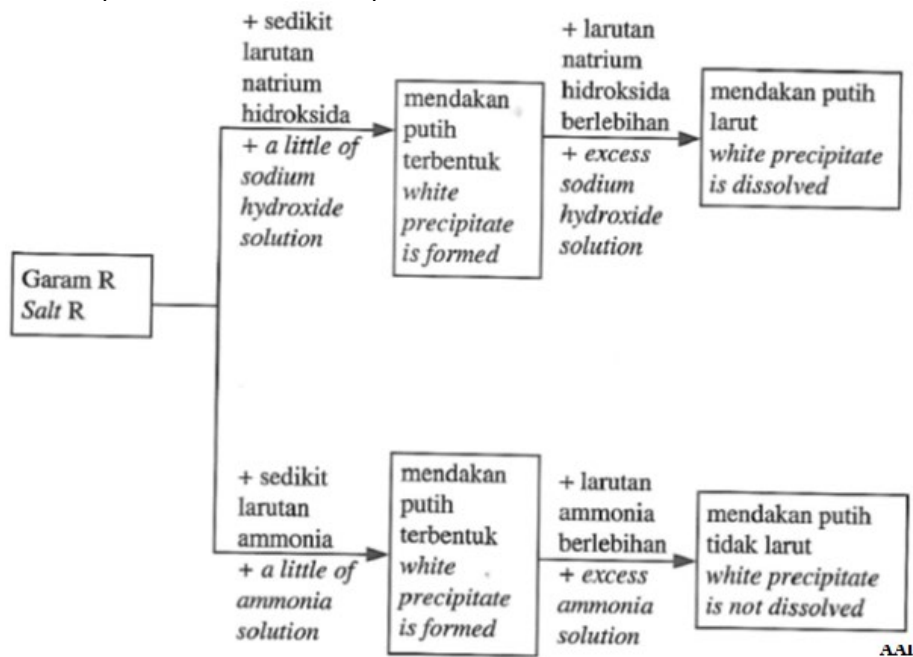
Antara garam berikut, yang manakah mempunyai kadar keterlarutan yang paling tinggi apabila dilarutkan dalam air suling?

- A Dissolve 2 g of salt powder into 100 cm³ of distilled water
Larutkan 2 g serbuk garam dalam 100 cm³ air suling
- B Dissolve 3 g of salt powder into 200 cm³ of distilled water
Larutkan 3 g serbuk garam dalam 200 cm³ air suling
- C Dissolve 2 g of salt granules into 100 cm³ of distilled water
Larutkan 2 g ketulan garam dalam 100 cm³ air suling
- D Dissolve 3 g of salt granules into 200 cm³ of distilled water
Larutkan 3 g ketulan garam dalam 200 cm³ air suling

164. Which of the following is a diprotic acid?
Antara yang berikut, yang manakah asid dwibes?

- | | | | |
|---|-------------------------------|---|---------------------------------------|
| A | Nitric acid
Asid nitrik | C | Sulphuric acid
Asid sulfurik |
| B | Ethanoic acid
Asid etanoik | D | Hydrochloric acid
Asid hidroklorik |

165. Rajah 165 menunjukkan proses bagi mengesahkan kehadiran kation dalam larutan garam R.
Diagram 165 shows a process to confirm the presence of the cation in salt solution R.

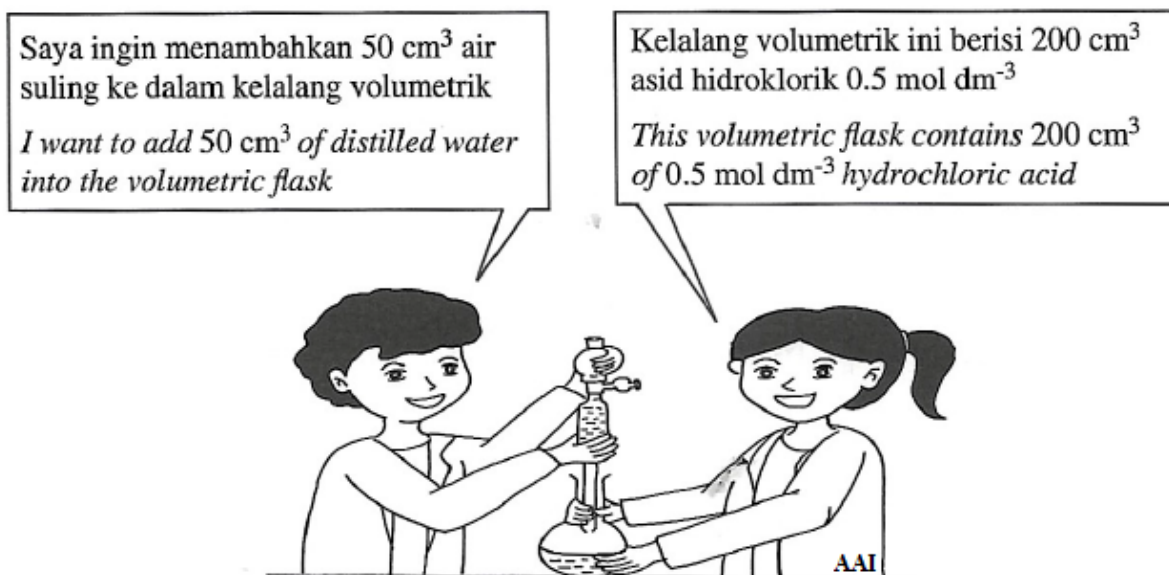


Rajah / Diagram 165

Antara yang berikut, kation manakah yang hadir dalam larutan garam R? Which of the following cations is present in salt solution R?

- | | |
|---|-----------|
| A | Al^{2+} |
| B | Ca^{2+} |
| C | Mg^{2+} |
| D | Zn^{2+} |

166. Rajah 166 menunjukkan perbualan antara dua murid.
Diagram 166 shows a conversation between two students.



Rajah 166 / Diagram 167

Apakah nilai pH akhir?
What is the final pH value?

- | | | | |
|---|------|---|------|
| A | 0.20 | C | 0.40 |
| B | 0.30 | D | 0.50 |

167. What is the mass of sodium chloride obtained when 50.0 cm^3 of 1.0 mol dm^{-3} sodium hydroxide reacts with 50.0 cm^3 of 1.0 mol dm^{-3} hydrochloric acid?

[Relative atomic mass: Na = 23, Cl = 35.5]

Berapakah jisim natrium klorida yang diperolehi apabila 50.0 cm^3 natrium hidroksida 1.0 mol dm^{-3} bertindak balas dengan 50.0 cm^3 asid hidroklorik 1.0 mol dm^{-3} ?

[Jisim atom relatif. Na = 23, Cl = 35.5]

- | | | | |
|---|---------|---|---------|
| A | 0.025 g | C | 1.463 g |
| B | 0.050 g | D | 2.925 g |

168. 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 1 apabila dilarutkan ke dalam air. Apakah sebatian X?

- | | |
|---------------------------------------|---|
| A Sodium oxide
Natrium oksida | C Ammonium chloride
Ammonium klorida |
| B Magnesium oxide
Magnesium oksida | D Hydrogen chloride
Hidrogen klorida |

169. 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} C 3.010×10^{24}
 B 1.806×10^{24} D 3.612×10^{24}

170. 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

171. Which of the following is a weak acid and a weak alkali?
 Antara yang berikut, yang manakah asid lemah dan alkali lemah?

- A Methanoic acid and ammonia solution
 Asid metanoik dan larutan ammonia
 B Methanoic acid and potassium hydroxide solution
 Asid metanoik dan larutan kalium hidroksida
 C Hydrochloric acid and ammonia solution
 Asid hidroklorik dan larutan ammonia
 D Hydrochloric acid and potassium hydroxide solution
 Asid hidroklorik dan larutan kalium hidroksida

172. Table 172 shows the observation for two reactants.
 Jadual 172 menunjukkan pemerhatian bagi dua bahan tindak balas.

Reaction Tindak Balas	Reactant Bahan Tindak Balas	Observation Pemerhatian
I	CuO and T CuO dan T	Blue solution produced Larutan biru terhasil
II	AgNO ₃ and T AgNO ₃ dan T	White precipitate formed Mendakan putih terbentuk

Table 172 / Jadual 172

What is T?
 Apakah T?

- A Hydrochloric acid Asid hidroklorik
 B Ethanoic acid Asid etanoik
 C Carbonic acid Asid karbonik
 D Nitric acid Asid nitrik

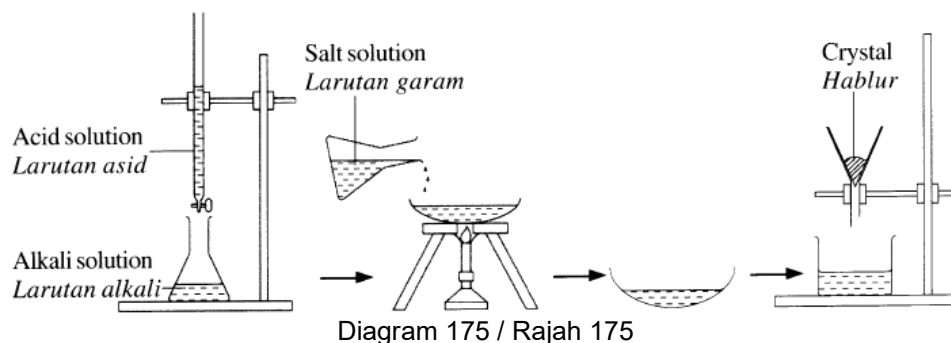
173. Which statement explains why water is needed to show the acidic properties of an acid?
Penyataan manakah menerangkan mengapa air diperlukan untuk menunjukkan sifat keasidan bagi suatu asid?

- A Neutralisation of acid occurs in water
Peneutralan asid berlaku dalam air
- B Ionisation of acid occurs in water
Pengionan asid berlaku dalam air
- C Water dissolves the acid
Air melarutkan asid
- D Water oxidises the acid
Air mengoksidakan asid

174. 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 penunjuk 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

175. Diagram 175 shows the apparatus set-up for the preparation of a salt.
Rajah 175 menunjukkan susunan radas bagi penyediaan suatu garam.



Which salt is prepared through this method?
Garam manakah yang disediakan melalui kaedah ini?

- | | |
|--|--|
| A Zinc sulphate
<i>Zink sulfat</i> | C Magnesium nitrate
<i>Magnesium nitrat</i> |
| B Sodium sulphate
<i>Natrium sulfat</i> | D Aluminium nitrate
<i>Aluminium nitrat</i> |

176. 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

177. Which pair of acids is classified correctly?
Pasangan asid yang manakah dikelaskan dengan betul?

	Monoprotic acid Asid monobes	Diprotic acid Asid dwibes
A	Ethanoic acid Asid etanoik	Hydrochloric acid Asid hidroklorik
B	Hydrochloric acid Asid hidroklorik	Ethanoic acid Asid etanoik
C	Sulphuric acid Asid sulfurik	Nitric acid Asid nitrik
D	Nitric acid Asid nitrik	Sulphuric acid Asid sulfurik

178. Which statement is correct about salt?
Pernyataan manakah yang betul tentang garam?

- A Salt is an ionic compound produced when H^+ ion from an acid is replaced with a metal ion.
Garam ialah sebatian ion yang terhasil apabila ion H^+ daripada suatu asid digantikan dengan ion logam.
- B Salt is an ionic compound produced when OH^- ion from a base is replaced with a metal ion.
Garam ialah sebatian ion yang terhasil apabila ion OH^- daripada suatu bes digantikan dengan ion logam.
- C Salt is a covalent compound produced when H^+ ion from an acid is replaced with a metal ion.
Garam ialah sebatian kovalen yang terhasil apabila ion H^+ daripada suatu asid digantikan dengan ion logam.
- D Salt is a covalent compound produced when OH^- ion from a base is replaced with a metal ion.
Garam ialah sebatian kovalen yang terhasil apabila ion OH^- daripada suatu bes digantikan dengan ion logam.

178. Diagram 178 shows the conversation between two students while carrying out an experiment. Rajah 178 menunjukkan perbualan antara dua orang murid semasa menjalankan Satu eksperimen.

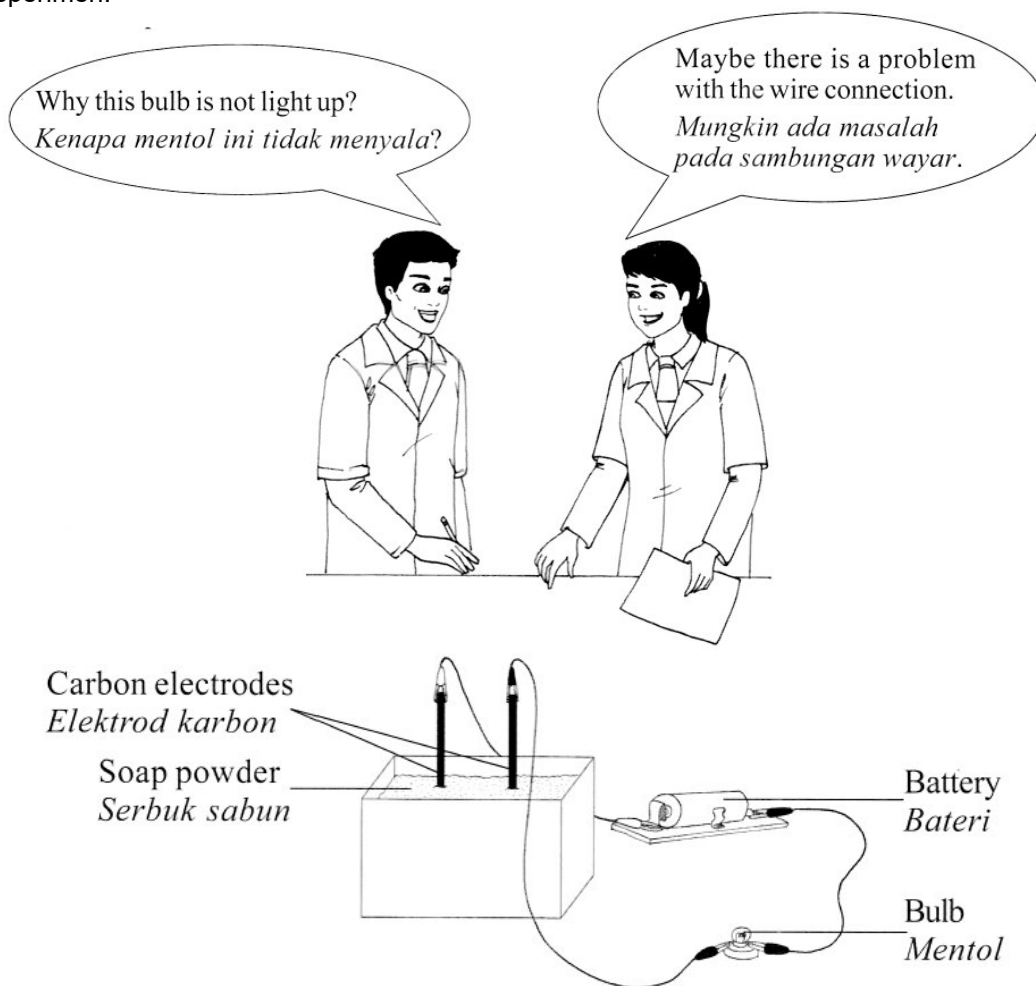


Diagram 11
Rajah 11

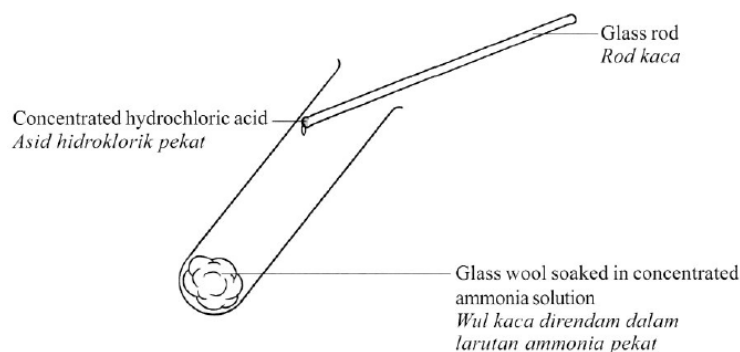
What can the students do to overcome the problem?
Apakah yang boleh dilakukan oleh murid itu untuk mengatasi masalah tersebut?

- A Replace carbon electrodes with copper electrodes
Gantikan elektrod karbon dengan elektrod kuprum
- B Pour ethanol into soap powder
Tuangkan etanol ke dalam serbuk sabun
- C Pour water into soap powder
Tuangkan air ke dalam serbuk sabun
- D Replace soap powder with detergent powder
Gantikan serbuk sabun dengan serbuk detergen

179. Which of the following is the correct sequence in preparation of a solution by dilution method?
Antara yang berikut, yang manakah urutan yang betul dalam penyediaan satu larutan melalui kaedah pencairan?

- I Transfer the solution into a volumetric flask
Pindahkan larutan ke dalam kelalang volumetri
- II Calculate the volume of solution to be diluted
Kira isi padu larutan yang hendak dicairkan
- III Use a pipette to obtain the volume of solution needed
Guna pipet untuk memperoleh isi padu larutan yang diperlukan
- IV Add distilled water to the required volume of solution
Tambah air suling kepada isi padu larutan yang dikehendaki
- A II, I, III, IV C II, III, I, IV
B II, I, IV, III D II, III, IV, I

180. Diagram 180 shows the apparatus set-up to test a type of gas.
Rajah 180 menunjukkan susunan radas untuk menguji suatu jenis gas.



Which observation is correct?
Pemerhatian manakah yang betul?

- A White fumes produced
Wasap putih terhasil
- B Colourless gas released
Gas tak berwarna terbebas
- C Greenish-yellow gas released
Gas kuning kehijauan terbebas
- D Droplets of colourless liquid formed
Titisan cecair tak berwarna terbentuk

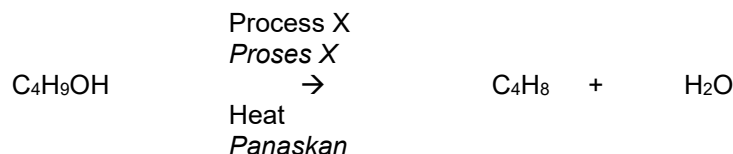
181. Which of the following is the property of ammonium sulphate?
Antara yang berikut, yang manakah sifat ammonium sulfat?

- A Insoluble in water
Tak larut dalam air
- B Soluble in organic solvent
Larut dalam pelarut organik
- C High melting and boiling point
Takat lebur dan takat didih yang tinggi
- D Does not conduct electricity in the solid and aqueous state
Tidak mengkonduksi elektrik dalam keadaan pepejal dan akueus

182. Which substance is an alkali?
Bahan manakah adalah suatu alkali?

- | | | | |
|---|-------------------------------------|---|---|
| A | Zinc oxide
Zink oksida | C | Potassium hydroxide
Kalium hidroksida |
| B | Magnesium oxide
Magnesium oksida | D | Aluminium hydroxide
Aluminium hidroksida |

182. The following equation shows the conversion of butanol to butene.
Persamaan berikut menunjukkan penukaran butanol kepada butena.



What is process X?
Apakah proses X?

- | | | | |
|---|----------------------------------|---|--|
| A | Oxidation
<i>Pengoksidaan</i> | C | Dehydration
<i>Pengdehidratan</i> |
| B | Hydrolysis
<i>Hidrolisis</i> | D | Hydrogenation
<i>Penghidrogenan</i> |

183. An oxide of element X dissolves in water to form a solution. Phenolphthalein indicator turns from colourless to pink when it is dropped into the solution. What is X?
Suatu oksida unsur X larut dalam air untuk menghasilkan suatu larutan. Penunjuk fenolftalein bertukar daripada tidak berwarna menjadi merah jambu apabila ia dititiskan ke dalam larutan itu. Apakah X?

- | | | | |
|---|--------------------------|---|--------------------------|
| A | Carbon
<i>Karbon</i> | C | Sodium
<i>Natrium</i> |
| B | Sulphur
<i>Sulfur</i> | D | Copper
<i>Kuprum</i> |

184. 14.9 g of potassium chloride, KCl is dissolved in distilled water to produce 0.4 mol dm⁻³ potassium chloride solution. What is the volume of distilled water needed to dissolve potassium chloride?

[Molar mass: KCl = 74.5 g mol⁻¹]

14.9 g kalium klorida, KCl dilarutkan dalam air suling untuk menghasilkan 0.4 mol dm⁻³ larutan kalium klorida. Berapakah isi padu air suling diperlukan untuk melarutkan kalium klorida?

[Jisim molar: KCl = 74.5 g mol⁻¹]

- | | | | |
|---|---------------------|---|----------------------|
| A | 50 cm ³ | C | 500 cm ³ |
| B | 200 cm ³ | D | 2000 cm ³ |

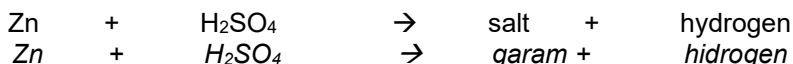
185. Dry ammonia gas is prepared in the laboratory by heating ammonium chloride with calcium hydroxide. Which substance is used as a drying agent in the preparation?

Gas ammonia kering disediakan dalam makmal melalui pemanasan ammonium klorida dengan kalsium hidroksida. Bahan manakah yang digunakan sebagai agen pengering dalam penyediaan itu?

- A Soda lime
Soda kapur
- B Lime water
Air kapur
- C Calcium carbonate
Kalsium karbonat
- D Dilute nitric acid
Asid nitrik cair

185. The following equation represents a reaction between zinc metal and sulphuric acid.

Persamaan berikut mewakili tindak balas antara logam zink dan asid sulfurik.



What is the name of the salt and its solubility in water?

Apakah nama bagi garam itu dan keterlarutannya dalam air?

	Name of salt <i>Nama garam</i>	Solubility in water <i>Keterlarutan dalam air</i>
A	Zinc sulphate <i>Zink sulfat</i>	Soluble <i>Larut</i>
B	Zinc oxide <i>Zink oksida</i>	Insoluble <i>Tidak larut</i>
C	Zinc oxide <i>Zink oksida</i>	Soluble <i>Larut</i>
D	Zinc sulphate <i>Zink sulfat</i>	Insoluble <i>Tidak larut</i>

186. Which pair shows pH value and the degree of dissociation for sulphuric acid?

Pasangan manakah yang menunjukkan nilai pH dan darjah penceraian bagi asid sulfurik yang betul?

	pH value <i>Nilai pH</i>	Degree of dissociation <i>Darjah penceraian</i>
A	2	High <i>Tinggi</i>
B	2	Low <i>Rendah</i>
C	6	Low <i>Rendah</i>
D	6	High <i>Tinggi</i>

187. Diagram 187 shows two beakers, P and Q that contain granulated limestones, CaCO_3 and pH paper respectively in dilute ethanoic acid.

Rajah 187 menunjukkan dua bikar, P dan Q yang mengandungi ketulan batu kapur, CaCO_3 dan kertas pH masing-masing dalam asid etanoik cair.

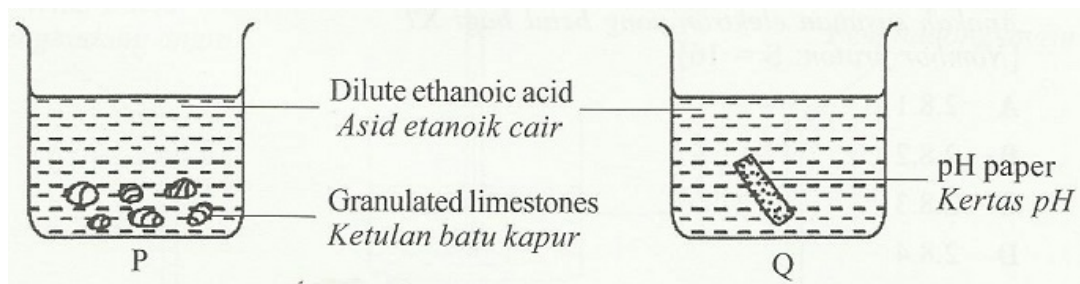


Diagram 187 / Rajah 187

Which observation is correct?

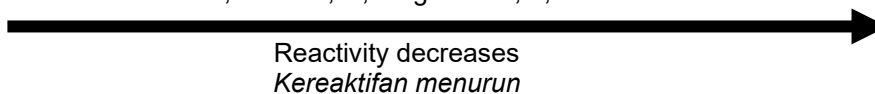
Pemerhatian yang manakah betul?

	P	Q
A	Gas bubbles released <i>Gelembung gas terbebas</i>	pH value = 1 <i>nilai pH = 1</i>
B	Gas bubbles released <i>Gelembung gas terbebas</i>	pH value = 4 <i>nilai pH = 4</i>
C	Solution turns cloudy <i>Larutan menjadi keruh</i>	pH value = 4 <i>nilai pH = 4</i>
D	No change <i>Tiada perubahan</i>	pH value = 1 <i>nilai pH = 1</i>

188. The following information shows the arrangement of some metals in the reactivity series.

Maklumat berikut menunjukkan susunan beberapa logam dalam siri kereaktifan.

potassium, sodium, R, magnesium, L, tin
kalium, natrium, R, magnesium, L, stanum



What are R and L?

Apakah R dan L?

	R	L
A	Calcium <i>Kalsium</i>	Iron <i>Besi</i>
B	Calcium <i>Kalsium</i>	Copper <i>Kuprum</i>
C	Aluminium <i>Aluminium</i>	Copper <i>Kuprum</i>
D	Aluminium <i>Aluminium</i>	Iron <i>Besi</i>

189. Which statement is correct about acid?
 Pernyataan manakah yang betul tentang asid?

- A Acid solution conducts electric current
Larutan asid mengkonduksikan arus elektrik
- B Strong acid ionizes partially in water
Asid kuat mengion separa dalam air
- C Weak acid produces high concentration of hydrogen ions
Asid lemah menghasilkan kepekatan ion hidrogen yang tinggi
- D The presence of water enables acid to produce hydroxide ions
Kehadiran air membolehkan asid menghasilkan ion hidroksida

190. Table 190 shows the pH values of two solutions with the same concentration.
 Jadual 190 menunjukkan nilai pH bagi dua larutan dengan kepekatan yang sama.

Solution Larutan	pH
Q	2
R	6

Table 190 / Jadual 190

Which statement explains the differences in the pH values?
 Pernyataan manakah yang menerangkan perbezaan antara nilai pH itu?

- A Q ionizes partially whereas R ionizes completely
Q mengion separa manakala R mengion lengkap
- B The concentration of hydrogen ions in Q is lower than R
Kepekatan ion hidrogen dalam Q adalah lebih rendah daripada R
- C The number of mole of hydrogen ions in Q is less than R
Bilangan mol ion hidrogen dalam Q adalah kurang daripada R
- D The degree of ionization of Q is higher than R
Darjah pengionan Q adalah lebih tinggi daripada R

191. A student is required to confirm the presence of nitrate ion in the solution X.
 What is the suitable reagent and the expected observation in the test?
 Seorang pelajar dikehendaki mengesahkan kehadiran ion nitrat dalam larutan X. Apakah reagen yang sesuai dan pemerhatian yang dijangkakan dalam ujian itu?

	Reagent Reagen	Observation Pemerhatian
A	Dilute hydrochloric acid Asid hidroklorik cair	Gas released turns lime water chalky Gas yang terbebas mengeruhkan air kapur
B	Dilute nitric acid and silver nitrate solution Asid nitrik cair dan larutan argentum nitrat	White precipitate is formed Mendakan putih terbentuk
C	Dilute hydrochloric acid and barium chloride solution Asid hidroklorik cair dan larutan barium klorida	White precipitate is formed Mendakan putih terbentuk
D	Dilute sulphuric acid, iron(II) sulphate solution and concentrated sulphuric acid Asid sulfurik cair, ferum(II) sulfat dan asid sulfurik pekat	A brown ring is formed Cincin perang terbentuk

192. A substance has the following characteristics.
Suatu bahan mempunyai ciri-ciri berikut.

- Turns moist blue litmus paper to red
Menukar kertas litmus biru lembap ke merah
- Sour taste
Rasa masam
- Gas bubbles released when reacts with magnesium
Gelembung gas terbebas apabila bertindak balas dengan magnesium

What is the molecular formula of the substance?
Apakah formula molekul bagi bahan itu?

- | | | | |
|---|------------|---|-------------------|
| A | C_2H_6 | C | C_2H_5COOH |
| B | C_2H_5OH | D | $C_2H_5COOC_2H_5$ |

191. Which substance neutralises a solution with the pH value of 4?
Bahan manakah meneutralkan suatu larutan dengan nilai pH 4?

- A Distilled water
Air suling
- B Sodium chloride
Natrium klorida
- C Sodium hydroxide
Natrium hidroksida
- D Dilute ethanoic acid
Asid etanoik cair

192. Which of the following is a soluble salt?
Antara yang berikut, yang manakah adalah satu garam terlarutkan?

- A Iron(II) chloride
Ferum(II) klorida
- B Silver chloride
Argentum klorida
- C Calcium sulphate
Kalsium sulfat
- D Lead(II) sulphate
Plumbum(II) sulfat

193. Table 193 shows the observations when a series of tests are conducted to verify the anion and cation in a compound X.

Jadual 4 menunjukkan pemerhatian apabila satu siri ujian dijalankan bagi mengesahkan anion dan kation dalam sebatian X.

Test Ujian	Observation Pemerhatian
Add a few drops of ammonia solution until excess to solution of X <i>Tambah beberapa titik larutan ammonia sehingga berlebihan kepada larutan X</i>	White precipitate is formed and it is soluble in excess ammonia solution <i>Mendakan putih terbentuk dan larut dalam larutan ammonia berlebihan</i>
Add solution of X to silver nitrate solution <i>Tambah larutan X kepada larutan argentum nitrat</i>	White precipitate is formed <i>Mendakan putih terbentuk</i>

Table / Jadual 193

What are the anion and cation present in compound X?

Apakah anion dan kation yang hadir dalam sebatian X?

	Anion Anion	Cation Kation
A	Chloride Klorida	Lead Plumbum
B	Chloride Klorida	Zinc Zink
C	Sulphate Sulfat	Zinc Zink
D	Sulphate Sulfat	Lead Plumbum

194. A student used ethanol as an electrolyte in an electrolysis experiment. After two minutes, there was no deflection of the needle on the ammeter.

Seorang murid menggunakan etanol sebagai elektrolit dalam suatu eksperimen elektrolisis. Selepas diminit, didapati tiada pesongan pada jarum ammeter.

Which explanation is the most suitable for the observation?

Penjelasan manakah yang paling sesuai bagi pemerhatian tersebut?

A Particles of ethanol move freely
Zarah etanol bergerak bebas

B Particles of ethanol lose electrons
Zarah etanol kehilangan elektron

C Particles of ethanol contain positively-charged ions
Zarah etanol mengandungi ion bercas positif

D Particles of ethanol are made up of molecule
Zarah etanol terdiri daripada molekul

195. Which solution contains the greatest number of hydrogen ions?

Larutan manakah mengandungi paling banyak ion hidrogen?

- A 0.3 dm³ of 2.0 mol dm⁻³ sulphuric acid
0.3 dm³ asid sulfurik 2.0 mol dm⁻³
- B 0.4 dm³ of 2.0 mol dm⁻³ nitric acid
0.4 dm³ asid nitrik 2.0 mol dm⁻³
- C 0.5 dm³ of 2.0 mol dm⁻³ hydrochloric acid
0.5 dm³ asid hidroklorik 2.0 mol dm⁻³
- D 0.6 dm³ of 2.0 mol dm⁻³ ethanoic acid
0.6 dm³ asid etanoik 2.0 mol dm⁻³

196. Diagram 196 shows an observation when lead strip reacts with hydrochloric acid, bubbles of gas are produced.

Rajah 196 menunjukkan satu pemerhatian apabila kepingan plumbum bertindak balas dengan asid hidroklorik, gelembung gas dihasilkan.

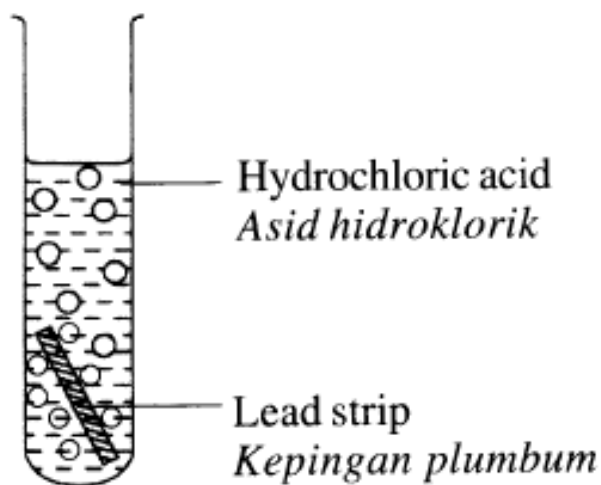


Diagram 196 / Rajah 196

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 | C | Iron
Ferum |
| B | Copper
Kuprum | D | Aluminium
Aluminium |

197. Table 197 shows the observation for two tests on solution T.
Jadual 197 menunjukkan pemerhatian bagi dua ujian ke atas larutan T.

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

Table 197 / *Jadual 197*

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+}

198. What is the process involved when alcohol reacts with acidified potassium dichromate(VI) solution?
 Apakah proses yang terlibat apabila suatu alkohol bertindak balas dengan larutan kalium dikromat(VI) berasid?

- A Oxidation C Esterification
 Pengoksidaan Pengesteran
 B Dehydration D Halogenation
 Pendehidratan Penghalogenan

199. Which of the following is not an oxidising agent?
 Antara yang berikut, yang manakah bukan agen pengoksidaan?

- A Chlorine C Hydrogen peroxide
 Klorin Hidrogen peroksida
 B Potassium iodide D Concentrated nitric acid
 Kalium iodida Asid nitrik pekat

200. What is the oxidation number of hydrogen in magnesium hydride, MgH_2 ?
 Apakah nombor pengoksidaan bagi hidrogen dalam magnesium hidrida, MgH_2 ?

- A 0
 B -1
 C +1
 D +2

201. The position of carbon in the Reactivity Series of Metal is between
Kedudukan karbon dalam Siri Kereaktifan Logam adalah di antara

- A iron and lead.
ferum dengan plumbum.
- B zinc and iron.
Zink dengan ferum.
- C aluminium and zinc.
aluminium dengan zink.
- D calcium and aluminium.
kalsium dengan aluminium.

201. Diagram 201 shows a part of heater found in an electric kettle regularly used by a housewife.
Rajah 201 menunjukkan bahagian pemanas yang terdapat dalam sebuah cerek elektrik yang sering digunakan oleh seorang suri rumah.

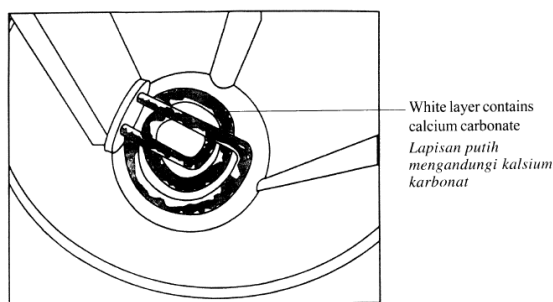


Diagram 201 / Rajah 201

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
Garam
- B Vinegar
Cuka
- C Cooking oil
Minyak masak
- D Wheat flour
Tepung gandum

202. The following chemical equation represents a reaction between sulphuric acid and potassium hydroxide solution.

Persamaan kimia berikut mewakili tindak balas antara asid sulfurik dengan larutan kalium hidroksida.



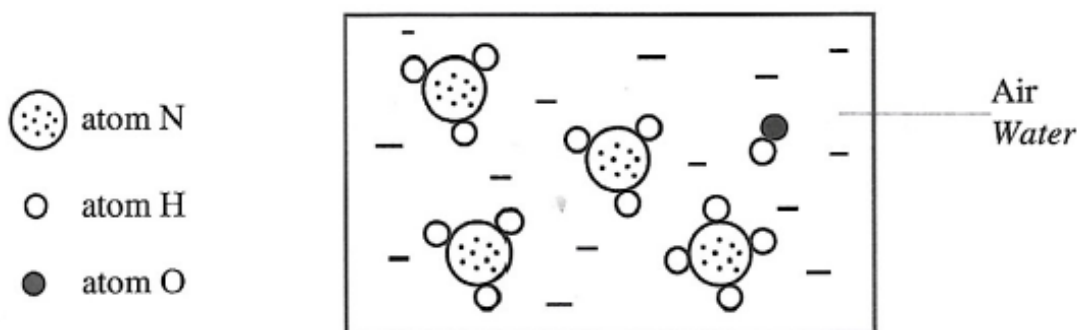
What is the volume of 0.5 mol dm⁻³ sulphuric acid required to neutralise 25 cm³ of 0.1 mol dm⁻³ potassium hydroxide?

Apakah isi padu asid sulfurik 0.5 mol dm⁻³ yang diperlukan untuk meneutralkan 25 cm³ larutan kalium hidroksida 0.1 mol dm⁻³?

- | | | | |
|---|---------------------|---|---------------------|
| A | 2.5 cm ³ | C | 3.5 cm ³ |
| B | 3.0 cm ³ | D | 4.2 cm ³ |

203. Rajah 203 menunjukkan pengionan bagi suatu bahan, dalam air.

Diagram 203 shows the ionisation of a substance, in water.



Rajah 203 / Diagram 203

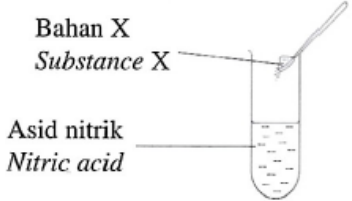
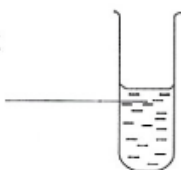
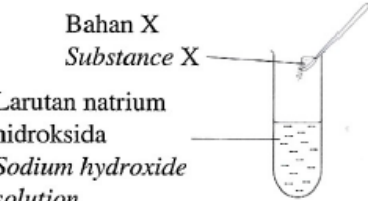
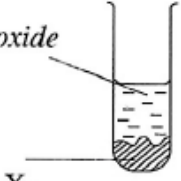
Antara yang berikut, pernyataan manakah yang betul tentang bahan tersebut?

Which of the following statements is correct about the substance?

- A Nilai pH kurang daripada 7
pH value is less than 7
- B Pengionan lengkap dalam air
Complete ionisation in water
- C Kepekatan ion hidroksida yang rendah
Low concentration of hydroxide ions
- D Bilangan mol ion hidrogen yang tinggi
High number of moles of hydrogen ions

204. Rajah 204 menunjukkan pemerhatian bagi suatu eksperimen apabila bahan X ditambah ke dalam dua larutan.

Diagram 204 shows the observations of an experiment when substance X is added into two solutions.

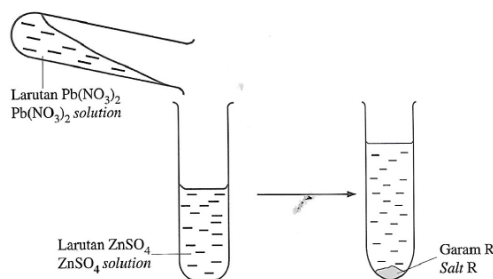
Set Set	Pemerhatian Observation	
	Sebelum eksperimen Before experiment	Selepas eksperimen After experiment
I	Bahan X <i>Substance X</i>  Asid nitrik <i>Nitric acid</i>	Larutan tidak berwarna <i>Colourless solution</i> 
II	Bahan X <i>Substance X</i>  Larutan natrium hidroksida <i>Sodium hydroxide solution</i>	Larutan natrium hidroksida <i>Sodium hydroxide solution</i>  Bahan X <i>Substance X</i>

Rajah 204 / Diagram 204

Apakah bahan X?
 What is substance X?

- | | | | |
|---|--------------------------------|---|--------------------------------|
| A | MgO | C | Cl ₂ O ₇ |
| B | Al ₂ O ₃ | D | P ₄ O ₁₀ |

205. Rajah 205 menunjukkan suatu eksperimen untuk menghasilkan garam R. Diagram 9 shows an experiment to produce salt R.



Rajah 205 / Diagram 205

Apakah larutan garam yang boleh digunakan untuk menggantikan larutan Pb(NO₃)₂ untuk menghasilkan garam yang mempunyai keterlarutan yang sama seperti garam R?

What salt solution can be used to replace Pb(NO₃)₂ solution to produce salt that has the same solubility as salt R?

- | | | | |
|---|-----------------------------------|---|-----------------------------------|
| A | Cu(NO ₃) ₂ | C | Fe(NO ₃) ₂ |
| B | Ca(NO ₃) ₂ | D | Mg(NO ₃) ₂ |

206. Diagram 206 shows the apparatus set-up for the neutralisation reaction between a strong acid and a strong alkali.

Rajah 206 menunjukkan susunan radas bagi tindak balas peneutralan antara asid kuat dan alkali kuat.

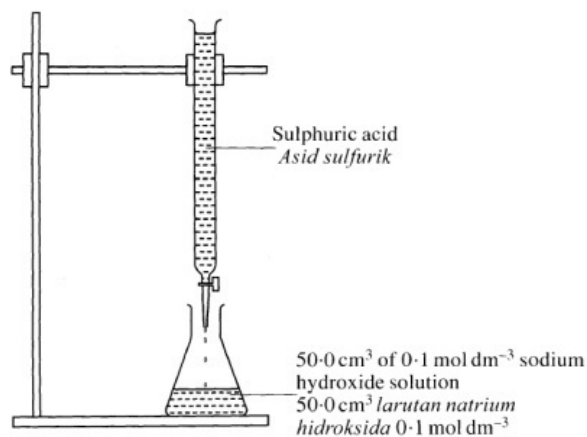


Diagram / Rajah 206

25.0 cm³ of sulphuric acid neutralises 50.0 cm³ of 1.0 mol dm⁻³ sodium hydroxide solution. What is the molarity of the sulphuric acid?

25.0 cm³ asid sulfurik meneutralkan 50.0 cm³ larutan natrium hidroksida 1.0 mol dm⁻³.

Apakah kemolaran asid sulfurik?

- | | | | |
|---|---------------------------|---|---------------------------|
| A | 0.10 mol dm ⁻³ | C | 0.20 mol dm ⁻³ |
| B | 0.15 mol dm ⁻³ | D | 0.40 mol dm ⁻³ |

207. The following equation represents the reaction between hydrochloric acid and calcium hydroxide solution.

Persamaan berikut mewakili tindak balas antara asid hidroklorik dan larutan kalsium hidroksida.



20.0 cm³ of 0.1 mol dm⁻³ hydrochloric acid is neutralised by 50.0 cm³ of calcium hydroxide solution. What is the molarity of the calcium hydroxide solution?

20.0 cm³ asid hidroklorik 0.1 mol dm⁻³ dineutralkan oleh 50.0 cm³ larutan kalsium hidroksida. Berapakah kemolaran larutan kalsium hidroksida itu?

- | | | | |
|---|----------------------------|---|----------------------------|
| A | 0.020 mol dm ⁻³ | C | 0.125 mol dm ⁻³ |
| B | 0.040 mol dm ⁻³ | D | 0.250 mol dm ⁻³ |

208. What is the main source in the production of detergent?

Apakah sumber utama dalam penghasilan detergen?

- | | | | |
|---|----------------------------|---|------------------------|
| A | Palm oil
Minyak sawit | C | Ammonia
Ammonia |
| B | Animal fat
Lemak haiwan | D | Petroleum
Petroleum |

209. A pupil wants to produce a rubber strip that is harder and resistant to heat. He dips the rubber strip in a beaker containing methylbenzene and substance Q. What is substance Q?

Seorang pelajar ingin menghasilkan kepingan getah yang lebih keras dan tahan haba.

Dia mencelupkan kepingan getah itu ke dalam bikar yang mengandungi metilbenzena dan bahan Q.

Apakah bahan Q?

- | | | | |
|---|---|---|--|
| A | Potassium hydroxide
<i>Kalium hidroksida</i> | C | Hydrogen chloride
<i>Hidrogen klorida</i> |
| B | Disulphur dichloride
<i>Disulfur diklorida</i> | D | Ethanoic acid
<i>Asid etanoik</i> |

210. Which pair shows pH value and the degree of dissociation for sulphuric acid?

Pasangan manakah yang menunjukkan nilai pH dan darjah penceraian bagi asid sulfurik yang betul?

	pH value <i>Nilai pH</i>	Degree of dissociation <i>Darjah penceraian</i>
A	2	High <i>Tinggi</i>
B	2	Low <i>Rendah</i>
C	6	Low <i>Rendah</i>
D	6	High <i>Tinggi</i>

211. Which pair produces the highest heat of neutralisation?

Pasangan manakah yang menghasilkan haba penutralan paling tinggi?

- A Methanoic acid and sodium hydroxide solution
Asid metanoik dan larutan natrium hidroksida
- B Sulphuric acid and potassium hydroxide solution
Asid sulfurik dan larutan kalium hidroksida
- C Hydrochloric acid and potassium hydroxide solution
Asid hidroklorik dan larutan kalium hidroksida
- D Ethanoic acid and sodium hydroxide solution
Asid etanoik dan larutan natrium hidroksida

212. Which acid contains the highest number of hydrogen ions?

Asid manakah yang mengandungi bilangan ion hidrogen yang paling tinggi?

- A 25 cm³ of 1 mol dm⁻³ nitric acid
25 cm³ asid nitrik 1 mol dm⁻³
- B 25 cm³ of 1 mol dm⁻³ ethanoic acid
25 cm³ asid etanoik 1 mol dm⁻³
- C 25 cm³ of 1 mol dm⁻³ sulphuric acid
25 cm³ asid sulfurik 1 mol dm⁻³
- D 25 cm³ of 1 mol dm⁻³ hydrochloric acid
25 cm³ asid hidroklorik 1 mol dm⁻³

213. Which of the following is not a chemical property of acids?
Antara yang berikut, yang manakah bukan sifat kimia bagi asid?

- A Reacts with carbonate to produce salt, water and carbon dioxide
Bertindak balas dengan karbonat untuk menghasilkan garam, air dan karbon dioksida
- B Reacts with reactive metal to produce salt and hydrogen
Bertindak balas dengan logam reaktif untuk menghasilkan garam dan hidrogen
- C Reacts with metal oxide to produce salt and water
Bertindak balas dengan oksida logam untuk menghasilkan garam dan air
- D Reacts with alkali to produce salt and hydrogen.
Bertindak balas dengan alkali untuk menghasilkan garam dan hidrogen

214. A farmer found that his soil is too acidic for some plants to grow well. Which substance is suitable to reduce the acidity of the soil?

Seorang petani mendapati tanahnya terlalu berasid untuk tanamannya tumbuh dengan baik. Bahan manakah yang sesuai untuk mengurangkan keasidan tanah itu?

- A Barium chloride
Barium klorida
- B Calcium chloride
Kalsium oksida
- C Sodium chloride
Natrium nitrit
- D Potassium iodide
Kalium iodida

215. The following equation represents the neutralization reaction between barium hydroxide, Ba(OH)₂ and hydrochloric acid, HCl.

Persamaan berikut mewakili tindak balas peneutralan antara barium hidroksida dan asid hidroklorik, HCl.



What is the volume of 0.5 mol dm⁻³ hydrochloric acid needed to neutralize 25 cm³ of 0.1 mol dm⁻³ barium hydroxide?

Berapakah isi padu asid hidroklorik 0.5 mol dm⁻³ yang diperlukan untuk meneutralkan 25 cm³ barium hidroksida 0.1 mol dm⁻³?

- A 2.5 cm³
- B 5.0 cm³
- C 10.0 cm³
- D 12.5 cm³

216. Table 216 shows the observations in three tests on solution X.
Jadual 216 menunjukkan pemerhatian bagi tiga ujian ke atas larutan X.

	Test	Observation
I	Add sodium hydroxide solution until in excess <i>Tambah larutan natrium hidroksida sehingga berlebihan</i>	White precipitate which dissolves in excess sodium hydroxide solution <i>Mendakan putih larut dalam larutan natrium hidroksida</i>
II	Add ammonia solution until in excess <i>Tambah larutan ammonia sehingga berlebihan</i>	White precipitate which dissolves in excess sodium ammonia solution <i>Mendakan putih larut dalam larutan ammonia berlebihan</i>
III	Add 2 cm ³ of dilute nitric acid and few drops of silver nitrate solution <i>Tambah 2 cm³ asid nitrik cair dan beberapa titik larutan argentum nitrat</i>	White precipitate formed <i>Mendakan putih terbentuk</i>

Table 216 / *Jadual 216*

What is X?
Apakah X?

- A Zinc chloride
Zink klorida
- B Zinc sulphate
Zink sulfat
- C Aluminium chloride
Aluminium klorida
- D Aluminium sulphate
Aluminium sulfat

217. 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

218. Diagram 1 shows an energy profile for manufacturing ammonia through Haber process.
Rajah 1 menunjukkan profil tenaga bagi pembuatan ammonia melalui proses Haber.

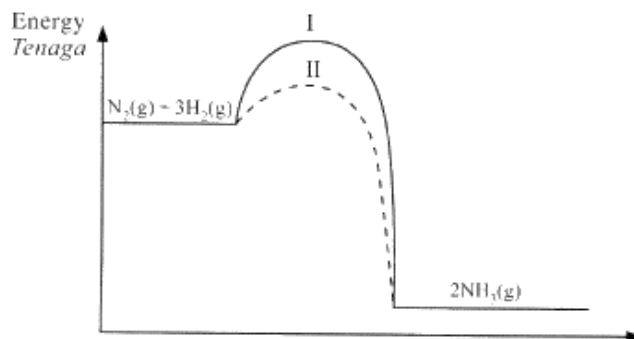


Diagram 218 / Rajah 218

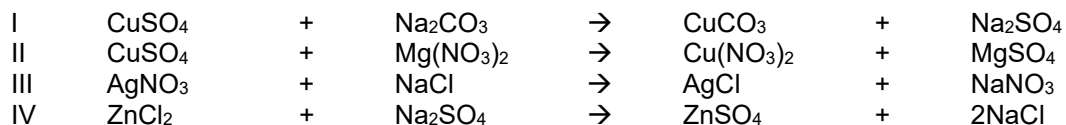
What is the change needed to be done to get curve II from curve I?
Apakah perubahan yang perlu dilakukan untuk mendapatkan lengkung II daripada lengkung I?

- A The mixture is passed through layers of iron
Campuran dilalukan melalui lapisan besi
- B The mixture is cooled to produce ammonia in liquid form
Campuran disejukkan untuk menghasilkan ammonia dalam bentuk cecair
- C The mixture is compressed to pressure of 200 atmosphere
Campuran dimampatkan sehingga tekanan 200 atmosfera
- D The mixture is heated to temperature of 450 °C
Campuran dipanaskan sehingga suhu 450 °C

219. A concentrated sodium chloride solution is electrolysed using carbon electrodes.
Which are the half-equations that represent the reactions at the anode and the cathode?
Larutan natrium klorida pekat di elektrolisis menggunakan elektrod karbon. Setengah persamaan manakah yang mewakili tindak balas di anod dan di katod?

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

220. Which equations represent double decomposition reactions that form a precipitate?
Persamaan manakah yang mewakili tindak balas penguraian ganda dua yang menghasilkan mendakan?



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

221. Which of the following is correct about weak alkaline solution?
Antara berikut, yang manakah betul tentang larutan alkali lemah?

- A Have pH value of 13
Mempunyai nilai pH 13
- B Partially ionised in water
Mengion separa dalam air
- C Concentration of the solution is low
Kepekatan larutan adalah lemah
- D Solution does not react with acid
Larutan tidak bertindak balas dengan asid

222. Which characteristic of hydrogen chloride enables it to show acidic properties in water?
Ciri hidrogen klorida yang manakah membolehkannya menunjukkan sifat keasidan dalam air?

- A Dissolves in water
Larut dalam air
- B Contains hydrogen in its molecule
Mengandungi hidrogen dalam molekulnya
- C Contains chlorine in its molecule
Mengandungi klorin dalam molekulnya
- D Ionises in water to form hydrogen ions
Mengion dalam air untuk membentuk ion-ion hidrogen

223. Table 223 shows the concentration of hydrogen ions in hydrochloric acid and sulphuric acid.
Jadual 223 menunjukkan kepekatan ion hidrogen dalam asid hidroklorik dan asid sulfurik.

Acid <i>Asid</i>	Concentration of hydrogen ions (mol dm^{-3}) <i>Kepekatan ion hidrogen (mol dm^{-3})</i>
0.1 mol dm^{-3} hydrochloric acid <i>Asid hidroklorik 0.1 mol dm⁻³</i>	0.1
0.1 mol dm^{-3} sulphuric acid <i>Asid sulfurik 0.1 mol dm⁻³</i>	0.2

Table 223 / *Jadual 223*

Why is the concentration of hydrogen ions in sulphuric acid higher than in hydrochloric acid?
Mengapakah kepekatan ion hidrogen dalam asid sulfurik lebih tinggi daripada dalam asid hidroklorik?

- A Sulphuric acid is denser
Asid sulfurik lebih tumpat
- B Sulphuric acid is more soluble in water
Asid sulfurik lebih mudah larut dalam air
- C Sulphuric acid is a stronger acid
Asid sulfurik ialah asid yang lebih kuat
- D Sulphuric acid is a diprotic acid
Asid sulfurik ialah asid diprotic

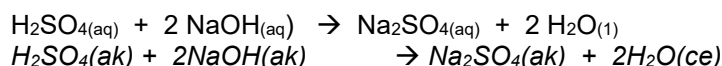
224. Which substance forms yellow precipitate when added to lead(II) nitrate solution?

Bahan manakah yang membentuk mendakan kuning apabila ditambahkan kepada larutan plumbum(II) nitrat?

- | | | | |
|---|---|---|--|
| A | Sodium chloride
<i>Natrium klorida</i> | C | Potassium iodide
<i>Kalium karbonat</i> |
| B | Sodium carbonate
<i>Natrium karbonat</i> | D | Potassium sulphate
<i>Kalium sulfat</i> |

225. The following chemical equation shows the reaction between sulphuric acid and sodium hydroxide.

Persamaan kimia berikut menunjukkan tindak balas antara asid sulfurik dengan natrium hidroksida.



What is the molarity of sulphuric acid used when 100 cm³ of the acid neutralises 0.04 mol of sodium hydroxide?

Berapakah kemolaran asid sulfurik yang digunakan apabila 100cm³ asid itu meneutralkan 0.04 mol natrium hidroksida?

- | | | | |
|---|---------------------------|---|---------------------------|
| A | 0.02 mol dm ⁻³ | C | 0.20 mol dm ⁻³ |
| B | 0.08 mol dm ⁻³ | D | 0.80 mol dm ⁻³ |

228. What is the number of moles in 100 cm³ of 1.5 mol dm⁻³ of nitric acid?

Berapakah bilangan mol dalam 100 cm³ asid nitrik 1.5 mol dm⁻³?

- | | | | |
|---|-----------|---|-----------|
| A | 0.015 mol | C | 0.150 mol |
| B | 0.100 mol | D | 1.500 mol |

229. A student wants to identify cation that present in a salt solution. When sodium hydroxide solution is added into the salt solution, brown precipitate is formed.

What is the method that need to be done next and the observation expected to confirm the presence of the cation?

Seorang murid ingin mengenal pasti kation yang hadir dalam suatu larutan garam. Apabila larutan natrium hidroksida ditambah ke dalam larutan garam itu, mendakan perang terbentuk. Apakah kaedah yang perlu dilakukan seterusnya dan apakah pemerhatian yang dijangkakan untuk mengesahkan kehadiran kation itu?

	Method Kaedah	Observation Pemerhatian
A	Warm up the solution <i>Hangatkan larutan</i>	Gas released turns red litmus paper into blue <i>Gas yang terbebas menukarkan kertas litmus merah kepada biru</i>
B	Heat up the solution <i>Panaskan larutan</i>	Gas released turns lime water chalky <i>Gas yang terbebas mengeruhkan air kapur</i>
C	Add potassium tiosianate solution <i>Tambahkan larutan kalium tiosianat</i>	Red blood solution produced <i>Larutan merah darah dihasilkan</i>
D	Add acidic potassium manganate(VII) <i>Tambahkan larutan kalium manganat(VII) bersaid</i>	Purple solution is decolourised <i>Larutan ungu dinyahwarnakan</i>

230. What is the number of moles in 100 cm³ of 1.5 mol dm⁻³ of nitric acid?
Berapakah bilangan mol dalam 100 cm³ asid nitrik 1.5 mol dm⁻³?

- A 0.015 mol C 0.150 mol
 B 0.100 mol D 1.500 mol

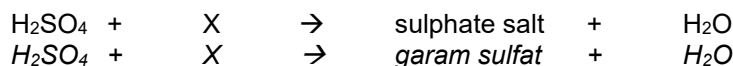
233. The reaction between barium chloride solution and lead(II) nitrate solution produces lead(II) chloride and barium nitrate. Which ionic equation represents the reaction?

Tindak balas antara larutan barium klorida dan larutan plumbum(II) nitrat menghasilkan plumbum(II) klorida dan barium nitrat. Persamaan ion yang manakah mewakili tindak balas itu?

- A $\text{Pb}^{2+} + \text{NO}_3^- \rightarrow \text{Pb}(\text{NO}_3)_2$
 B $\text{Pb}^{2+} + 2\text{Cl}^- \rightarrow \text{PbCl}_2$
 C $\text{Ba}^{2+} + 2\text{Cl}^- \rightarrow \text{BaCl}_2$
 D $\text{Ba}^{2+} + 2\text{NO}_3^- \rightarrow \text{Ba}(\text{NO}_3)_2$

234. The following equation shows the reaction to obtain soluble sulphate salt.

Persamaan berikut menunjukkan tindak balas untuk mendapatkan garam sulfat terlarutkan.



What is substance X?

Apakah bahan X?

- A Calcium oxide C Barium hydroxide
Kalsium oksida Barium hidroksida
- B Lead(II) oxide D Potassium hydroxide
Plumbum(II) oksida Kalium hidroksida.

235. A piece of sodium metal is put into a beaker which contains 30 cm³ of water to form a solution. Which of the following can react with the solution?

Sedikit logam natrium dimasukkan ke dalam sebuah bikar yang mengandungi 30 cm³ air untuk membentuk satu larutan. Antara yang berikut, yang manakah boleh bertindak balas dengan larutan itu?

- A Aqueous ammonia
Ammonia akueus
- B Potassium carbonate solution
Larutan kalium karbonat
- C Lithium hydrogen carbonate solution
Larutan litium hidrogen karbonat
- D Hydrogen chloride solution
Larutan hidrogen klorida

KADAR TINDAK BALAS

236. Table 236 shows the volume of oxygen gas collected when hydrogen peroxide solution decomposed in the presence of manganese(IV) oxide.

Jadual 3 menunjukkan isi padu gas oksigen yang dikumpulkan apabila larutan hidrogen peroksida terurai dengan kehadiran mangan(IV) oksida.

Time (s) Masa (s)	0	60	120	180	240	300
Volume of gas (cm ³) Isi padu gas (cm ³)	0.0	6.2	10.4	25.8	32.0	32.0

Table 236 Jadual 236

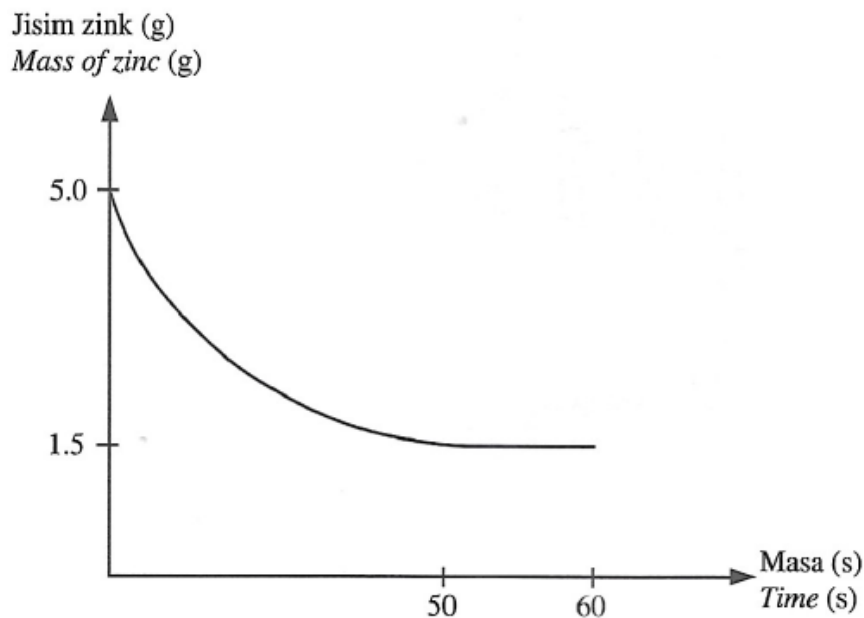
What is the average rate of reaction in the third minute?

Berapakah kadar tindak balas purata dalam minit ketiga?

- A 0.107 cm³ s⁻¹ C 0.143 cm³ s⁻¹
 B 0.133 cm³ s⁻¹ D 0.257 cm³ s⁻¹

237. Rajah 237 menunjukkan suatu graf bagi tindak balas antara zink dan larutan kuprum(II) sulfat.

Diagram 237 shows a graph for the reaction between zinc and copper(II) sulphate solution.



Rajah / Diagram 237

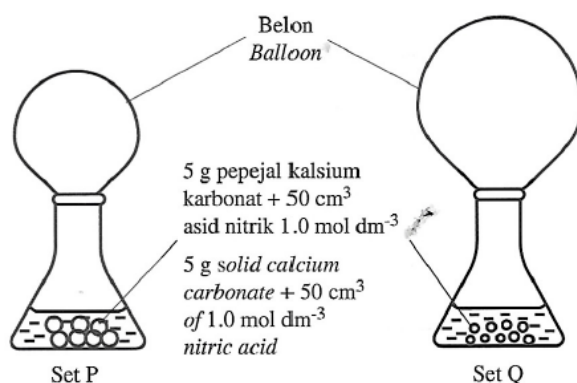
Apakah kadar tindak balas purata?

What is the average rate of reaction?

- A 0.025 g s⁻¹
 B 0.030 g s⁻¹
 C 0.058 g s⁻¹
 D 0.070 g s⁻¹

238. Rajah 238 menunjukkan keadaan belon dalam set P dan set Q selepas beberapa minit tindak balas berlaku.

Diagram 238 shows the conditions of balloons in set P and set Q a few minutes after a reaction occurred.



Rajah 238 / Diagram 238

Antara yang berikut, pernyataan manakah yang menerangkan pemerhatian itu?

Which of the following statements explains the observation?

- A Zarah bahan tindak balas dalam set P bergerak lebih cepat.
Reacting particles in set P move faster.
- B Lebih banyak zarah kalsium karbonat hadir dalam set Q.
More particles of calcium carbonate are present in set Q.
- C Jumlah luas permukaan kalsium karbonat dalam set Q adalah lebih besar.
Total surface area of calcium carbonate in set Q is larger.
- B Lebih banyak zarah bahan tindak balas mencapai tenaga pengaktifan yang rendah dalam set P.
More reacting particles achieve low activation energy in set P.

239. Rajah 239 menunjukkan dua graf yang diperolehi daripada tindak balas antara asid sulfurik dengan pita magnesium.

Diagram 239 shows two graphs obtained from a reaction between sulphuric acid and magnesium ribbon.

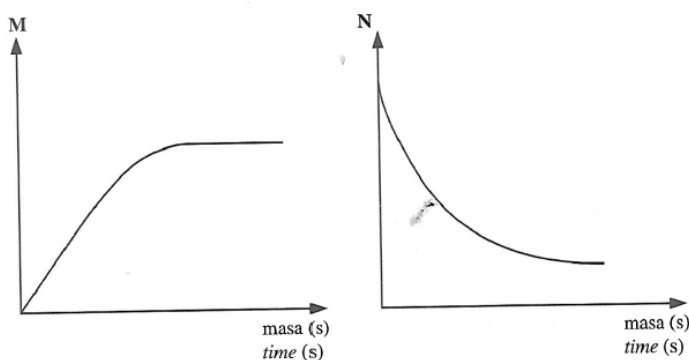


Diagram 11

Apakah M dan N?
What are M and N?

	M	N
A	Jisim pita magnesium Mass of magnesium ribbon	Kepekatan asid sulfurik Concentration of sulphuric acid
B	Kepekatan asid sulfurik Concentration of sulphuric acid	Isi padu gas hidrogen Volume of hydrogen gas
C	Kepekatan asid sulfurik Concentration of sulphuric acid	Jisim pita magnesium Mass of magnesium ribbon
D	Isi padu gas hidrogen Volume of hydrogen gas	Kepekatan asid sulfurik Concentration of sulphuric acid

240. Which of the following is the characteristic of catalyst?
Antara yang berikut, yang manakah adalah sifat mangkin?

- A Catalyst used only in solid form
Mangkin digunakan hanya dalam bentuk pepejal
- B Catalyst increases the quantity of the product
Mangkin meningkatkan kuantiti hasil tindak balas
- C Physical state of catalyst is unchanged during reaction
Keadaan fizikal mangkin tidak berubah semasa tindak balas
- D The mass of catalyst remain the same after the reaction
Jisim mangkin tetap sama selepas tindak balas

241. Table 241 shows the volume of carbon dioxide gas collected in an experiment.
Jadual 241 menunjukkan isi padu gas karbon dioksida terkumpul dalam satu eksperimen.

Time (s) <i>Masa (s)</i>	0	30	60	90	120	150	180	210	240	270
Volume of carbon dioxide gas (cm ³) <i>Isi padu gas karbon dioksida (cm³)</i>	0.0	20.0	30.0	31.0	32.0	32.5	33.0	33.0	33.0	33.0

Table 241 *Jadual 241*

What is the average rate of reaction?
Berapakah kadar tindak balas purata?

- A 0.12 cm³ s⁻¹
- B 0.18 cm³ s⁻¹
- C 0.22 cm³ s⁻¹
- D 0.37 cm³ s⁻¹

242. Diagram 242 shows a graph to study the effect of total surface area on the rate of reaction.
Rajah 242 menunjukkan suatu graf bagi mengkaji kesan jumlah luas permukaan ke atas kadar tindak balas.

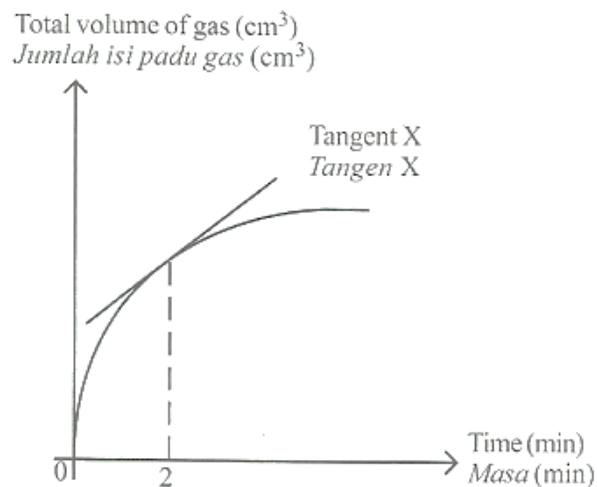


Diagram 242 / Rajah 242

What is represented by gradient tangent X?
Apakah yang diwakili oleh kecerunan tangen X?

- A Average rate of reaction in the first 2 minutes
Kadar tindak balas purata dalam 2 minit pertama
- B Average rate of reaction in the 2nd minute
Kadar tindak balas purata pada minit ke-2
- C Overall average rate of reaction
Kadar tindak balas purata keseluruhan
- D Rate of reaction at the 2nd minute
Kadar tindak balas pada minit ke-2

243. The decomposition of lead(II) nitrate produces lead(II) oxide, nitrogen dioxide and oxygen. Which of the following is the balanced chemical equation for the reaction?

Penguraian plumbum(II) nitrat menghasilkan plumbum(II) oksida, nitrogen dioksida dan oksigen. Antara yang berikut, yang manakah persamaan kimia seimbang bagi tindak balas berikut?

- A $\text{Pb}(\text{NO}_3)_2 \rightarrow \text{PbO}_2 + 2\text{NO} + \text{O}_2$
- B $\text{Pb}(\text{NO}_3)_2 \rightarrow \text{PbO}_2 + 2\text{NO} + \text{O}_3$
- C $2\text{Pb}(\text{NO}_3)_2 \rightarrow 2\text{PbO}_2 + 4\text{NO} + \text{O}_2$
- D $3\text{Pb}(\text{NO}_3)_2 \rightarrow 3\text{PbO}_2 + 6\text{NO} + \text{O}_3$

244. Diagram 244 shows a graph of the volume of gas released against time for a reaction between calcium carbonate, CaCO_3 and hydrochloric acid, HCl .

Rajah 244 menunjukkan graf isi padu gas yang terbebas melawan masa bagi tindak balas antara kalsium karbonat, CaCO_3 dan asid hidroklorik, HCl .

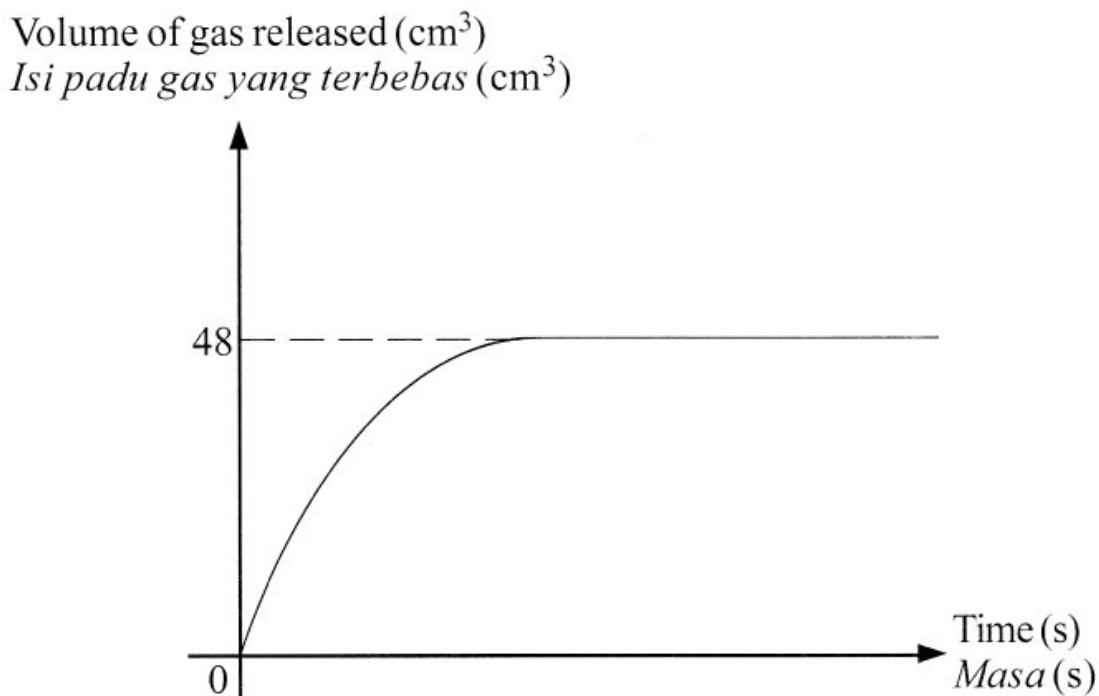


Diagram 244 / Rajah 244

What is the mass of calcium carbonate used in the reaction?

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

Relative atomic mass: C = 12, O = 16, Ca = 40]

Berapakah jisim kalsium karbonat yang digunakan dalam tindak balas itu?

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

Jisim atom relatif: C = 12, O = 16, Ca = 40]

- A 0.14 g
- B 0.20 g
- C 0.40 g
- D 2.00 g

245. Diagram 245 shows the graph of the volume of gas released against time for the reaction between calcium carbonate and hydrochloric acid.

Rajah 245 menunjukkan graf isi padu gas yang terbebas melawan masa bagi satu tindak balas antara kalsium karbonat dengan asid hidroklorik.

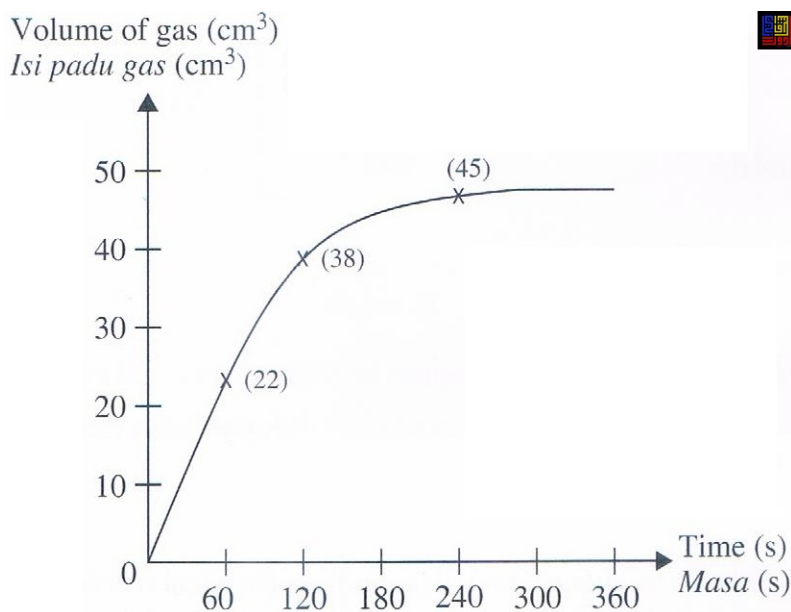


Diagram 16

Rajah 16

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

Apakah kadar tindak balas purata dalam minit kedua?

- A 22.5 cm³ per minute 22.5 cm³ per minit
 B 19.0 cm³ per minute 19.0 cm³ per minit
 C 16.0 cm³ per minute 16.0 cm³ per minit
 D 8.0 cm³ per minute 8.0 cm³ per minit

246. Diagram 246 shows the results of experiment I and experiment II for decomposition of hydrogen peroxide solution in the presence of a catalyst.

Rajah 246 menunjukkan keputusan eksperimen I dan eksperimen II bagi penguraian larutan hidrogen peroksida dengan kehadiran suatu mangkin.

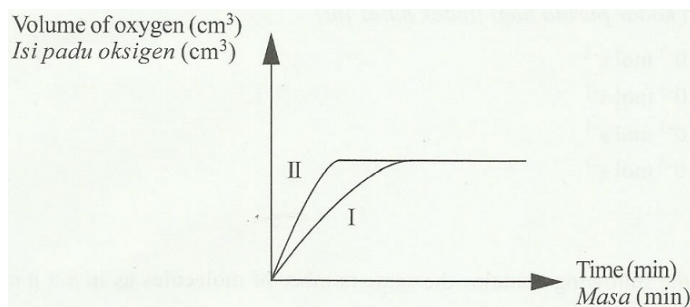


Diagram 246 / Rajah 246

Experiment I uses 50 cm³ of 1.0 mol dm⁻³ of hydrogen peroxide solution at temperature 21°C. What is used in Experiment II to obtain the curve shown in Diagram 12?

Eksperimen I menggunakan 50 cm³ larutan hidrogen peroksida 1.0 mol dm⁻³ pada suhu 21°C. Apakah yang digunakan dalam Eksperimen II untuk memperoleh lengkung yang ditunjukkan dalam Rajah 12?

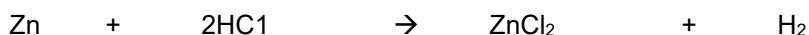
	Hydrogen peroxide <i>Hidrogen peroksida</i>		Temperature (°C) Suhu (°C)
	Volume (cm ³) <i>Isipadu (cm³)</i>	Concentration (mol dm ⁻³) <i>Kepekatan (mol dm⁻³)</i>	
A	25	0.5	30
B	25	1.0	25
C	50	0.5	25
D	50	1.0	30

39. 0.2 mol of zinc powder react with excess dilute hydrochloric acid. After 30 seconds, 0.05 mol of zinc remains as residue. What is the average rate of the reaction?

0.2 mol serbuk zink bertindak balas dengan asid hidroklorik cair berlebihan. Selepas 30 saat, didapati 0.05 mol zink tertinggal sebagai baki. Berapakah kadar purata bagi tindak balas itu?

- A $1.7 \times 10^{-3} \text{ mol s}^{-1}$
- B $5.0 \times 10^{-3} \text{ mol s}^{-1}$
- C $6.7 \times 10^{-3} \text{ mol s}^{-1}$
- D $8.3 \times 10^{-3} \text{ mol s}^{-1}$

247. 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
Mengecilkan saiz zink
- B Decrease the volume of hydrochloric acid
Mengurangkan isi padu asid hidroklorik
- C Decrease the temperature of hydrochloric acid
Menurunkan suhu asid hidroklorik
- D Decrease the concentration of hydrochloric acid
Mengurangkan kepekatan asid hidroklorik

248. Which unit is correct for the rate of reaction?

Unit manakah yang betul untuk kadar tindak balas?

- A g mol⁻¹
- B g min⁻¹
- C mol dm⁻³
- D kJ mol⁻¹

249. Diagram 249 is a graph which shows the volume of gas against time for the reaction between sulphuric acid with excess marble chips.

Rajah 249 ialah graf yang menunjukkan isi padu gas karbon dioksida melawan masa bagi tindak balas antara asid sulfurik dengan ketulan marmar berlebihan.

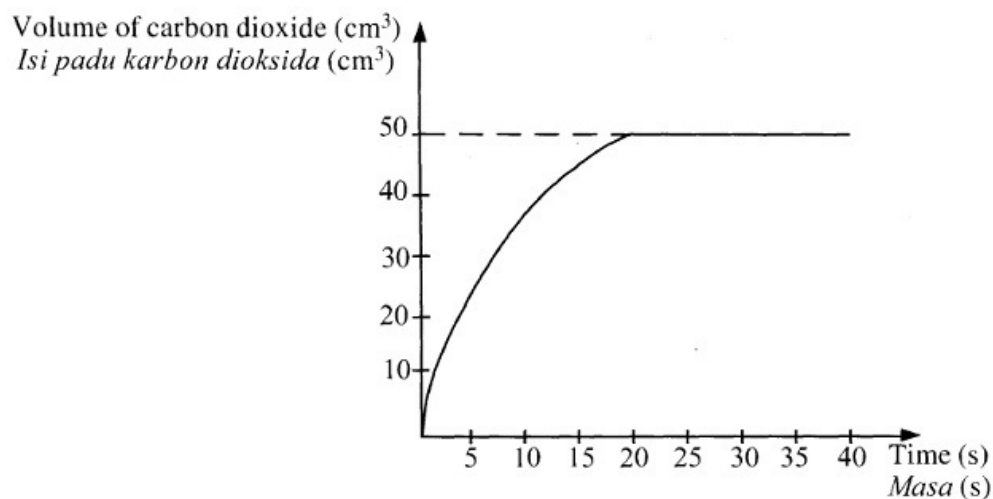


Diagram 249 / Rajah 249

What is the average rate of reaction?

Berapakah kadar tindak balas purata bagi tindak balas itu?

- A 1.0 cm³s⁻¹
- B 2.0 cm³s⁻¹
- C 2.5 cm³s⁻¹
- D 3.0 cm³s⁻¹

250. Which of the following has the lowest rate of reaction?

Antara yang berikut, yang manakah mempunyai kadar tindak balas yang paling rendah?

- A Combustion of ethanol
Pembakaran etanol
- B Fermentation of glucose
Penapaian glukosa
- C Oxidation of magnesium
Pengoksidaan magnesium
- D Precipitation of silver chloride
Pemendakan argentum klorida

251. A student wants to prepare hydrogen gas in the laboratory through the reaction between magnesium ribbon and hydrochloric acid. Which steps must be taken to shorten the time to collect the gas?
Seorang pelajar ingin menyediakan gas hidrogen di dalam makmal melalui tindak balas antara pita magnesium dan asid hidroklorik. Langkah-langkah manakah mesti diambil untuk memendekkan masa pengumpulan gas itu?

- I Adding water to hydrochloric acid
Menambahkan air kepada asid hidroklorik
- II Using a larger conical flask for the solution
Menggunakan kelalang kon yang lebih besar untuk larutan tersebut
- III Replacing magnesium ribbon with magnesium powder
Menggantikan pita magnesium dengan serbuk magnesium
- IV Adding a few drops of copper(II) sulphate solution to the mixture of the reactants
Menambahkan beberapa titis larutan kuprum(II) sulfat kepada campuran bahan tindak balas
- A I and II
I dan II
- B I and IV
I dan IV
- C II and III
II dan III
- D III and IV
III dan IV

252. The following equations represent two stages in the manufacture of nitric acid from ammonia.
Persamaan berikut mewakili dua peringkat dalam pembuatan asid nitrik daripada ammonia.

Stage 1 Peringkat 1	$4\text{NH}_3 + 5\text{O}_2 \rightarrow 4\text{NO} + 6\text{H}_2\text{O}$
Stage 2 Peringkat 2	$4\text{NO} + 2\text{H}_2\text{O} + 3\text{O}_2 \rightarrow 4\text{HNO}_3$

480 dm³ of ammonia is used to produce nitric acid in 60 minutes.

What is the mass of nitric acid produced in 30 minutes?

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

Molar volume of gas = 24.0 dm³ mol⁻¹]

480 dm³ ammonia digunakan untuk menghasilkan asid nitrik dalam tempoh 60 minit.

Berapakah jisim asid nitrik yang telah dihasilkan dalam tempoh 30 minit? [Jisim atom relatif: O = 16; N = 14; H = 1;

Isi padu molar gas = 24.0 dm³ mol⁻¹]

- A 630 g
 B 1260 g
 C 2520 g
 D 5040 g

253. The following equation represents the reaction between zinc and hydrochloric acid.
 Persamaan berikut mewakili tindak balas antara zink dan asid hidroklorik.



What is the volume of hydrogen gas produced when 6.5 g of zinc reacts with hydrochloric acid at standard temperature and pressure (STP)?

[Relative atomic mass: Zn = 65; H = 1;

Molar volume of gas at STP: $22.4 \text{ dm}^3 \text{ mol}^{-1}$]

Berapakah isi padu gas hidrogen yang terhasil apabila 6.5 g zink bertindak balas dengan asid hidroklorik pada suhu dan tekanan piawai (STP)?

[Jisim atom relatif: Zn = 65; H = 1;

Isi padu molar gas pada STP: $22.4 \text{ dm}^3 \text{ mol}^{-1}$]

- | | | | |
|---|---------------------|---|---------------------|
| A | 0.10 dm^3 | C | 2.24 dm^3 |
| B | 1.12 dm^3 | D | 4.48 dm^3 |

254. Diagram 254 is a graph which shows the volume of gas against time for the reaction between sulphuric acid with excess marble chips.

Rajah 254 ialah graf yang menunjukkan isi padu gas karbon dioksida melawan masa bagi tindak balas antara asid sulfurik dengan ketulan marmar berlebihan.

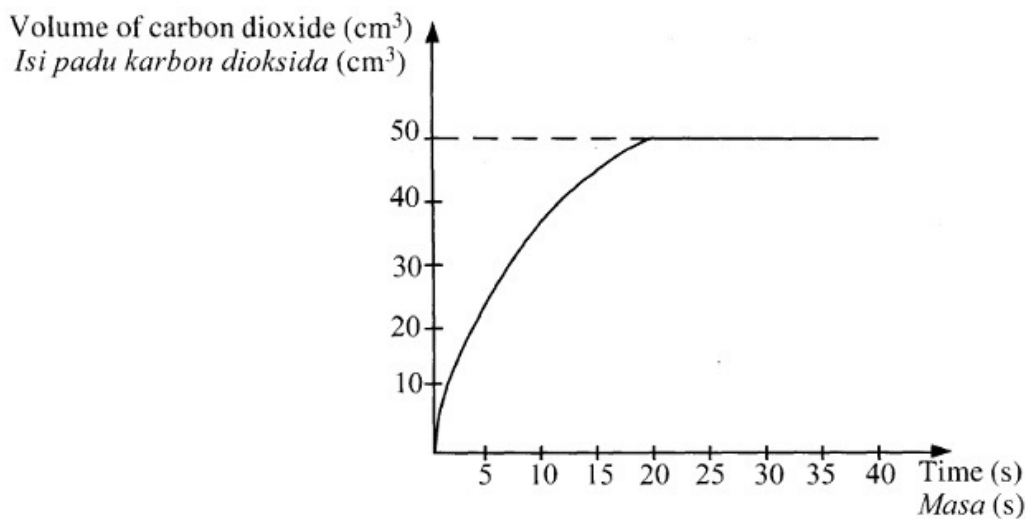


Diagram 254 Rajah 254

What is the average rate of reaction?

Berapakah kadar tindak balas purata bagi tindak balas itu?

- | | |
|---|---------------------------------|
| A | $1.0 \text{ cm}^3\text{s}^{-1}$ |
| B | $2.0 \text{ cm}^3\text{s}^{-1}$ |
| C | $2.5 \text{ cm}^3\text{s}^{-1}$ |
| D | $3.0 \text{ cm}^3\text{s}^{-1}$ |

255. Table 1 shows the condition of reactants used in experiment I and experiment II.

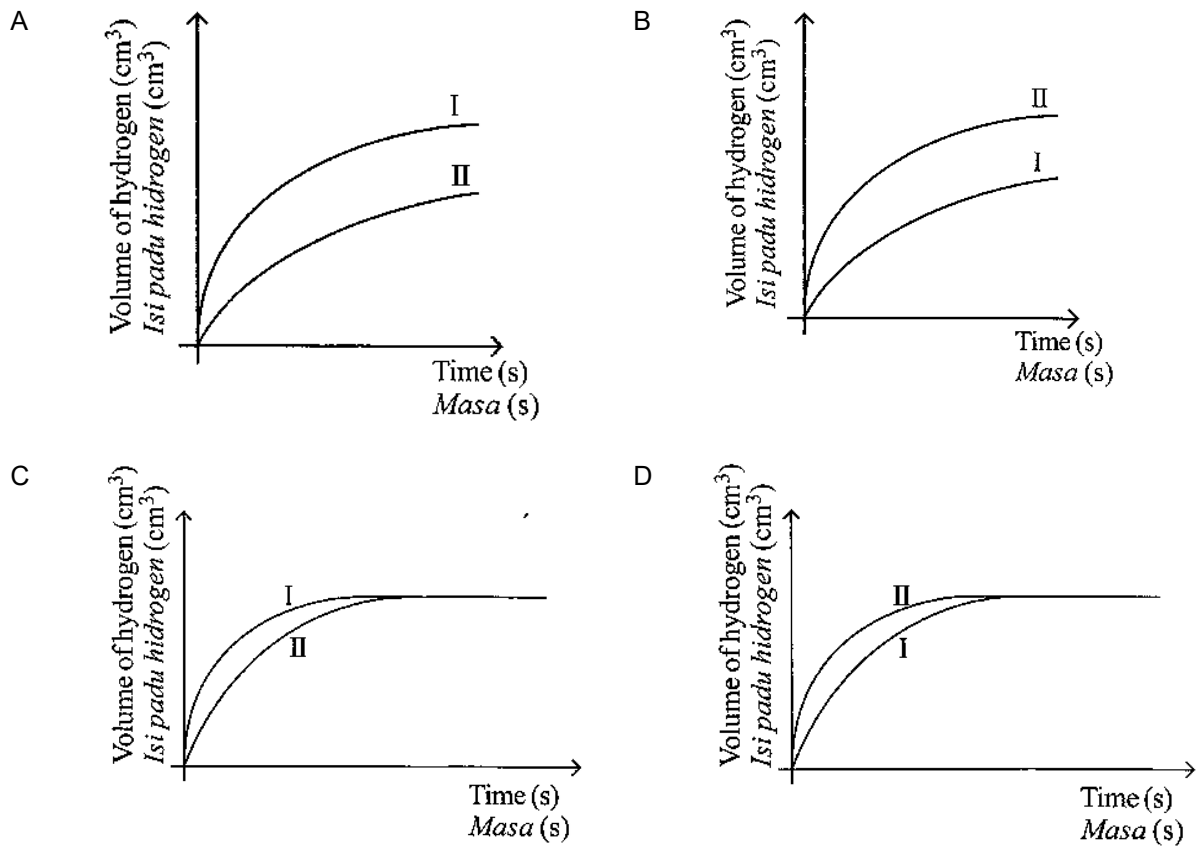
Jadual 1 menunjukkan keadaan bahan tindak balas yang digunakan dalam eksperimen I dan eksperimen II.

Experiment <i>Eksperimen</i>	Condition of reactants <i>Keadaan bahan tindak balas</i>
I	Excess zinc granules + 50 cm ³ of 2.0 mol dm ⁻³ hydrochloric acid <i>Ketulan zink berlebihan + 50 cm³ asid hidroklorik 2.0 mol dm⁻³</i>
II	Excess zinc powder + 50 cm ³ of 2.0 mol dm ⁻³ hydrochloric acid <i>Serbuk zink berlebihan + 50 cm³ asid hidroklorik 2.0 mol dm⁻³</i>

Table 255 / Jadual 255

Which graph shows the correct curve for experiment I and experiment II?

Graf manakah yang menunjukkan lengkung yang betul bagi eksperimen I dan eksperimen II?



256. Table 256 shows the total volume of oxygen gas, O_2 , collected in the decomposition reaction of hydrogen peroxide, H_2O_2 .

Jadual 256 menunjukkan jumlah isi padu gas oksigen, O_2 yang dikumpul dalam tindak balas penguraian hidrogen peroksida, H_2O_2 .

Time(s) Masa(s)	0	30	60	90	120	150	180	210	240
Volume of O_2 (cm^3) Isi padu O_2 (cm^3)	0.00	18.00	27.50	35.00	41.50	46.50	50.00	50.00	50.00

Table / Jadual 256

What is the overall average rate of reaction?

Berapakah kadar tindak balas purata keseluruhan?

- | | | | |
|---|-------------------------------------|---|-------------------------------------|
| A | $0.152 \text{ cm}^3 \text{ s}^{-1}$ | C | $0.278 \text{ cm}^3 \text{ s}^{-1}$ |
| B | $0.208 \text{ cm}^3 \text{ s}^{-1}$ | D | $0.310 \text{ cm}^3 \text{ s}^{-1}$ |

257. When the temperature of a reacting mixture increases, the rate of reaction increases. Which statement explains why the rate of reaction increases?

Apabila suhu campuran bahan tindak balas meningkat, kadar tindak balas meningkat.

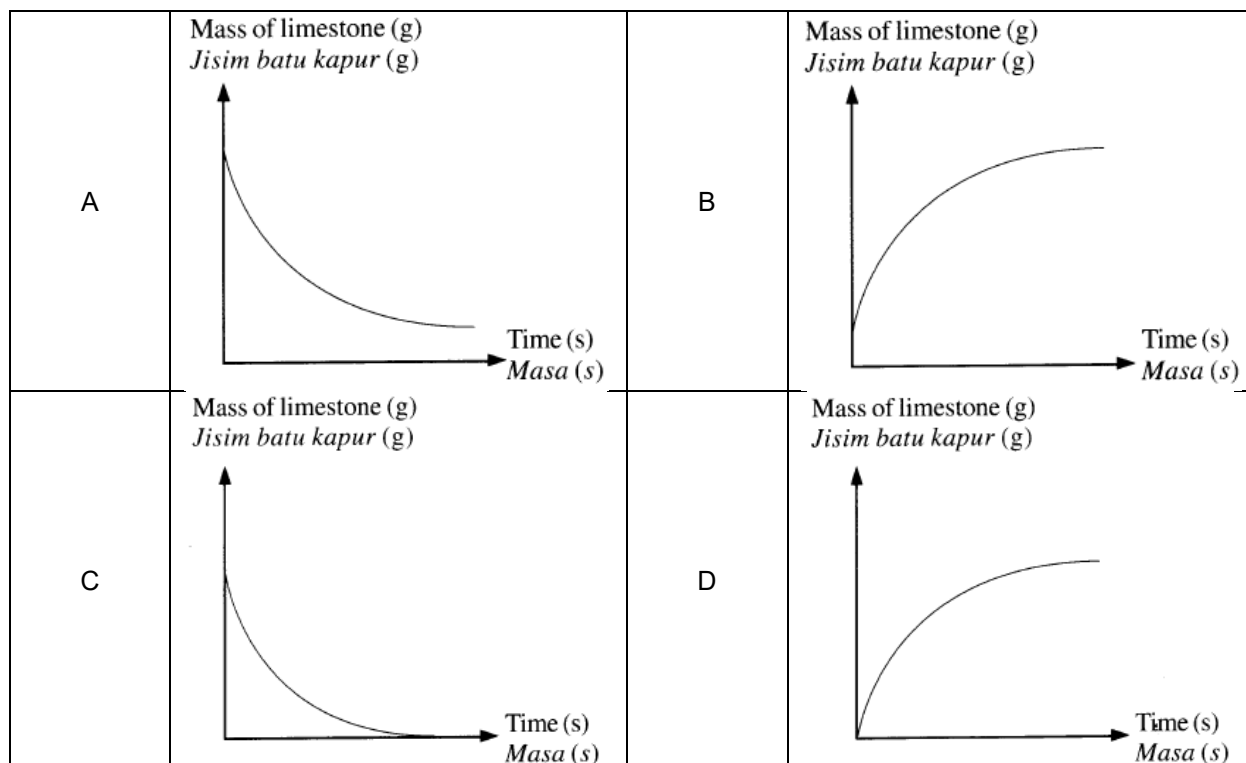
Pernyataan manakah yang menerangkan mengapa kadar tindak balas meningkat

- A The total surface area of the reactant particles increases.
Jumlah luas permukaan zarah-zarah bahan tindak balas bertambah
- B The total number of the reactant particles per unit volume increases.
Jumlah bilangan zarah-zarah bahan tindak balas per unit isi padu bertambah
- C The reactant particles move faster and collide more often with one another
Zarah-zarah bahan tindak balas bergerak lebih cepat dan berlanggar lebih kerap antara satu sama lain
- D The reactant particles which collide more often are able to overcome the lower activation energy
Zarah-zarah bahan tindak balas yang berlanggar lebih kerap boleh mengatasi tenaga pengaktifan yang lebih rendah

258 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?

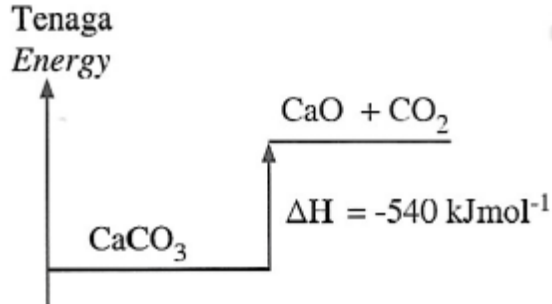
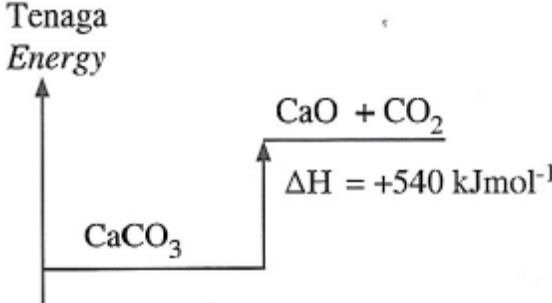
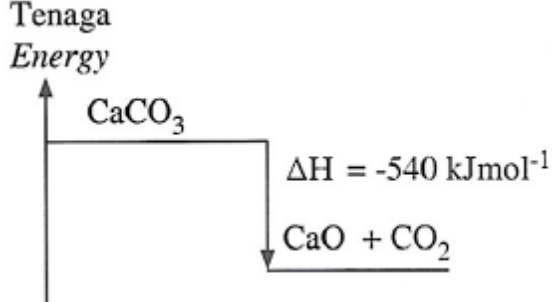
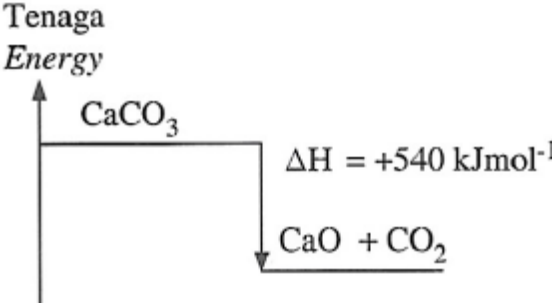


259. Persamaan berikut mewakili tindak balas penguraian bagi kalsium karbonat, CaCO_3 .
The following equation represents the decomposition reaction of calcium carbonate, CaCO_3 .



Haba yang diserap apabila 1 mol CaCO_3 terurai ialah 540 kJ mol^{-1} . Gambar rajah aras tenaga yang manakah betul bagi tindak balas itu?

Heat absorbed when 1 mol of CaCO_3 decomposed is 540 kJ mol^{-1} . Which energy level diagram is correct for the reaction?

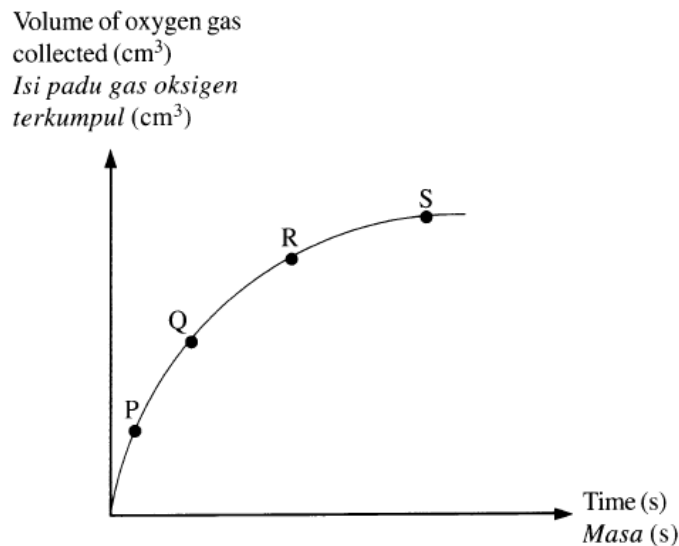
A	
B	
C	
D	

260. Persamaan kimia yang manakah mewakili tindak balas yang menghasilkan haba paling tinggi?
Which chemical equation represents the reaction that produces the highest heat?

- A $\text{HCl} + \text{NaOH} \rightarrow \text{NaCl} + \text{H}_2\text{O}$
 B $\text{HCl} + \text{NH}_4\text{OH} \rightarrow \text{NH}_4\text{Cl} + \text{H}_2\text{O}$
 C $\text{H}_2\text{SO}_4 + 2\text{NaOH} \rightarrow \text{Na}_2\text{SO}_4 + 2\text{H}_2\text{O}$
 D $\text{H}_2\text{SO}_4 + 2\text{NH}_4\text{OH} \rightarrow (\text{NH}_4)_2\text{SO}_4 + 2\text{H}_2\text{O}$

260. Diagram 260 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 260 menunjukkan satu graf isi padu gas oksigen yang terkumpul melawan masa dalam tindak balas penguraian hidrogen peroksida apabila menggunakan mangkin mangan dioksida.



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

268. Which reaction has the highest rate of reaction?

Tindak balas manakah yang mempunyai kadar tindak balas yang paling tinggi?

- A Rusting of water pipe
Pengaratn paip air
- B Photosynthesis in green plant
Fotosintesis dalam tumbuhan hijau
- C Burning of a small piece of charcoal in the air
Pembakaran ketulan kecil arang batu dalam udara
- D Formation of stalactites and stalagmites in a cave
Pembentukan stalaktit dan stalagmit dalam gua

269. Table 6 shows the total volume of hydrogen gas, collected at regular intervals for the reaction between zinc and dilute hydrochloric acid.

Jadual 6 menunjukkan jumlah isi padu gas hidrogen, yang dikumpul pada sela masa yang sekata bagi tindak balas antara zink dan asid hidroklorik cair.

Time (min) Masa (min)	Total volume of hydrogen gas (cm ³) Jumlah isi padu gas hidrogen (cm ³)
0.0	0.000
0.5	8.00
1.0	14.50
1.5	20.50
2.0	24.00
2.5	26.50
3.0	26.50
3.5	26.50

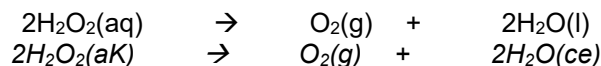
Table 269 / Jadual 269

What is the average rate of reaction?
Berapakah kadar tindak balas purata?

- A 0.10 cm³ min⁻¹
- B 7.60 cm³ min⁻¹
- C 10.60 cm³ min⁻¹
- D 37.40 cm³ min⁻¹

270. The following equation represents the decomposition of hydrogen peroxide, H₂O₂.

Persamaan berikut mewakili penguraian hidrogen peroksida, H₂O₂



2 g of manganese(IV) oxide, MnO₂ is added to hydrogen peroxide. What is the difference of adding manganese(IV) oxide to hydrogen peroxide compared to the decomposition without manganese(IV) oxide?

2 g mangan(IV) oksida, MnO₂ ditambah kepada hidrogen peroksida. Apakah perbezaan penambahan mangan(IV) oksida kepada hidrogen peroksida berbanding penguraian tanpa mangan(IV) oksida?

- A More heat is released
Lebih banyak haba terbebas
- B Total volume of oxygen becomes lower
Jumlah isi padu oksigen menjadi kurang
- C Concentration of hydrogen peroxide becomes higher
Kepekatan hidrogen peroksida menjadi lebih tinggi
- D Initial rate of decomposition of hydrogen peroxide becomes higher
Kadar awal penguraian hidrogen peroksida menjadi lebih tinggi

271. The following equation shows the reaction between zinc powder and hydrochloric acid.
Persamaan berikut menunjukkan tindak balas antara serbuk zink dengan asid hidroklorik.



How can the rate of production of hydrogen be increased?
Bagaimanakah kadar penghasilan hidrogen boleh ditingkatkan?

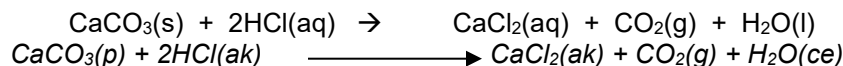
- A Increases the size of the zinc
Meningkatkan saiz zink
- B Increases the volume of water in the acid
Meningkatkan isi padu air dalam asid
- C Increases the volume of the hydrochloric acid
Meningkatkan isi padu asid hidroklorik
- D Increases the temperature of the hydrochloric acid
Meningkatkan suhu asid hidroklorik

272. Which reaction has the highest rate of reaction?
Tindak balas manakah yang mempunyai kadar tindak balas yang paling tinggi?

- A Rusting of water pipe
Pengaratan paip air
- B Photosynthesis in green plant
Fotosintesis dalam tumbuhan hijau
- C Burning of a small piece of charcoal in the air
Pembakaran ketulan kecil arang batu dalam udara
- D Formation of stalactites and stalagmites in a cave
Pembentukan stalaktit dan stalagmit dalam gua

273. The following chemical equation represents the reaction between calcium carbonate, CaCO_3 and hydrochloric acid, HCl .

Persamaan kimia berikut mewakili tindak balas antara kalsium karbonat, CaCO_3 dan asid hidroklorik, HCl .



Which changes can be used to determine the rate of reaction?
Perubahan manakah boleh digunakan untuk menentukan kadar tindak balas?

- I Mass of calcium carbonate per unit time
Jisim kalsium karbonat per unit masa
- II Volume of carbon dioxide released per unit time
Isipadu karbon dioksida dibebaskan per unit masa

- III Colour of the solution per unit time
Warna larutan per unit masa
- IV Mass of precipitate produced per unit time
Jisim mendakan terhasil per unit masa
- A I and II
I dan II
- B I and III
I dan III
- C II and IV
II dan IV
- D III and IV
III dan IV

274. When a few drops of copper(II) sulphate solution is added to a mixture of zinc powder and dilute sulphuric acid, the rate of reaction increases. Which statement best explains why the rate of reaction increases?

Apabila beberapa titik larutan kuprum(II) sulfat ditambah kepada campuran serbuk zink dan asid sulfuric cair, kadar tindak balas meningkat. Pernyataan manakah yang terbaik menjelaskan mengapa kadar tindak balas meningkat?

- A Lowers the activation energy
Merendahkan tenaga pengaktifan
- B Increases the collision frequency
Meningkatkan frekuensi perlanggaran
- C Increases the concentration of sulphate ion in the mixture
Meningkatkan kepekatan ion sulfat dalam campuran
- D Makes the orientation of collision between the reacting particles favourable
Menjadikan orientasi perlanggaran antara zarah bahan tindak balas lebih sesuai.

275. Which metals can displace lead from lead(II) nitrate solution?

Logam manakah yang boleh menyesarkan plumbum daripada larutan plumbum(II) nitrat?

- I Zinc
Zink
- II Silver
Argentum
- III Copper
Kuprum
- IV Aluminium
Aluminium
- A I and II
I dan II
- B I and IV
I dan IV
- C II and III
II dan III
- D III and IV
III dan IV

KESEIMBANGAN REDOKS

276. Which of the following are redox reactions?

Antara yang berikut, yang manakah merupakan tindak balas redoks?

- I Igniting the gas stove
Menyalakan dapur gas
- II Washing oil-stained clothes using detergent
Mencuci pakaian yang terkena kotoran minyak dengan detergen
- III Rusting of car's body
Pengaratan pada badan kereta
- IV Using hot pack to relieve muscle pain
Menggunakan pek panas untuk meredakan sakit otot
- 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

278. Which metal can be extracted from its ores by electrolysis process?

Logam manakah yang boleh diekstrak daripada bijihnya melalui proses elektrolisis?

- A Aluminium Aluminium C Lead Plumbum
B Zinc Zink D Tin Stanun

279. Which equation represents a redox reaction?

Persamaan manakah mewakili satu tindak balas redoks?

- A $2\text{Mg} + \text{O}_2 \rightarrow 2\text{MgO}$
B $\text{HCl} + \text{NaOH} \rightarrow \text{NaCl} + \text{H}_2\text{O}$
C $\text{Pb}(\text{NO}_3)_2 + 2\text{KI} \rightarrow \text{PbI}_2 + 2\text{KNO}_3$
D $\text{H}_2\text{SO}_4 + \text{CuO} \rightarrow \text{CuSO}_4 + \text{H}_2\text{O}$

280. Table 280 shows the voltmeter readings of different pairs of electrodes R and Q.

Jadual 280 menunjukkan bacaan voltmeter bagi pasangan elektrod R dan Q yang berbeza.

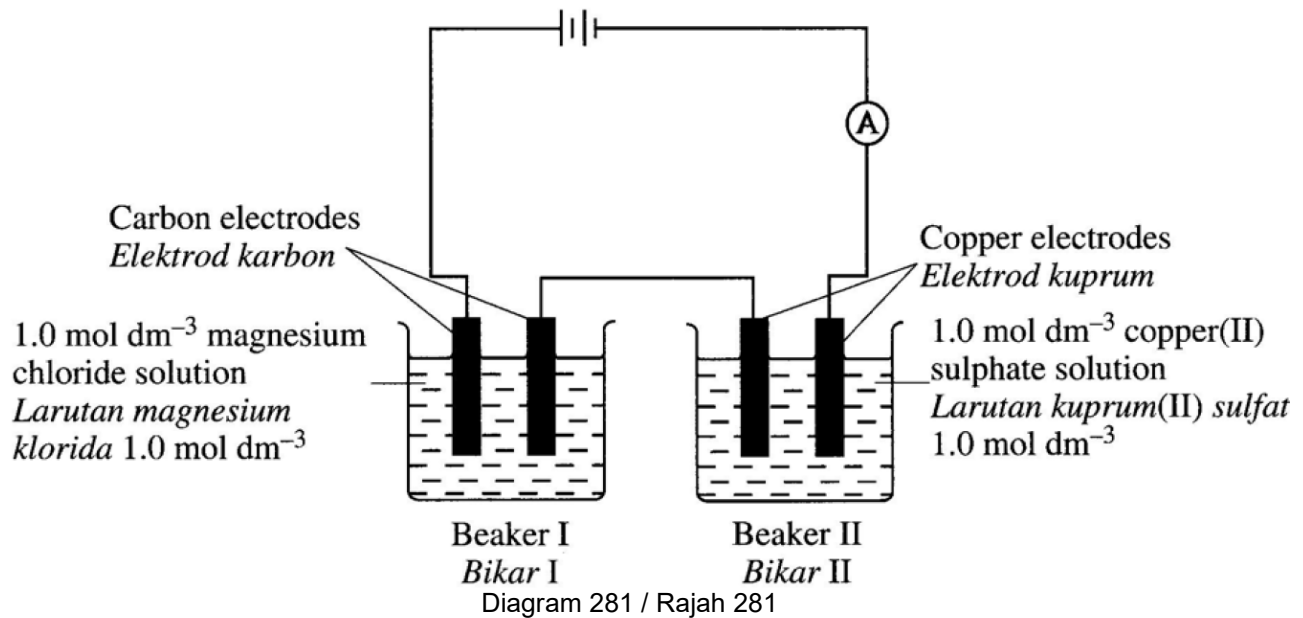
Electrode Elektrod		Voltmeter reading (V) Bacaan voltmeter (V)
R	Q	
Copper Kuprum	Magnesium Magnesium	2.7
Zinc Zink	Magnesium Magnesium	1.6
Iron Ferum	Zinc Zink	0.3

Table 280 / Jadual 280

What is the voltmeter reading when R and Q electrodes are copper and iron? Apakah bacaan voltmeter apabila elektrod R dan Q adalah kuprum dan ferum?

- A 0.8 V C 3.0 V
B 2.4 V D 4.6 V

281. Rajah 7 menunjukkan susunan radas bagi satu sel elektrolisis.



What are the products formed at anode in Beaker I and II?
Apakah hasil yang terbentuk pada anod dalam Bikar I dan Bikar II?

	Beaker I Bikar I	Beaker II Bikar II
A	Hydrogen gas Gas hidrogen	Oxygen gas Gas oksigen
B	Oxygen gas Gas oksigen	Copper atom Atom kuprum
C	Magnesium atom Atom magnesium	Hydrogen gas Gas hidrogen
D	Chlorine gas Gas klorin	Copper(II) ions Ion kuprum(II)

282. Table 282 shows the result from an experiment to study the electrical conductivity of a substance.
Jadual 282 menunjukkan keputusan daripada satu eksperimen untuk mengkaji kekonduksian elektrik suatu bahan.

Substance Bahan	Observation Pemerhatian
Solid Pepejal	

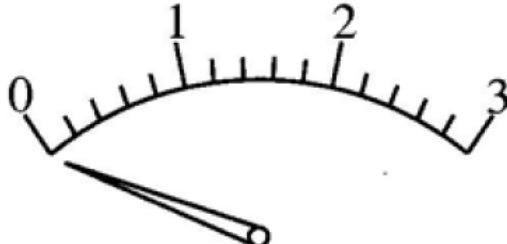
Substance Bahan	Observation Pemerhatian
Molten Leburan	

Table / Jadual 282

Which of the following explains the result?

Antara yang berikut, yang manakah menerangkan keputusan tersebut?

- A Water is not added to the substance
Air tidak ditambahkan kepada bahan itu
- B The substance consists of molecules
Bahan itu terdiri daripada molekul
- C The melting point of substance is low
Takat lebur bahan itu adalah rendah
- D The substance consists of ions in fixed position
Bahan itu terdiri daripada ion dalam kedudukan yang tetap

282. Diagram 282 shows the apparatus set-up for the transfer of electrons at a distance in U-tube.
Rajah 282 menunjukkan susunan radas bagi pemindahan elektron pada suatu jarak dalam tiub-U.

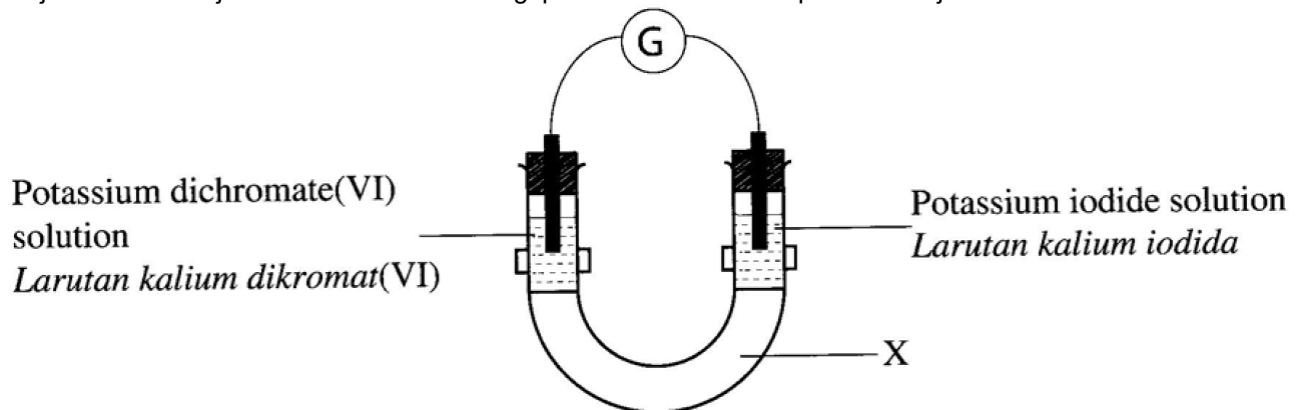


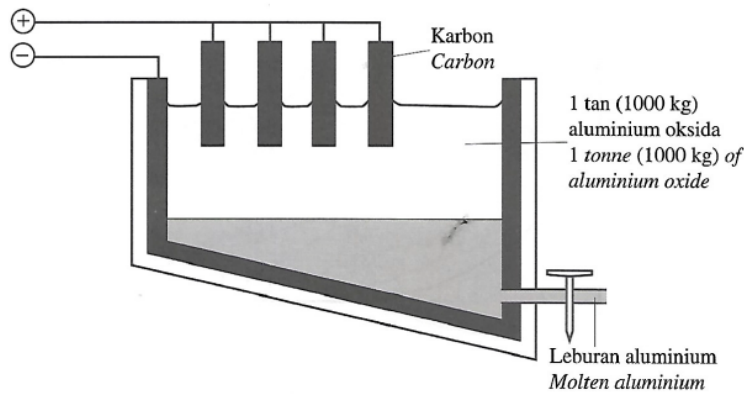
Diagram 282 / Rajah 282

What is X?
Apakah X?

- A Sodium hydroxide
Natrium hidroksida
- B Butyl butanoate
Butil butanoat
- C Sulphuric acid
Asid sulfurik
- D Ethanol
Etanol

283. Rajah 283 menunjukkan tangki elektrolisis yang digunakan untuk mengekstrak aluminium daripada bijihnya, aluminium oksida.

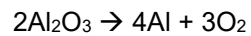
Diagram 283 shows the electrolytic tank used to extract aluminium from its ore, aluminium oxide.



Rajah 283 / Diagram 283

Persamaan berikut mewakili tindak balas dalam tangki tersebut.

The following equation represents the reaction in the tank.



Apakah jisim aluminium yang diekstrak?

[Jisim atom relatif: O = 16, Al = 27]

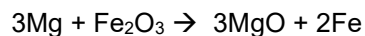
What is the mass of aluminium extracted?

[Relative atomic mass: O = 16, Al = 27]

- | | | | |
|---|---------|---|--------|
| A | 1058 kg | C | 264 kg |
| B | 529 kg | D | 235 kg |

284. Persamaan berikut mewakili penurunan ferum(III) oksida oleh magnesium.

The following equation represents the reduction of iron(III) oxide by magnesium.



Berapakah jisim magnesium yang diperlukan untuk menurunkan 16.0 g ferum(III) oksida?

[Jisim atom relatif: Fe = 56, Mg = 24, O = 16]

What is the mass of magnesium needed to reduce 16.0 g of iron(III) oxide?

[Relative atomic mass: Fe = 56, Mg = 24, O = 16]

- | | |
|---|--------|
| A | 2.4 g |
| B | 5.6 g |
| C | 7.2 g |
| D | 16.0 g |

285. Metals are extracted from their ores. What is the name of the ores that contain Fe_2O_3 as the main mineral?

Logam diekstrakkan daripada bijih. Apakah nama bijih yang mengandungi Fe_2O_3 sebagai mineral utama?

- A Cassiterite
Kasiterit
- B Hematite
Hematit
- C Magnetite
Magnetit
- D Malachite
Malakit

286. Diagram 286 shows the apparatus set-up to study the transfer of electron at a distance.

Rajah 286 menunjukkan susunan radas untuk mengkaji pemindahan elektron pada suatu jarak.

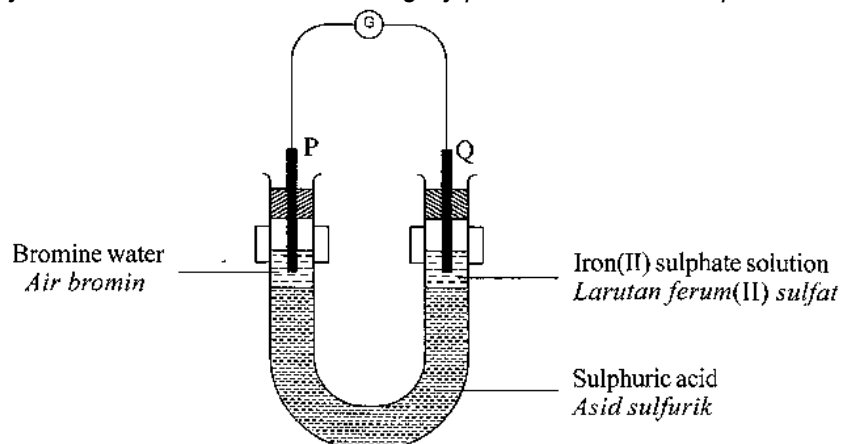


Diagram 286 / Rajah 286

Which of the following occurs in Diagram 9?

Antara yang berikut, yang manakah berlaku dalam Rajah 9?

- A Iron deposited at electrode Q
Ferum terenap di elektrod Q
- B Electrons flow through sulphuric acid
Elektron mengalir melalui asid sulfurik
- C Hydrogen gas released at electrode P
Gas hidrogen terbebas di elektrod P
- D Brown colour of bromine turns to colourless
Warna perang bromin menjadi tidak berwarna

287. Which pair is matched correctly?
Pasangan yang manakah dipadankan dengan betul?

	Substance Bahan	Type of particle Jenis zarah
A	Ammonia Ammonia	Molecule Molekul
B	Neon Neon	Molecule Molekul
C	Nitrogen dioxide Nitrogen dioksida	Ion Ion
D	Hydrogen chloride Hidrogen klorida	Ion Ion

288. Which of the following is a reduction reaction?
Antara yang berikut, yang manakah tindak balas penurunan?

- | | | | |
|---|--|---|---|
| A | Carbon gains oxygen
Karbon menerima oksigen | C | Hydrogen sulfide loses hydrogen
Hidrogen sulfida kehilangan hidrogen |
| B | Zinc atom loses electrons
Atom zink kehilangan electron | D | Bromine molecule gains electron
Molekul bromin menerima elektron |

288. Diagram 288 shows a water cycle.
Rajah 288 menunjukkan satu kitaran air.

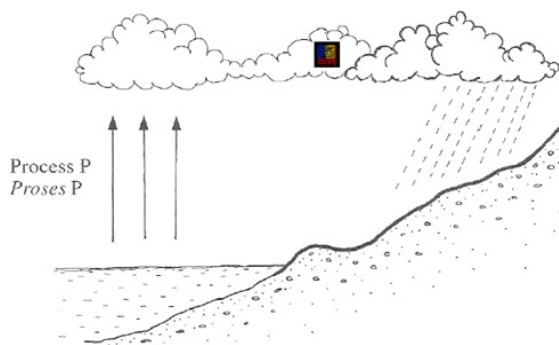


Diagram 288 / Rajah 288

What is process P and the energy change involved?
Apakah proses P dan perubahan tenaga yang terlibat?

	Process P Proses P	Energy change Perubahan tenaga
A	Condensation <i>Kondensasi</i>	Energy absorbed <i>Tenaga diserap</i>
B	Condensation <i>Kondensasi</i>	Energy released <i>Tenaga dibebaskan</i>
C	Evaporation <i>Penyejatan</i>	Energy absorbed <i>Tenaga diserap</i>
D	Evaporation <i>Penyejatan</i>	Energy released <i>Tenaga dibebaskan</i>

289. Which substance is suitable to change Fe^{2+} ions to Fe^{3+} ions?
Bahan manakah yang sesuai untuk menukarkan ion Fe^{2+} kepada ion Fe^{3+} ?

- A Zinc powder
Serbuk zink
- B Bromine water
Air bromin
- C Sulphur dioxide gas
Gas sulfur dioksida
- D Potassium chloride solution
Larutan kalium klorida

290. Which elements can form coloured compounds?
Unsur yang manakah boleh membentuk sebatian berwarna?

- I Zinc
Zink
- II Lead
Plumbum
- III Iron
Ferum
- IV Copper
Kuprum
- A I and II
I dan II
- B I and III
I dan III
- C II and IV
II dan IV
- D III and IV
III dan IV

291. 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 $\text{CaCO}_3 + 2\text{HCl} \rightarrow \text{CaCl}_2 + \text{H}_2\text{O} + \text{CO}_2$

292. Which chemical cell is not rechargeable?
Sel kimia manakah yang tidak boleh dicas semula?

- A Mercury cell
Sel merkuri
- B Lithium-ion cell
Sel ion litium
- C Nickel-cadmium cell
Sel nikel-kadmium
- D Nickel-metal hydride cell
Sel nikel logam hidrida

293. 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> | C | Gain of electrons
<i>Penerimaan elektron</i> |
| B | Gain of hydrogen
<i>Penerimaan hidrogen</i> | D | Increase in oxidation number
<i>Penambahan nombor pengoksidaan</i> |

294. 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
Antara ion plumbum(II) dan ion ferum(II)
- B Between zinc ion and iron(II) ion,
Antara ion zink dan ion ferum(II)
- Antara ion plumbum(II) dan ion kuprum(II)*
- D Between zinc ion and tin(II) ion
Antara ion zink dan ion stanum(II)

295. 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

296. Which compound is formed by transferring electrons?

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

297. Table 297 shows information about three chemical cells.
Jadual 297 menunjukkan maklumat tentang tiga sel kimia.

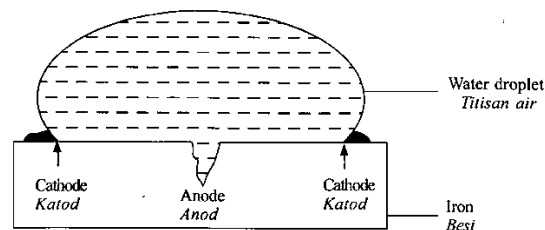
Chemical cell <i>Sel kimia</i>	Pair of electrodes <i>Pasangan elektrod</i>	Voltage (V) <i>Voltan (V)</i>	Positive terminal <i>Terminal positif</i>
I	Y and Z <i>Y dan Z</i>	0.7	Z
II	Z and E <i>Z dan E</i>	1.2	E
III	E and X <i>E dan X</i>	1.4	E

Table 287 / *Jadual 297*

Which is the correct arrangement in ascending order of the metals in tendency to donate electrons?
Susunan logam secara menaik yang manakah betul bagi kecenderungan untuk menderma elektron?

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

298. Diagram 298 shows a water droplet on a piece of iron.
Rajah 298 menunjukkan setitis air di atas sebatang besi.



Which equation occurs at the cathode?
Persamaan manakah yang berlaku di katod?

- A $\text{Fe} \rightarrow \text{Fe}^{2+} + 2\text{e}^-$
 B $\text{Fe}^{2+} + 2\text{e}^- \rightarrow \text{Fe}$
 C $\text{O}_2 + 2\text{H}_2\text{O} + 4\text{e}^- \rightarrow 4\text{OH}^-$
 D $4\text{OH}^- \rightarrow \text{O}_2 + 2\text{H}_2\text{O} + 4\text{e}^-$

299. Which of the following is correct about an electrolyte?
Antara yang berikut, yang manakah betul tentang elektrolit?

- A Dissolves in water
Larut dalam air
- B Exists as liquid at room temperature
Wujud sebagai cecair pada suhu bilik
- C Conducts electricity in solid state
Mengkonduksi elektrik dalam keadaan pepejal
- D Has freely moving ions in aqueous state
Mempunyai ion-ion bergerak bebas dalam keadaan akueus

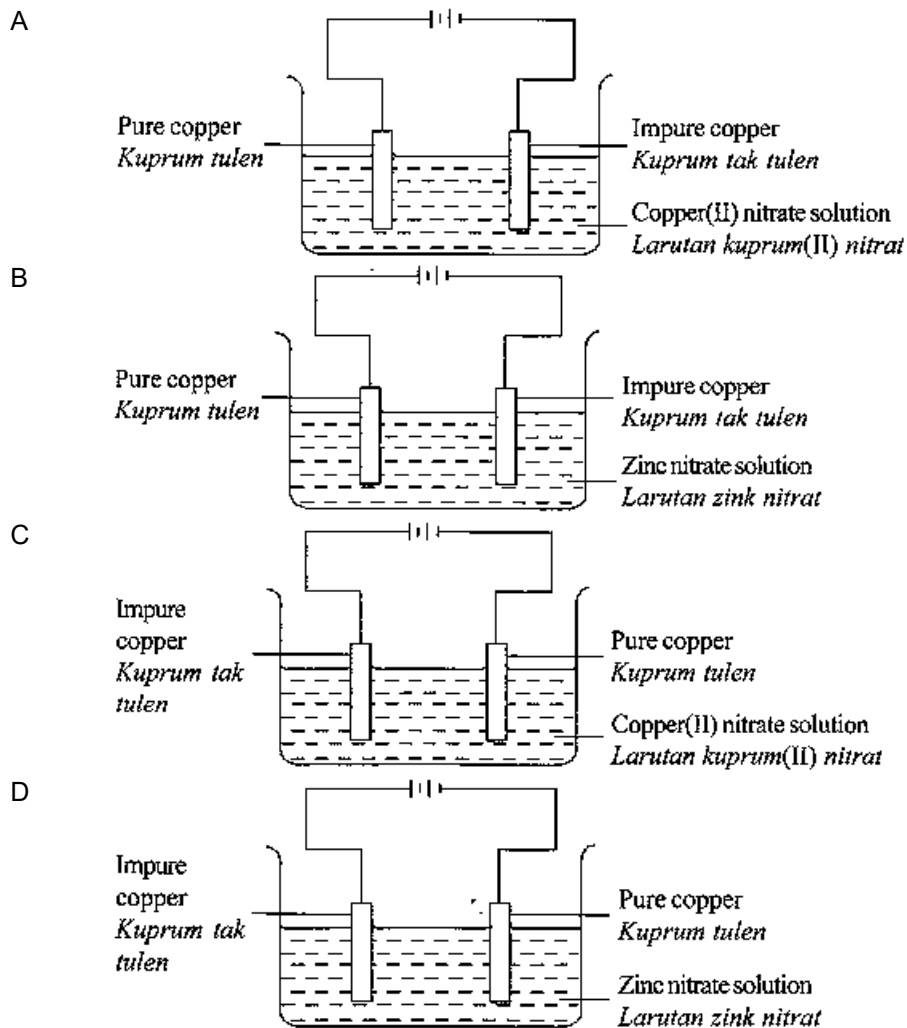
300. What is the meaning of reduction?
Apakah maksud penurunan?

- | | | | |
|---|-------------------------------------|---|--|
| A | Gain of electron
Terima elektron | C | Loss of hydrogen
Hilang hidrogen |
| B | Gain of oxygen
Terima oksigen | D | Increase in oxidation number
Penambahan nombor pengoksidaan |

301. Which substance is an oxidizing agent?
Bahan manakah adalah agen pengoksidaan?

- | | | | |
|---|--------------------------------------|---|---|
| A | Bromine water
Air bromin | C | Iron(II) chloride solution
Larutan ferum(II) klorida |
| B | Magnesium powder
Serbuk magnesium | D | Potassium iodide solution
Larutan kalium iodida |

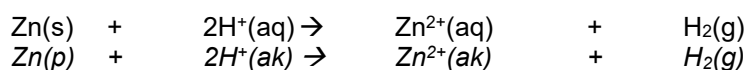
302. Which apparatus set-up is correct to purify copper metal?
Susunan radas manakah yang betul untuk menuliskan logam kuprum?



303. Which pair produces the highest heat of neutralisation?
Pasangan manakah yang menghasilkan haba peneutralan paling tinggi?

- A Methanoic acid and sodium hydroxide solution
Asid metanoik dan larutan natrium hidroksida
- B Sulphuric acid and potassium hydroxide solution
Asid sulfurik dan larutan kalium hidroksida
- C Hydrochloric acid and potassium hydroxide solution
Asid hidroklorik dan larutan kalium hidroksida
- D Ethanoic acid and sodium hydroxide solution
Asid etanoik dan larutan natrium hidroksida

304. The following ionic equation shows the reaction between zinc and acid.
Persamaan ion berikut menunjukkan tindak balas antara zink dengan asid.



What is the change in oxidation number of hydrogen?
Apakah perubahan nombor pengoksidaan bagi hidrogen?

- A 0 to +1
0 kepada +1
- B 0 to +2
0 kepada +2
- C +1 to 0
+1 kepada 0
- D +1 to +2
+1 kepada +2

305. Diagram 305 shows a chemical cell.
Rajah 305 menunjukkan suatu sel kimia.

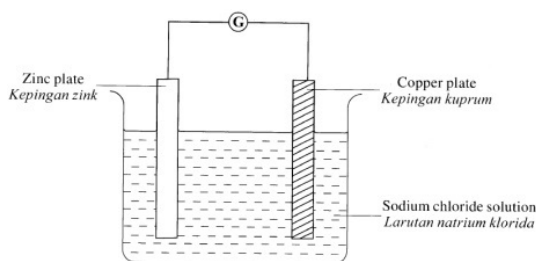


Diagram 305 / Rajah 305

Which substances undergo oxidation and reduction?
Bahan manakah yang mengalami pengoksidaan dan penurunan?

	Oxidation <i>Pengoksidaan</i>	Reduction <i>Penurunan</i>
A	Copper <i>Kuprum</i>	Copper(II) ion <i>Ion kuprum(II)</i>
B	Copper <i>Kuprum</i>	Hydrogen ion <i>Ion hidrogen</i>
C	Zinc <i>Zink</i>	Copper(II) ion <i>Ion kuprum(II)</i>
D	Zinc <i>Zink</i>	Hydrogen ion <i>Ion hidrogen</i>

306. Cryolite, Na_3AlF_6 is used in the extraction process of aluminium in industry. What is the use of this substance?

Kriolit, Na_3AlF_6 digunakan dalam proses pengekstrakan aluminium dalam industri. Apakah kegunaan bahan ini?

- A Lower the melting points of aluminium oxide
Merendahkan takat lebur aluminium oksida
- B Increase the rate of reaction
Meningkatkan kadar tindak balas
- C Eliminate impurities
Menyingkirkan bendasing
- D Hamper electrode from being oxidized
Menghalang elektrod daripada dioksidakan

307. A concentrated sodium chloride solution is electrolysed using carbon electrodes. Which are the half-equations that represent the reactions at the anode and the cathode?

Larutan natrium klorida pekat di elektrolisis menggunakan elektrod karbon. Setengah persamaan manakah yang mewakili tindak balas di anod dan di katod?

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

308. Which statement defines oxidation?

Pernyataan manakah yang mendefinisikan pengoksidaan?

- A Increases in oxidation number
Penambahan nombor pengoksidaan
- B Gain of hydrogen
Terima hidrogen
- C Loss of oxygen
Hilang oksigen
- D Gain of electron
Terima elektron

309. Which metal can prevent rusting when is in contact with iron?

Logam manakah yang dapat mencegah pengaratan apabila bersentuh dengan besi?

- A Lead
Plumbum
- B Silver
Argentum
- C Copper
Kuprum
- D Magnesium
Magnesium

310. What is the oxidation number of the chromium element in potassium dichromate(VI), $K_2Cr_2O_7$?
Berapakah nombor pengoksidaan bagi unsur kromium dalam kalium dikromat(VI), $K_2Cr_2O_7$?

- A +2 C +5
 B +3 D +6

311. Iron rusts in the presence of oxygen and water. Which method causes iron to rust faster?
Besi berkarat dengan kehadiran oksigen dan air. Kaedah manakah menyebabkan besi berkarat lebih cepat?

- A Coating iron with tin
Penyaduran besi dengan stanum
 B Touching iron with lead
Penyentuhan besi dengan plumbum
 C Galvanizing iron with zinc
Penggalvanian besi dengan zink
 D Connecting iron to magnesium
Penyambungan besi kepada magnesium

312. A student found that an iron spoon rusts easily. What is the suitable method to solve the problem?
Seorang pelajar mendapati sudu besi mudah berkarat. Apakah kaedah yang sesuai untuk menyelesaikan masalah itu?

- A Dip into oil C Electroplate with silver
Celup ke dalam minyak Sadur dengan argentum
 B Scrub with sand paper D Contact with copper metal
Gosok dengan kertas pasir Sentuh dengan logam kuprum

313. What is the oxidation number of X in $X_2O_3^{2-}$ ion?
Apakah nombor pengoksidaan bagi X dalam ion $X_2O_3^{2-}$?

- A +2 C -2
 B +4 D -4

314. Table 314 shows information about three voltaic cells. Metal X, Y and Z are use as electrodes in the cells.

Jadual 314 menunjukkan maklumat tentang tiga sel voltan. Logam-logam X, Y dan Z digunakan sebagai elektrod dalam sel itu.

Voltaic cell <i>Sel voltan</i>	Negative terminal <i>Terminal negatif</i>	Positive terminal <i>Terminal positif</i>	Voltage (V) <i>Voltan (V)</i>
I	X	Y	3.0
II	Z	Y	1.2
III	X	Z	1.8

Table 314 / *Jadual 314*

What is the order of the metals from the most electropositive to the least electropositive?

Apakah susunan logam daripada yang paling elektropositif kepada yang paling kurang elektropositif?

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

315. Table 315 shows the positive terminal and voltmeter readings of three pairs of metals used as electrodes in voltaic cells.

Jadual 315 menunjukkan terminal positif dan bacaan voltmeter bagi tiga pasangan logam yang digunakan sebagai elektrod dalam sel voltan.

Pair of metal <i>Pasangan logam</i>	Positive terminal <i>Terminal positif</i>	Voltmeter reading (V) <i>Bacaan voltmeter (V)</i>
R, S	S	1.8
S, Q	S	0.3
P, R	R	0.2

Table 315 / Jadual 315

What is the voltmeter reading when P and Q are the pair of metals used as electrodes?

Apakah bacaan voltmeter apabila P dan Q adalah pasangan logam yang digunakan sebagai elektrod?

- A 0.1 V C 1.7 V
B 0.5 V D 2.3 V

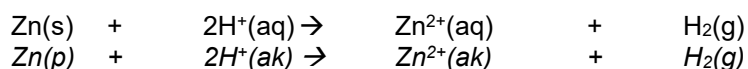
316. Which electrolyte and electrodes can be used to purify copper?

Elektrolit dan elektrod manakah yang boleh digunakan untuk menuliskan kuprum?

	Electrolyte <i>Elektrolit</i>	Electrode <i>Elektrod</i>	
		Anode <i>Anod</i>	Cathode <i>Katod</i>
A	Copper(II) sulphate solution <i>Larutan kuprum(II) sulfat</i>	Pure copper <i>Kuprum tulen</i>	Impure copper <i>Kuprum tak tulen</i>
B	Copper(II) nitrate solution <i>Larutan kuprum(II) nitrat</i>	Impure copper <i>Kuprum tak tulen</i>	Pure copper <i>Kuprum tulen</i>
C	Sulphuric acid <i>Asid Sulfurik</i>	Pure copper <i>Kuprum tulen</i>	Impure copper <i>Kuprum tak tulen</i>
D	Nitric acid <i>Asid nitrit</i>	Impure copper <i>Kuprum tak tulen</i>	Pure copper <i>Kuprum tulen</i>

317. The following ionic equation shows the reaction between zinc and acid.

Persamaan ion berikut menunjukkan tindak balas antara zink dengan asid.



What is the change in oxidation number of hydrogen?

Apakah perubahan nombor pengoksidaan bagi hidrogen?

- A 0 to +1
0 kepada +1
B 0 to +2
0 kepada +2
C +1 to 0
+1 kepada 0
D +1 to +2
+1 kepada +2

318. Table 318 shows information about three simple voltaic cells.
Jadual 318 menunjukkan maklumat tentang tiga sel voltan ringkas.

Pair of metals Pasangan logam	Potential difference (V) Beza keupayaan (V)	Positive terminal Terminal positif
W and X <i>W dan X</i>	0.7	X
X and Y <i>X dan Y</i>	2.0	Y
W and Z <i>W dan Z</i>	1.6	Z

Table 318 / *Jadual 318*

What is the potential difference of a voltaic cell which uses Y and Z as electrodes?
Berapakah beza keupayaan sel voltan yang menggunakan Y dan Z sebagai elektrod?

- A 0.4 V C 1.1 V
 B 0.9 V D 1.3 V

319. Diagram 319 shows the apparatus set-up for an electrolysis cell.
Rajah 319 menunjukkan susunan radas bagi satu sel elektrolisis.

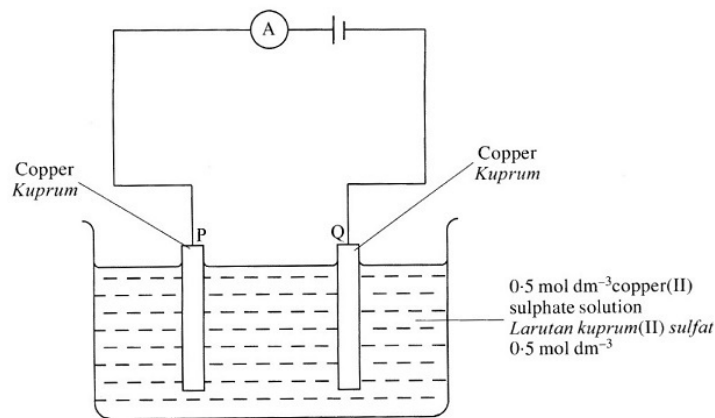
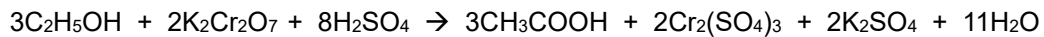


Diagram 319 / *Rajah 319*

Which of the following happens if the experiment left for 1 hour?
Antara yang berikut, yang manakah berlaku jika eksperimen itu dibiarkan selama 1 jam?

- A Electrode P gets thicker
Elektrod P semakin tebal
- B Ammeter reading becomes zero
Bacaan ammeter menjadi sifar
- C Bubbles of gas are produced at electrode Q
Gelembung gas terhasil di elektrod Q
- D Intensity of the blue colour of the solution does not change
Keamatan warna biru larutan tidak berubah

320. Reaction between ethanol and acidified potassium dichromate(VI) show in equation below
Persamaan berikut mewakili tindak balas pengoksidaan antara etanol dan kalium dikromat(VI) berasid.



What is the change in the oxidation number of chromium?

Apakah perubahan nombor pengoksidaan bagi kromium?

- | | | | |
|---|--------------------------|---|--------------------------|
| A | +2 to +6
+2 kepada +6 | C | +6 to +2
+6 kepada +2 |
| B | +3 to +6
+3 kepada +6 | D | +6 to +3
+6 kepada +3 |

321. Which pair correctly shows the differences between an electrolytic cell and a voltaic cell?
Pasangan manakah yang betul menunjukkan perbezaan antara sel elektrolisis dengan sel voltan?

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

322. Diagram 322 shows a simple voltaic cell.
Rajah 322 menunjukkan satu sel voltan ringkas.

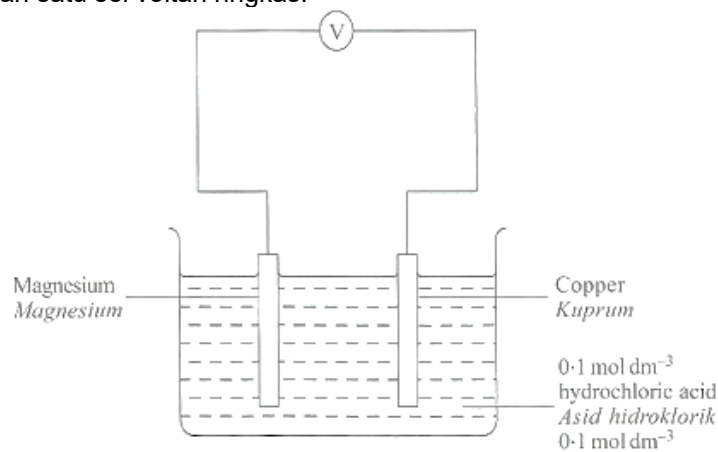


Diagram 322 / Rajah 322

Which half equation represents the reaction at the positive terminal of the voltaic cell?
Setengah persamaan manakah mewakili tindak balas di terminal positif sel voltan?

- A $2\text{Cl}^- \rightarrow \text{Cl}_2 + 2\text{e}$
 B $\text{Cu}^{2+} + 2\text{e} \rightarrow \text{Cu}$
 C $2\text{H}^+ + 2\text{e} \rightarrow \text{H}_2$
 D $\text{Mg} \rightarrow \text{Mg}^{2+} + 2\text{e}$

323. Diagram 323 shows the electron arrangement of a compound with a formula ZY_2 .
Rajah 323 menunjukkan susunan elektron bagi satu sebatian dengan formula ZY_2 .

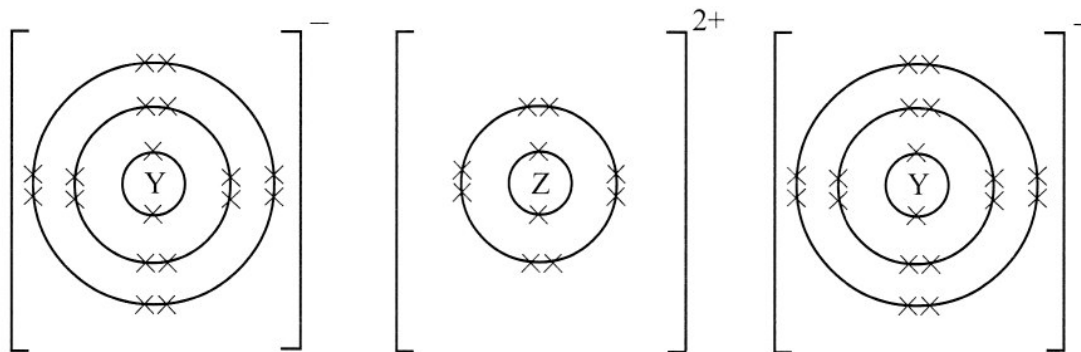


Diagram 323 / Rajah 323

What are the proton number of atoms Z and Y?
Apakah nombor proton bagi atom Z dan atom Y?

	Atom Z	Atom Y
A	8	19
B	10	18
C	11	16
D	12	17

324. The following ionic equation represents a redox reaction.
Persamaan ion berikut mewakili satu tindak balas redoks.



Which statement is correct?
Pernyataan manakah yang betul?

- A Silver ion is oxidized
Ion argentum dioksidakan
 B Silver ion is a reducing agent
Ion argentum adalah satu agen penurunan
 C Aluminium atom undergoes oxidation
Atom aluminium mengalami pengoksidaan
 D Aluminium atom receives electrons
Atom aluminium menerima elektron

325. Diagram 325 shows the chemical formula of a compound.
Rajah 325 menunjukkan formula kimia bagi satu sebatian.



Diagram 325 / Rajah 325

What is the IUPAC name and oxidation number of copper element in the compound?
Apakah nama IUPAC dan nombor pengoksidaan bagi unsur kuprum dalam sebatian itu?

	Name of compound Nama sebatian	Oxidation number of copper element Nombor pengoksidaan unsur kuprum
A	Copper(I) oxide Kuprum(I) oksida	+ 1
B	Copper(I) oxide Kuprum(I) oksida	+2
C	Copper(II) oxide Kuprum(II) oksida	+ 1
D	Copper(II) oxide Kuprum(II) oksida	+2

326. Diagram 326 shows the apparatus set-up for two simple cells.
Rajah 326 menunjukkan susunan radas bagi dua sel ringkas.

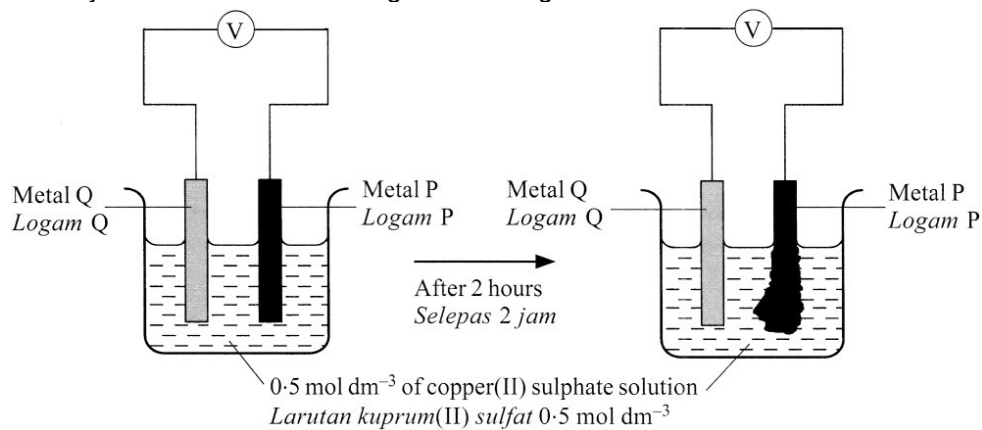
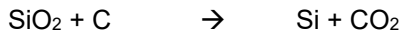


Diagram 326 / Rajah 326

Based on Diagram 326, which statement is correct?
Berdasarkan Rajah 326, pernyataan manakah yang betul?

- A Metal P is a positive terminal
Logam P adalah terminal positif
- B Electrons flow from metal P to metal Q
Elektron mengalir dari logam P ke logam Q
- C P can displace Q from its salt solution
P boleh mengantikan Q daripada larutan garamnya
- D Position of metal P is higher than metal Q in electrochemical series
Kedudukan logam P lebih tinggi berbanding logam Q dalam siri elektrokimia

327. The following chemical equation represents the extraction of silicon from quartz using coke.
 Persamaan kimia berikut mewakili pengekstrakan silikon daripada kuarza menggunakan kok.



What is the change in oxidation number of silicon?
 Apakah perubahan nombor pengoksidaan silikon?

- | | | |
|---|---------|-------------|
| A | +2 to 0 | +2 kepada 0 |
| B | +4 to 0 | +4 kepada 0 |
| C | 0 to +2 | 0 kepada +2 |
| D | 0 to +4 | 0 kepada +4 |

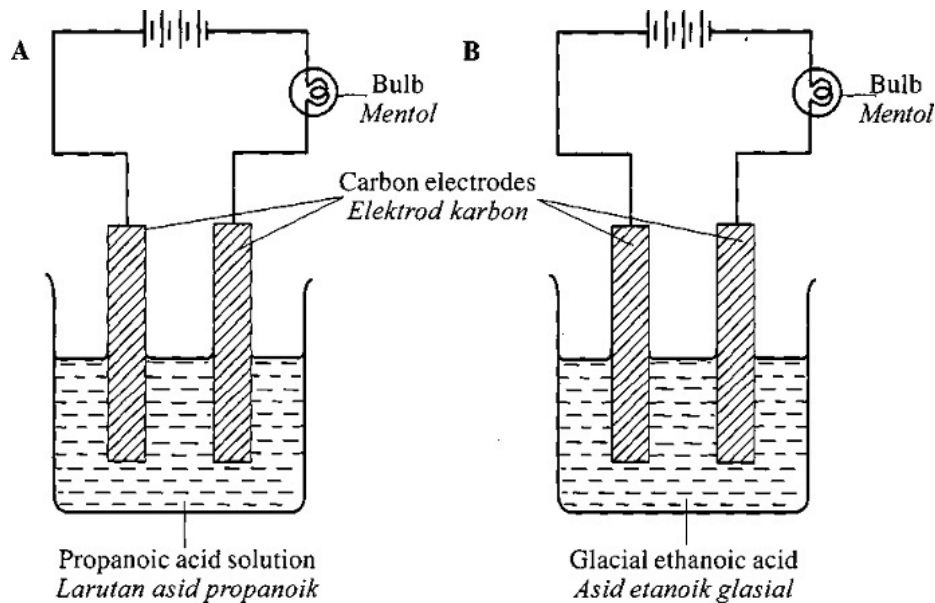
328. Which metals can displace lead from lead(II) nitrate solution?

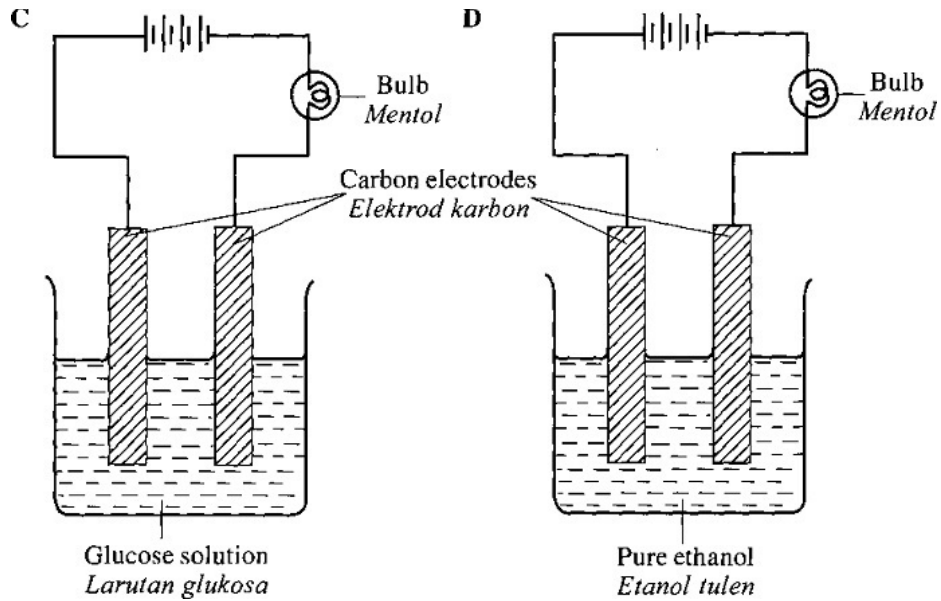
Logam manakah yang boleh menyesarkan plumbum daripada larutan plumbum(II) nitrat?

- | | | | |
|----|----------------------|-----|--------------------------|
| I | Zinc
Zink | III | Copper
Kuprum |
| II | Silver
Argentum | IV | Aluminium
Aluminium |
| A | I and II
I dan II | C | II and III
II dan III |
| B | I and IV
I dan IV | D | III and IV
III dan IV |

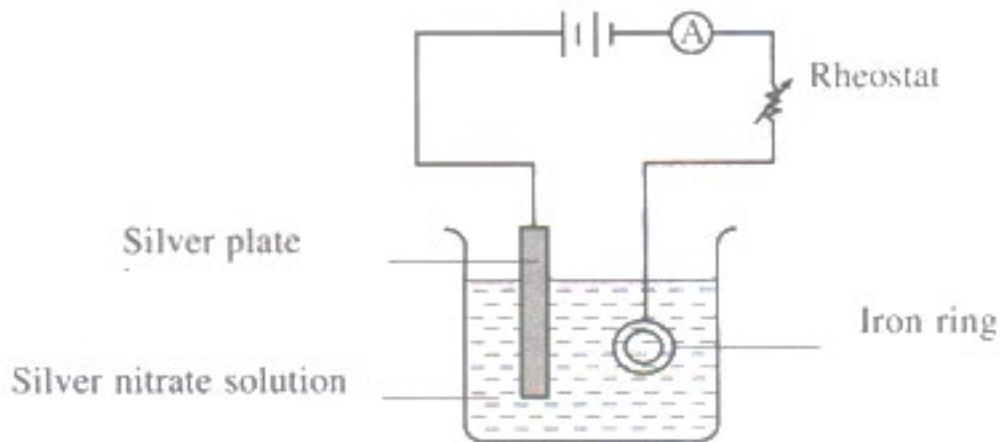
329. In which apparatus set-up does the bulb light up?

Dalam susunan radas manakah mentol itu akan menyala?





340. Diagram 340 shows the apparatus set-up for an experiment to electroplate an iron ring with silver.
Rajah 340 menunjukkan susunan radas bagi satu eksperimen untuk menyadur sebarang cincin besi dengan argentum



Which half equations represent the reaction at the anode and the cathode?
persamaan manakah yang mewakili tindak balas di anod dan di katod?

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

341. 0.1 mol dm^{-3} solution of X has a pH value of 13. Which statement is correct about the solution?
0.1 mol dm⁻³ larutan X mempunyai nilai pH 13. Pernyataan manakah yang betul tentang larutan itu?

- A X is a weak acid
X ialah suatu asid lemah
- B X is a strong alkali
X ialah suatu alkali kuat
- C X dissociates partially in water
X bercerai separa dalam air
- D X has a high concentration of hydrogen ions
X mempunyai kepekatan ion hidrogen yang tinggi

342. Iron(II) ions, Fe^{2+} in a solution can be changed to iron(III) ions, Fe^{3+} by adding solution X. What is X?
Ion ferum(II), Fe^{2+} dalam larutan boleh ditukar kepada ion ferum(III), Fe^{3+} dengan menambahkan larutan X. Apakah X?

- A Sodium hydroxide
Natrium hidroksida
- B Sodium thiosulphate
Natrium tiosulfat
- C Potassium hexacyanoferrate(II)
Kalium heksasianoferat(II)
- D Acidified potassium manganate(VII)
Kalium manganat(VII) berasid

343. A method to control the rusting of underground iron pipelines is through sacrificial protection. Which of the following is the sacrificial metal?

Cara mengawal pengaratan saluran paip besi bawah tanah adalah melalui perlindungan korban. Antara yang berikut, yang manakah adalah logam korban?

- A Copper
Kuprum
- B Lead
Plumbum
- C Tin
Stanum
- D Zinc
Zink

344. Diagram 344 shows the apparatus set-up to study the transfer reaction of electron at a distance. Rajah 344 menunjukkan susunan radas untuk mengkaji tindak balas pemindahan elektron dalam satu jarak.

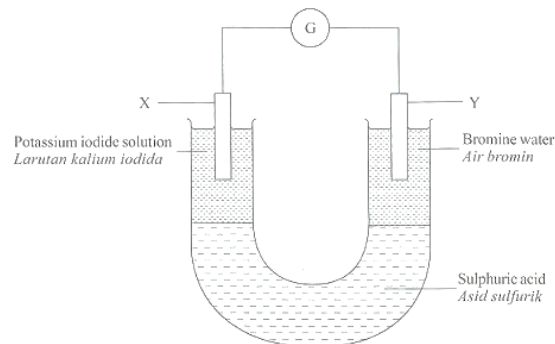


Diagram 344 / Rajah 344

Which of the following occur at X and Y?
Antara yang berikut, yang manakah berlaku di X dan Y?

	X	Y
A	Oxidation number of iodine changes from 0 to +2 <i>Nombor pengoksidaan iodin berubah dari 0 ke +2</i>	Oxidation number of bromine changes from -1 to 0 <i>Nombor pengoksidaan bromin berubah dari -1 ke 0</i>
B	Brown solution turns colourless <i>Larutan perang menjadi tidak berwarna</i>	No change in colour <i>Tiada perubahan warna</i>
C	Iodide ion is oxidised <i>Ion iodida dioksidakan</i>	Bromine is reduced <i>Bromin diturunkan</i>
D	Mass of X increases <i>Jisim X bertambah</i>	Mass of Y decreases <i>Jisim Y berkurang</i>

345. Diagram 345 shows the apparatus set-up for electroplating of iron plate with silver. Rajah 345 menunjukkan susunan radas bagi penyarduran plat ferum dengan argentum.

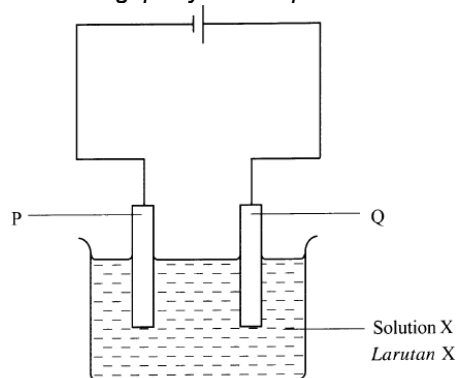


Diagram 345 / Rajah 345

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>

346. Diagram 3 shows four chemical cells.
 Rajah 3 menunjukkan empat sel kimia

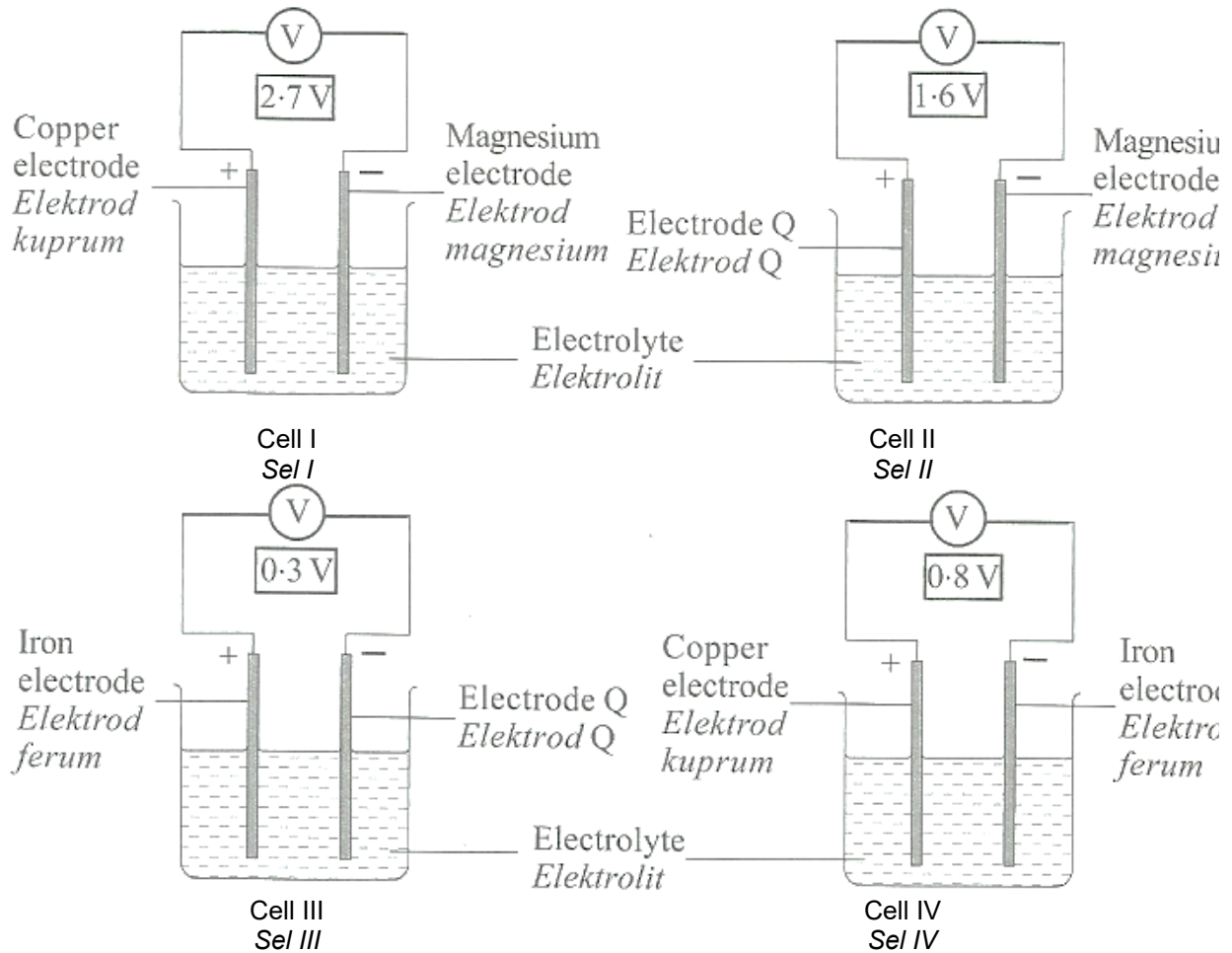


Diagram 346 / Rajah 346

What is the arrangement of metals Q, copper, iron and magnesium in descending order of the electrochemical series?

Apakah susunan logam Q, kuprum, ferum dan magnesium mengikut tertib menurun dalam siri elektrokimia?

- A Q, magnesium, iron, copper
Q, *magnesium, ferum, kuprum*
- B Magnesium, Q, iron, copper
Magnesium, Q, ferum, kuprum
- C Magnesium, iron, Q, copper
Magnesium, ferum, Q, kuprum
- D Magnesium, iron, copper, Q
Magnesium, ferum, kuprum, Q

347. Which particles are produced when an electrolyte dissolves in water?
Zarah manakah yang terhasil apabila elektrolit melarut dalam air?

- A Ions
Ion
- C Electrons
Elektron
- B Atoms
Atom
- D Molecules
Molekul

348. Which set of definition of oxidation in terms of oxygen, hydrogen and electron is correct?
Set manakah bagi definisi pengoksidaan dari segi oksigen, hidrogen dan elektron adalah betul?

	Oxygen Oksigen	Hydrogen Hidrogen	Electrons Elektron
A	Gain <i>Penerimaan</i>	Loss <i>Kehilangan</i>	Loss <i>Kehilangan</i>
B	Gain <i>Penerimaan</i>	Loss <i>Kehilangan</i>	Gain <i>Penerimaan</i>
C	Loss <i>Kehilangan</i>	Gain <i>Penerimaan</i>	Gain <i>Penerimaan</i>
D	Loss <i>Kehilangan</i>	Gain <i>Penerimaan</i>	Loss <i>Kehilangan</i>

349. Which of the following factor **does not** affect the electrolysis of an aqueous solution?
*Antara faktor berikut, yang manakah **tidak** mempengaruhi elektrolisis larutan akueus?*

- A Concentration of ions in the electrolytes
Kepekatan ion-ion dalam elektrolit
- B Types of electrodes used in the electrolysis
Jenis elektrod yang digunakan dalam elektrolisis
- C Position of ions in the electrochemical series
Kedudukan ion-ion dalam siri elektrokimia
- D Volume of electrolytes used in the electrolysis
Isi padu elektrolit yang digunakan dalam elektrolisis

350. Which set of definition of oxidation in terms of oxygen, hydrogen and electron is correct?
 Set manakah bagi definisi pengoksidaan dari segi oksigen, hidrogen dan elektron adalah betul?

	Oxygen Oksigen	Hydrogen Hidrogen	Electrons Elektron
A	Gain <i>Penerimaan</i>	Loss <i>Kehilangan</i>	Loss <i>Kehilangan</i>
B	Gain <i>Penerimaan</i>	Loss <i>Kehilangan</i>	Gain <i>Penerimaan</i>
C	Loss <i>Kehilangan</i>	Gain <i>Penerimaan</i>	Gain <i>Penerimaan</i>
D	Loss <i>Kehilangan</i>	Gain <i>Penerimaan</i>	Loss <i>Kehilangan</i>

351. Diagram 351 shows a voltaic cell.
 Rajah 351 menunjukkan suhu sel voltan.

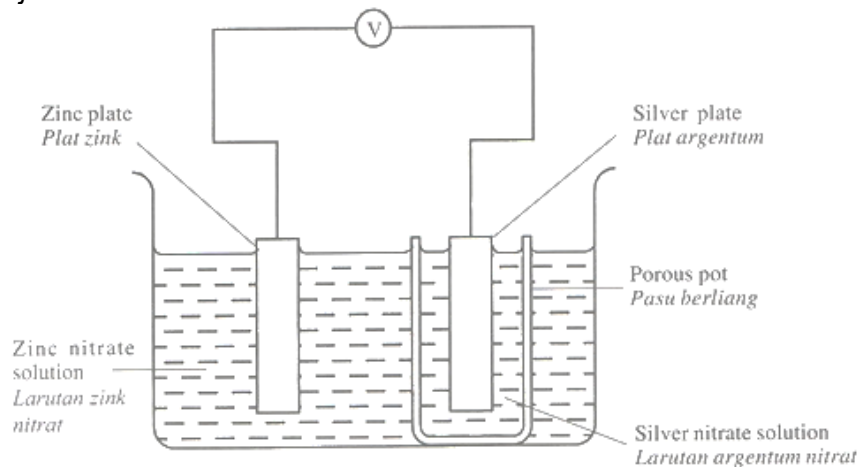
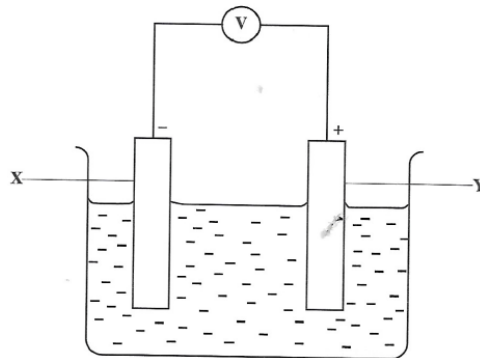


Diagram 351 / Rajah 351

The function of the porous pot is to allow the flow of
 Fungsi pasu berliang adalah untuk membenarkan pengaliran

- | | | | |
|---|---------------------------|---|---------------------------------------|
| A | ions
<i>ion-ion</i> | C | protons
<i>proton-proton</i> |
| B | atoms
<i>atom-atom</i> | D | electrons
<i>elektron-elektron</i> |

352 Rajah 352 menunjukkan suatu sel kimia.
Diagram 352 shows a chemical cell.



Rajah 352 / Diagram 352

Antara yang berikut, proses manakah yang betul berlaku di X dan Y?
Which of the following is the correct process that occurs at X and Y?

	X	Y
A	Kehilangan oksigen Loss of oxygen	Menerima oksigen Gain of oxygen
B	Pertambahan nombor pengoksidaan Increase in oxidation number	Pengurangan nombor pengoksidaan Decrease in oxidation number
C	Menerima elektron Gain of electrons	Kehilangan elektron Loss of electrons
D	Menerima hidrogen Gain of hydrogen	Kehilangan hidrogen Loss of hydrogen

353. Diagram 353 shows four test tubes that contain different metals immersed in water.
Rajah 353 menunjukkan empat tabung uji yang mengandungi logam yang berbeza direndam di dalam air.

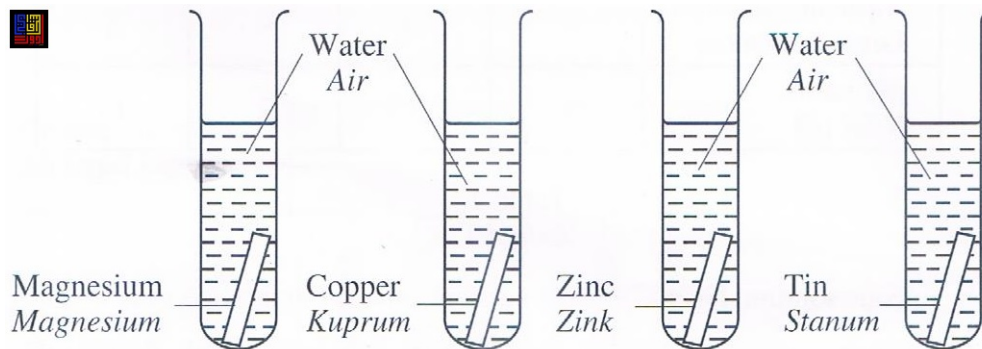


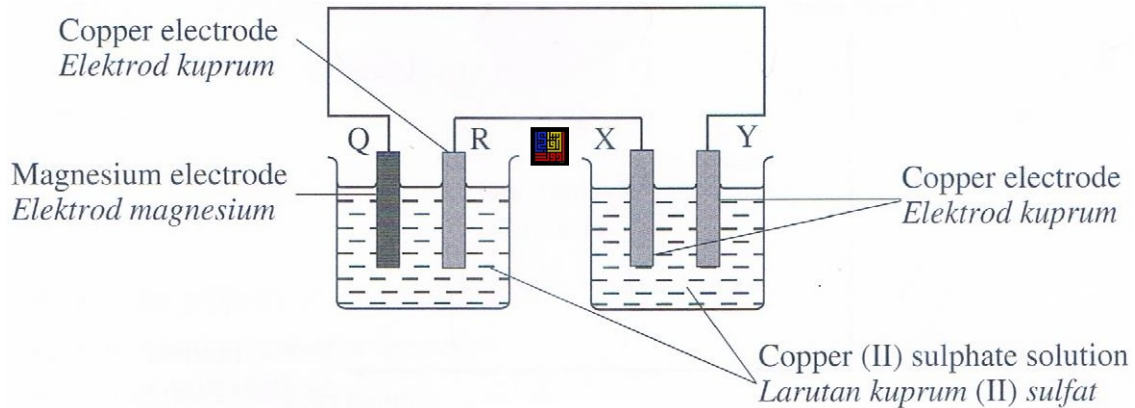
Diagram 353 / Rajah 353

Which metal is the slowest to corrode?
Logam manakah yang paling lambat terkakis?

- | | | |
|---|-----------|-----------|
| A | Magnesium | Magnesium |
| B | Copper | Kuprum |
| C | Zinc | Zink |
| D | Tin | Stanum |

Questions 354 and 355 are based on Diagram 354.
Soalan 354 dan 355 berdasarkan Rajah 354.

Diagram 354 shows the apparatus set-up for a combination of two cells.
Rajah 354 menunjukkan susunan radas bagi gabungan dua set.



354. Which electrodes undergo reduction?
Elektrod manakah yang mengalami penurunan?

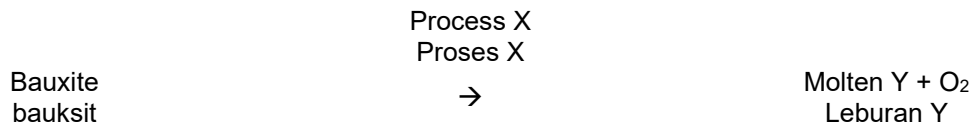
- A Q and R
Q dan R
- B Q and X
Q dan X
- C R and Y
R dan Y
- D X and Y
X dan Y

355. What are the products formed at the anode in both cells?
Apakah hasil yang terbentuk di anod dalam kedua-dua sel?

- | | |
|------------------------------------|----------------------------------|
| A Magnesium and copper | Magnesium dan kuprum |
| B Magnesium ion and copper(II) ion | Ion magnesium dan ion kuprum(II) |
| C Copper and oxygen | Kuprum dan oksigen |
| D Hydrogen gas and copper(II) ion | Gas hidrogen dan ion kuprum(II) |

Questions 356 and 357 are based on the chemical equation below.
Soalan 356 dan 357 adalah berdasarkan kepada persamaan kimia di bawah.

The following equation shows the change of bauxite to molten Y.
Persamaan berikut menunjukkan perubahan bauksit kepada leburan Y.



356. What is the main composition of bauxite?
Apakah komposisi utama bagi bauksit?

- | | |
|---------------------------|--------------------------------------|
| A Al(OH) ₃ | C Fe ₂ O ₃ |
| B CuCO ₃ | D SnO ₂ |

357. What is process X?
Apakah proses X?

- | | |
|------------------------------------|-----------------------------------|
| A Electroplating
Penyaduran | C Purification
Penulenan |
| B Distillation
Penyulingan | D Extraction
Pengekstrakan |

358. Logam M bertindak balas dengan asid hidroklorik untuk menghasilkan garam dan gas hidrogen.
Apakah tindak balas yang berlaku pada logam M?
Metal M reacts with hydrochloric acid to produce salt and hydrogen gas.
What is the reaction that occurs on metal M?

- A Penurunan
Reduction
- B Pengoksidaan
Oxidation
- C Pemendakan
Precipitation
- D Peneutralan
Neutralisation

359. Diagram 359 shows the apparatus set-up for the electrolysis of 25.0 cm^3 of 10 mol dm^{-3} copper(II) sulphate solution using carbon electrodes.

Rajah 359 menunjukkan susunan radas bagi elektrolisis 25.0 cm^3 larutan kuprum(II) sulfat 1.0 mol dm^{-3} dengan menggunakan elektrod karbon.

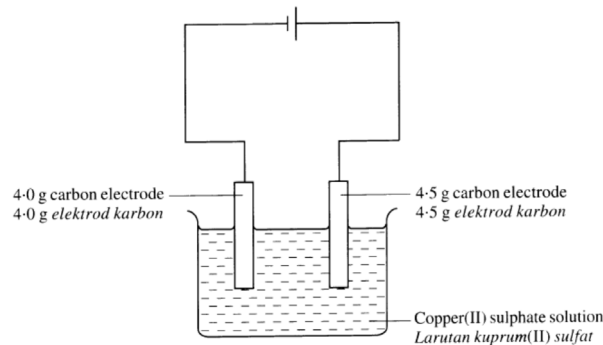


Diagram 359 / Rajah 359

After the reaction is completed, the blue copper(II) sulphate solution turns colourless. What is the mass of carbon cathode?

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

Selepas tindak balas selesai, larutan biru kuprum(II) sulfat 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 | 4.0g | D | 6.1g |

360. Diagram 360 shows a simple chemical cell built using a lime. Two different metals are used as electrodes.

Rajah 360 menunjukkan sel kimia ringkas yang dibina menggunakan buah limau. Dua logam berlainan digunakan sebagai elektrod.

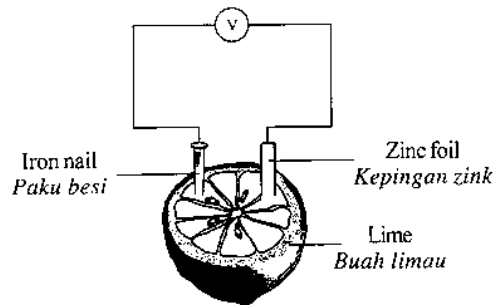


Diagram 360 / Rajah 360

Which of the following metal can be used to replace the iron nail to obtain the highest voltage reading?

Antara logam berikut, yang manakah boleh menggantikan paku besi itu untuk mendapatkan bacaan voltan yang paling tinggi?

- | | | | |
|---|-----------------|---|--------------------|
| A | Tin
Stannum | C | Silver
Argentum |
| B | Lead
Plumbum | D | Copper
Kuprum |

361. Semasa elektrolisis larutan kuprum(II) klorida dengan menggunakan elektrod karbon, warna elektrolit bertukar daripada biru menjadi biru muda.

Penyataan manakah yang paling baik untuk menerangkan pemerhatian itu?

During electrolysis of copper(II) chloride solution using carbon electrodes, the colour of the electrolyte turn from blue to light blue. Which statement best explains the observation?

- A Copper is produced at cathode
Kuprum terhasil di katod
- B Concentration of copper(II) ions decreases
Kepekatan ion kuprum(II) berkurangan
- C More chloride ions are discharged at anode
Semakin banyak ion klorida dinyahcas di anod
- D Chlorine gas produced decolourises the colour of the electrolyte
Gas klorin yang terhasil melunturkan warna elektrolit

362. Diagram 362 shows the apparatus set-up to purify silver.

Rajah 362 menunjukkan susunan radas untuk menuliskan argentum.

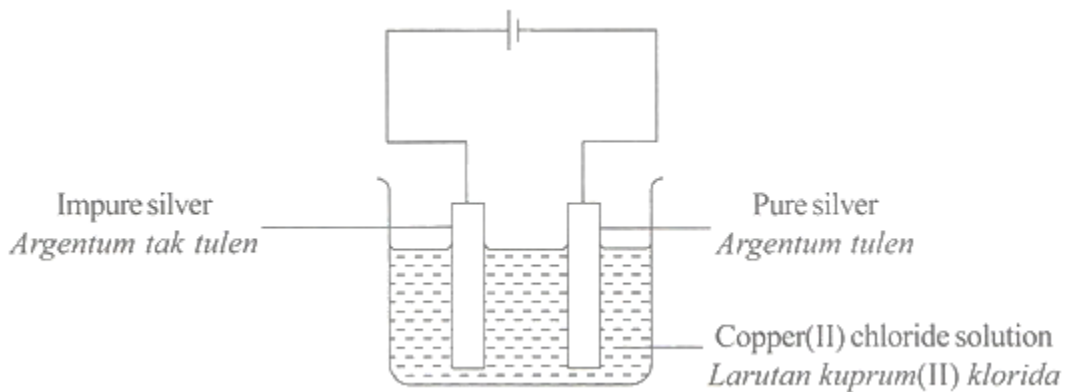


Diagram 362 / Rajah 362

After one hour, it is found that the silver is not purified.

What should be done to ensure purification takes place?

Selepas satu jam, didapati argentum tidak dituliskan. Apakah yang perlu dilakukan untuk memastikan penulenan berlaku?

- A Use a bigger pure silver
Gunakan argentum tulen yang lebih besar
- B Interchange the terminals in the cell
Saling tukar terminal pada sel
- C Increase the concentration of copper(II) chloride solution
Tambah kepekatan larutan kuprum(II) klorida
- D Use silver nitrate solution as the electrolyte
Gunakan larutan argentum nitrat sebagai elektrolit

363. Cryolite, Na_3AlF_6 is used in the extraction process of aluminium in industry. What is the use of this substance?

Kriolit, Na_3AlF_6 digunakan dalam proses pengekstrakan aluminium dalam industri. Apakah kegunaan bahan ini?

- A Lower the melting points of aluminium oxide
Merendahkan takat lebur aluminium oksida
- B Increase the rate of reaction
Meningkatkan kadar tindak balas
- C Eliminate impurities
Menyingkirkan bendasing
- D Hamper electrode from being oxidized
Menghalang elektrod daripada dioksidakan

364. Diagram 364 shows a displacement reaction.
Rajah 364 menunjukkan satu tindak balas penyesanan.

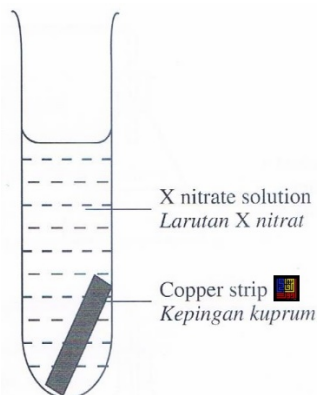


Diagram 364 / Rajah 364

After a few minutes, the colourless solution turns blue.
Selepas beberapa minit, larutan tanpa warna bertukar menjadi biru.

Which statement best explains the observation?
Pernyataan manakah yang paling baik menerangkan pemerhatian tersebut?

- A Copper undergoes oxidation
Kuprum mengalami pengoksidaan
- B Concentration of ion X increases
Kepekatan ion X meningkat
- C Copper(III) ions formed
Ion kuprum(III) terhasil
- D X loses electron
X kehilangan elektron

365. Which substance is a reducing agent?
Bahan manakah yang merupakan satu agen penurunan?

- A Acidified hydrogen peroxide solution
Larutan hidrogen peroksida berasid
- B Iron(III) nitrate solution
Larutan ferum(III) nitrat
- C Potassium iodide solution
Larutan kalium iodida
- D Acidified potassium manganate(VII) solution
Larutan kalium manganat(VII) berasid

366. Diagram 366 shows a ship in the sea that uses sacrificial anode method to prevent rusting. Metal X becomes thinner after several weeks.

Rajah 366 menunjukkan sebuah kapal di laut yang menggunakan kaedah anod korban bagi mengelakkan pengurangan.

Logam X menjadi semakin nipis selepas beberapa minggu.

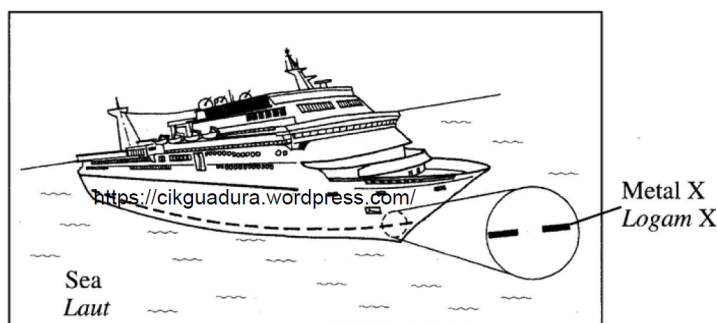


Diagram 366 / Rajah 366

Which of the following explains the situation?
Antara yang berikut, yang manakah menerangkan situasi tersebut?

- A Oxidation number of X increases
Nombor pengoksidaan X meningkat
- B Atom X is easier to receive an electron
Atom X lebih mudah untuk menerima elektron
- C Position of X is lower than iron in the electrochemical series
Kedudukan X adalah lebih rendah daripada ferum dalam siri elektrokimia
- D Metal X reacts with sea water
Logam X bertindak balas dengan air laut

366. Table 366 shows the observation for the reactions between metal X with two different salt solutions. *Jadual 366 menunjukkan pemerhatian bagi tindak balas di antara logam X dengan dua larutan garam yang berbeza.*

Salt solution <i>Larutan garam</i>	Observation <i>Pemerhatian</i>
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 366 / *Jadual 366*

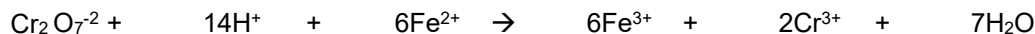
Which of the following is the correct descending order of metal X, copper and zinc in the electrochemical series?

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

- | | | | |
|---|---|---|---|
| A | X, copper, zinc
<i>X, kuprum, zink</i> | C | Zinc, copper, X
<i>Zink, kuprum, X</i> |
| B | X, zinc, copper
<i>X, zink, kuprum</i> | D | Zinc, X, copper
<i>Zink, X, kuprum</i> |

367. The following ionic equation represents the reaction between acidified potassium dichromate(VI) solution and iron(II) sulphate solution.

Persamaan ion berikut mewakili tindak balas antara larutan kalium dikromat(VI) berasid dengan larutan ferum(II) sulfat.



What is the change of oxidation number of chromium in the reaction?

Apakah perubahan nombor pengoksidaan kromium dalam tindak balas itu?

- | | | | |
|---|---------------------------------|---|---------------------------------|
| A | +6 to +2
<i>+6 kepada +2</i> | C | +7 to +2
<i>+7 kepada +2</i> |
| B | +6 to +3
<i>+6 kepada +3</i> | D | +7 to +3
<i>+7 kepada +3</i> |

SEBATIAN KARBON

368. Which molecule has a double covalent bond between its atoms?

[Proton number: H = 1, N = 7, O = 8, F = 9 ut F]

Molekul manakah yang mempunyai ikatan kovalen ganda dua antara atomnya?

[Proton number. H = 1, N = 7, O = 8, F = 9 patut F]

- | | | | |
|---|----------------------|---|----------------------|
| A | Hydrogen
Hidrogen | C | Nitrogen
Nitrogen |
| B | Fluorine
Fluorin | D | Oxygen
Oksigen |

367. Diagram 367 shows a gas cartridge of a Bunsen burner.

Rajah 367 menunjukkan kartrij gas penunu Bunsen.

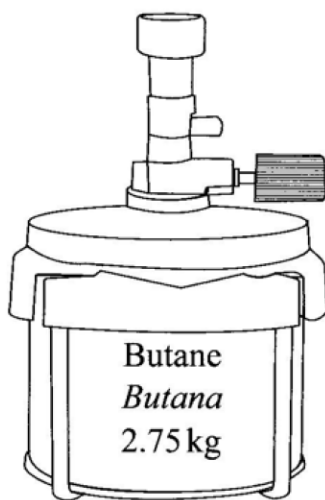


Diagram 367 / Rajah 367

What is the number of moles of the gas?

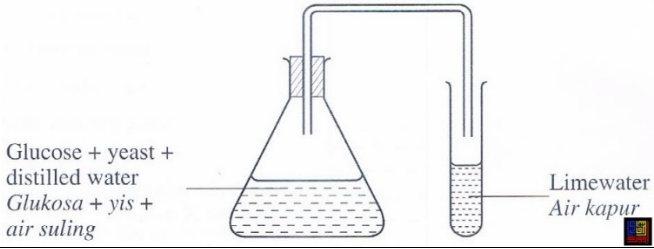
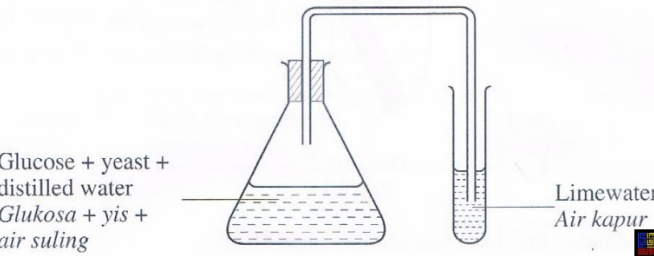
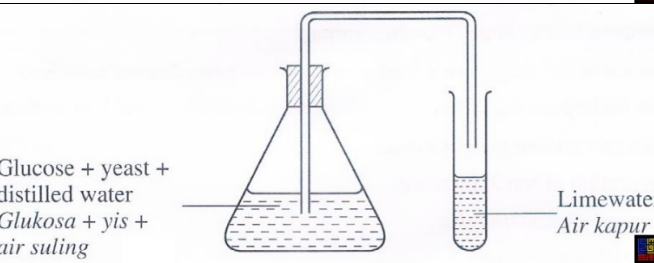
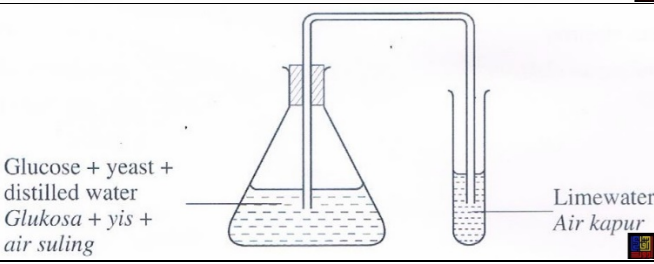
[Relative atomic mass: H = 1, C = 12]

Berapakah bilangan mol gas itu?

[Jisim atom relatif. H = 1, C = 12]

- | | | | |
|---|------|---|------|
| A | 20.4 | C | 47.4 |
| B | 21.1 | D | 49.1 |

368. Which diagram shows the correct apparatus set-up for a fermentation process?
Rajah manakah menunjukkan susunan radas yang betul bagi satu proses penapaian ?

A	 <p>Glucose + yeast + distilled water Glukosa + yis + air suling</p> <p>Limewater Air kapur</p>
B	 <p>Glucose + yeast + distilled water Glukosa + yis + air suling</p> <p>Limewater Air kapur</p>
C	 <p>Glucose + yeast + distilled water Glukosa + yis + air suling</p> <p>Limewater Air kapur</p>
D	 <p>Glucose + yeast + distilled water Glukosa + yis + air suling</p> <p>Limewater Air kapur</p>

369. Which of the following is the property of tetrachloromethane, CCl_4 ?
Antara yang berikut, yang manakah sifat tetraklorometana, CCl_4 ?

- A Non-volatile
Tidak meruap
- B Insoluble in organic solvent
Tidak larut dalam pelarut organik
- C Conducts electricity in any state
Mengkonduksi elektrik dalam semua keadaan
- D Has low melting and boiling point
Memunyai takat lebur dan takat didih yang rendah

370. Diagram 370 shows the structural formula of ester contained in pineapple.
Rajah 370 menunjukkan formula struktur ester yang terkandung dalam nanas.

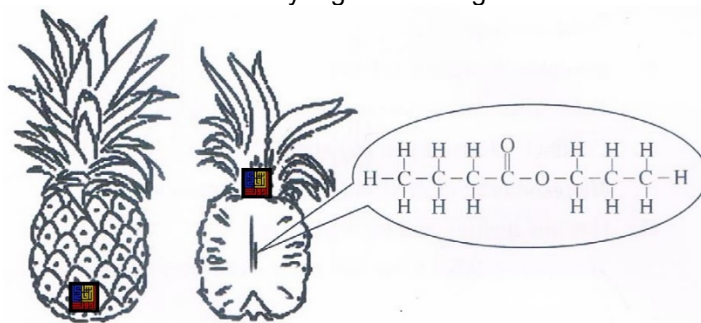


Diagram 370 / Rajah 370

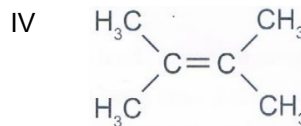
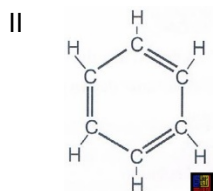
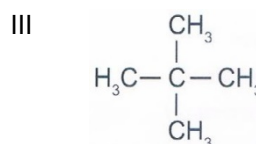
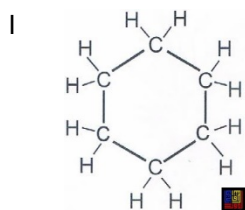
What is the name of the ester based on IUPAC system nomenclature?
Apakah nama ester tersebut mengikut sistem penamaan IUPAC?

- | | | |
|---|-------------------|------------------|
| A | Methyl pentanoate | Metil pentanoat |
| B | Propyl propanoate | Propil propanoat |
| C | Ethyl butanoate | Etil butanoat |
| D | Butyl ethanoate | Butil etanoat |

371. Which observation is correct when hexene is burnt in air?
Pemerhatian manakah yang betul apabila heksena dibakar dalam udara?

- | | |
|--|---|
| A No flame
Tiada nyalaan | C Yellow flame and little soot produced
Nyalaan kuning dan sedikit jelaga terhasil |
| B Blue flame produced
Nyalaan biru terhasil | D Yellow flame and lots of soot produced
Nyalaan kuning dan banyak jelaga terhasil |

372. Which of the following are saturated hydrocarbons?
Antara yang berikut, yang manakah merupakan hidrokarbon



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

378 Diagram 378 shows the structural formula of an organic compound.
Rajah 378 menunjukkan formula struktur suatu sebatian organik.

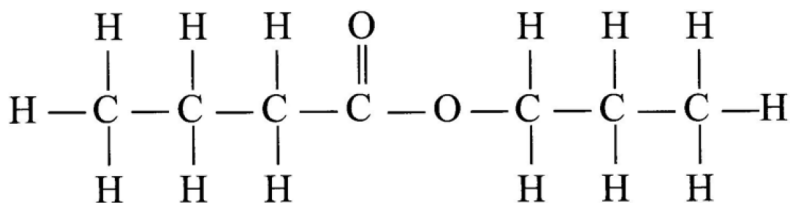


Diagram / Rajah 378

What is the name of the organic compound?
Apakah nama sebatian organik itu?

- | | | | |
|---|---------------------------------------|---|-------------------------------------|
| A | Propyl propanoate
Propil propanoat | C | Butyl propanoate
Butil propanoat |
| B | Propyl butanoate
Propil butanoat | D | Butyl butanoate
Butil butanoat |

379. Concentrated sulphuric acid is one of the substances needed to produce a brown ring in the confirmatory test for nitrate ion in a salt solution.

What are the other substances required for the test?

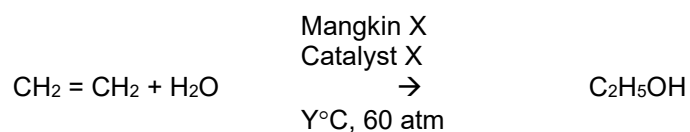
Asid sulfurik pekat merupakan salah satu bahan yang diperlukan untuk menghasilkan cincin perang bagi ujian pengesahan ion nitrat dalam suatu larutan garam.

Apakah bahan lain yang diperlukan untuk ujian tersebut?

- | | |
|-----|---|
| I | Nitric acid
Asid nitrik |
| II | Bromine water
Air bromin |
| III | Dilute sulphuric acid
Asid sulfurik cair |
| IV | Iron(II) sulphate
Ferum(II) sulfat |
| A | I and II
I dan II |
| B | I and IV
I dan IV |
| C | II and III
II dan III |
| D | III and IV
III dan IV |

380. Persamaan berikut mewakili tindak balas penghidratan etena untuk menghasilkan etanol secara industri.

The following equation represents the hydration of ethene to produce ethanol in industry.



Apakah X dan Y?
What are X and Y?

	X	Y
A	Nikel Nickel	180
B	Ferum Iron	450
C	Asid fosforik Phosphoric acid	300
D	Asid sulfurik pekat Concentrated sulphuric acid	180

381. Sebatian Q mempunyai sifat-sifat berikut.
Compound Q has the following properties.

- Tidak mengkonduksi elektrik
Cannot conduct electricity
- Tidak larut dalam air
Insoluble in water
- Menyahwama kalium manganat(VII) berasid
Decolourise acidified potassium manganate (VII)

Apakah sebatian Q?
What is compound Q?

- | | | |
|---|-------------------------------|-------------------|
| A | Asid etanoik
Ethanoic acid | C Etena
Ethene |
| B | Etanol
Ethanol | D Etana
Ethane |

382. Formula molekul berikut mewakili satu sebatian karbon yang terbentuk daripada tindak balas antara sebatian X dan sebatian Y.

The following molecular formula represents a carbon compound formed from the reaction between compounds X and Y.



Apakah sebatian X dan sebatian Y?

What are compounds X and Y?

	Sebatian X Compound X	Sebatian Y Compound Y
A	$\text{CH}_3\text{CH}_2\text{COOH}$	$\text{CH}_3\text{CH}_2\text{OH}$
B	$\text{CH}_3\text{CH}_2\text{COOH}$	$\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$
C	$\text{CH}_3\text{CH}_2\text{CH}_2\text{COOH}$	$\text{CH}_3\text{CH}_2\text{OH}$
D	$\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{COOH}$	$\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$

383. Antara yang berikut, yang manakah isomer bagi $\text{C}_4\text{H}_9\text{OH}$?

Which of the following are the isomers for $\text{C}_4\text{H}_9\text{OH}$?

I Propan-2-ol

Propan-2-ol

II Butan-1-ol

Butan-1-ol

III 2-metilpropan-2-ol

2-methylpropan-2-ol

IV 2-metilbutan-2-ol

2-methylbutan-2-ol

A I dan II

I and II

B I dan IV

I and IV

C II dan III

II and III

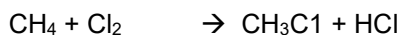
D III dan IV

III and IV

384. Campuran metana dan klorin bertindak balas apabila terdedah kepada cahaya matahari.

Persamaan berikut mewakili tindak balas tersebut.

A mixture of methane and chlorine react when it is exposed to sunlight. The following equation represents the reaction.



Bahan manakah yang diturunkan dalam tindak balas itu?

Which substance is reduced in the reaction?

- | | | | |
|---|---------------|---|------------------------|
| A | CH_4 | C | CH_3Cl |
| B | Cl_2 | D | HCl |

385. The following equation represents the complete combustion of a hydrocarbon.

Persamaan berikut mewakili pembakaran lengkap bagi satu hidrokarbon.



What are the values of x and y?

Apakah nilai bagi x dan y?

	X	Y
A	1	2
B	2	3
C	3	4
D	4	5

386. Diagram 386 shows a structure of a polymer.

Rajah 386 menunjukkan struktur bagi suatu polimer.

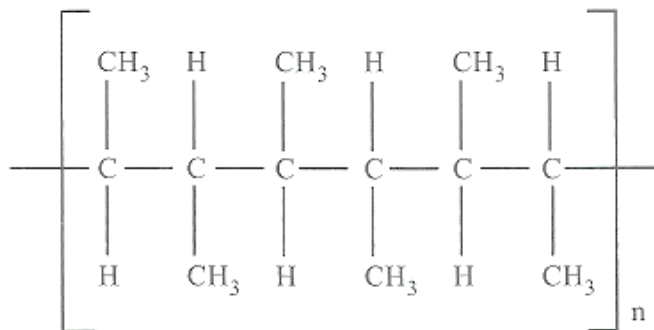
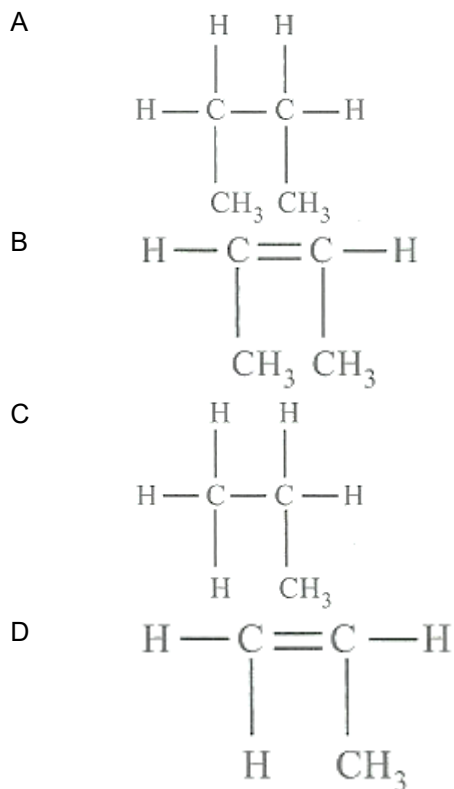


Diagram 386 / Rajah 386

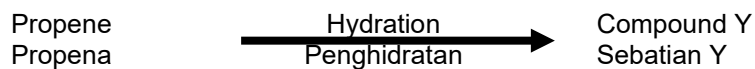
Which structural formula is a monomer for this polymer?

Formula struktur manakah merupakan monomer bagi polimer ini?



387. The following equation represents the conversion of propene to compound Y through a hydration process.

Persamaan berikut mewakili tindak balas penukaran propena kepada sebatian Y melalui suatu proses penghidratan.

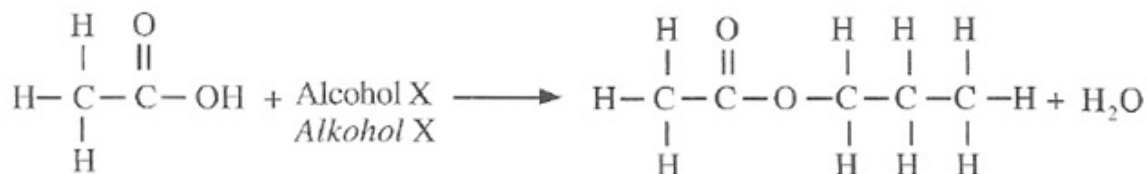


What is compound Y?

Apakah sebatian Y?

A	Propane Propana
B	Propanol Propanol
C	Propanoic acid Asid propanoik
D	Propyl propanoate Propil propanoat

388. The equation represents an esterification reaction.
 Persamaan mewakili satu tindak balas pengesteran.



What is X?
 Apakah X?

A	$ \begin{array}{c} \text{H} \quad \text{H} \quad \text{OH} \\ \quad \quad \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{H} \\ \quad \quad \\ \text{H} \quad \text{H} \quad \text{H} \end{array} $	B	$ \begin{array}{c} \text{H} \quad \text{H} \\ \quad \\ \text{H}-\text{C}-\text{C}-\text{OH} \\ \quad \\ \text{H} \quad \text{H} \end{array} $
C	$ \begin{array}{c} \text{H} \quad \text{OH} \quad \text{H} \quad \text{H} \quad \text{H} \\ \quad \quad \quad \quad \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{C}-\text{C}-\text{OH} \\ \quad \quad \quad \quad \\ \text{H} \quad \text{H} \quad \text{H} \quad \text{H} \quad \text{H} \end{array} $	D	$ \begin{array}{c} \text{H} \quad \text{H} \quad \text{H} \quad \text{H} \quad \text{H} \\ \quad \quad \quad \quad \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{C}-\text{C}-\text{H} \\ \quad \quad \quad \quad \\ \text{H} \quad \text{H} \quad \text{OH} \quad \text{H} \quad \text{H} \end{array} $

388. Diagram 388 shows the structural formula of a compound.
 Rajah 388 menunjukkan formula struktur bagi suatu sebatian.

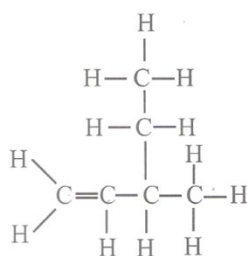


Diagram 388 / Rajah 388

What is the name of the compound?
 Apakah nama sebatian itu?

- A 2-ethylbut-1-ene
 2-etilbut-1-ena
- B 2-ethylbut-4-ene
 2-etilbut-4-ena
- C 3-methylpent-4-ene
 3-metilpent-4-ena
- D 3-methylpent-1-ene
 3-metilpent-1-ena

389. What is the meaning of saturated hydrocarbons?

Apakah yang dimaksudkan dengan hidrokarbon tepu?

- A Compounds containing only hydrogen atoms and carbon atoms
Sebatian yang mengandungi atom hidrogen dan atom karbon sahaja
- B Compounds containing only hydrogen atoms and carbon atoms with only single bond
Sebatian yang mengandungi atom hidrogen dan atom karbon sahaja dengan hanya ikatan tunggal
- C Compounds containing only hydrogen atoms and carbon atoms with one double bonds
Sebatian yang mengandungi atom hidrogen dan atom karbon sahaja dengan satu ikatan ganda dua
- D Compounds containing only hydrogen atoms and carbon atoms with one triple bonds
Sebatian yang mengandungi atom hidrogen dan atom karbon sahaja dengan satu ikatan ganda tiga

390. The molecular formula of ethanoic acid is CH_3COOH . What is the empirical formula of ethanoic acid?

Formula molekul asid etanoik ialah CH_3COOH . Apakah formula empirik asid etanoik?

- | | | | |
|---|-----------------------|---|----------------------------------|
| A | CHO | C | $\text{C}_2\text{H}_2\text{O}_2$ |
| B | CH_2O | D | $\text{C}_2\text{H}_4\text{O}_2$ |

381. What is the product formed when hydrogen and propene are passed over a nickel catalyst at temperature 180°C ?

Apakah hasil yang terbentuk apabila hidrogen dan propena dilalukan ke atas mangkin nikel pada suhu 180°C ?

- A Propane
Propana
- B Propanol
Propanol
- C Propanoic acid
Asid propanoik
- D Propyl propanoate
Propil propanoat

382. Which compound is an unsaturated hydrocarbon?

Sebatian manakah adalah hidrokarbon tak tepu?

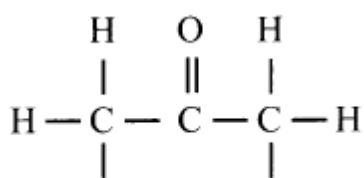
- A $\text{CH}_3\text{CHCH}_3\text{CH}_3$
- B $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$
- C $\text{CH}_2\text{CHCH}_2\text{CH}_2\text{CH}_3$
- D $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$

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

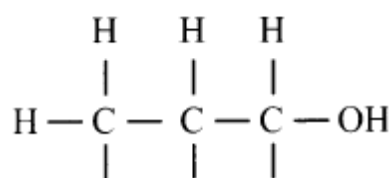
- Organic compound
Sebatian organik
- Has a hydroxyl group
Mempunyai kumpulan hidroksil
- Produced by addition reaction
Dihasilkan daripada tindak balas penambahan

Which structural formula represents compound R?
Formula struktur manakah yang mewakili sebatian R?

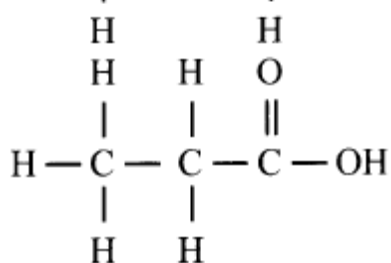
A



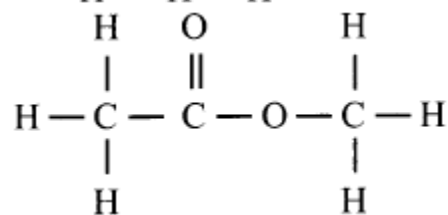
B



C



D

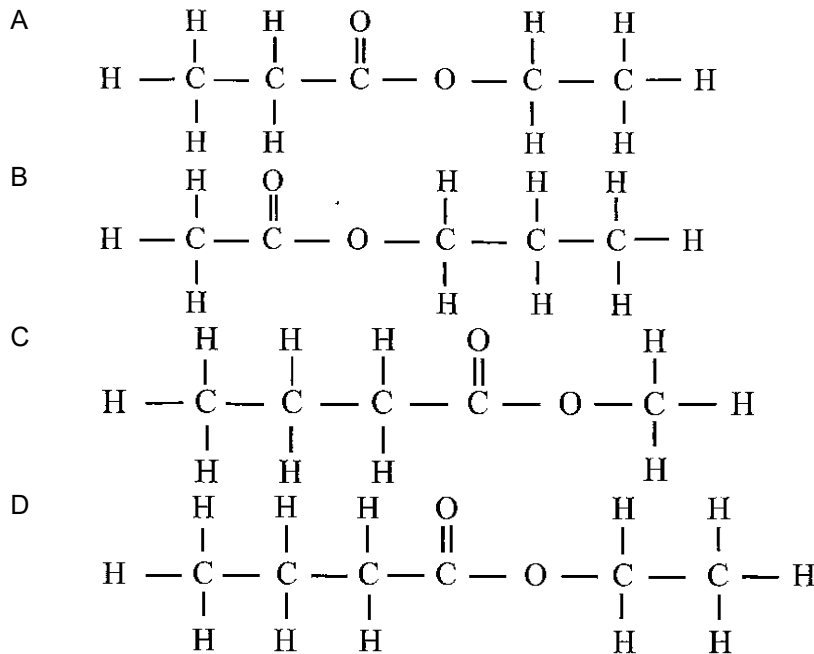


384. Which statement is correct?
Pernyataan manakah yang betul?

- A Vulcanised rubber is easily oxidised
Getah tervulkan mudah dioksidakan
- B Vulcanised rubber can withstand high heat
Getah tervulkan boleh menahan haba yang tinggi
- C Unvulcanised rubber is stronger and harder
Getah tak tervulkan lebih kuat dan lebih keras
- D Unvulcanised rubber is more elastic
Getah tak tervulkan lebih kenyal

385. What is the structural formula for an ester formed when ethanol, C_2H_5OH reacts with propanoic acid, C_2H_5COOH ?

Apakah formula struktur bagi suatu ester yang terbentuk apabila etanol, C_2H_5OH bertindak balas dengan asid propanoik, C_2H_5COOH ?



386. Diagram 386 shows the change of substance M to substance L through process Z.

Rajah 386 menunjukkan perubahan bahan M kepada bahan L melalui proses Z.

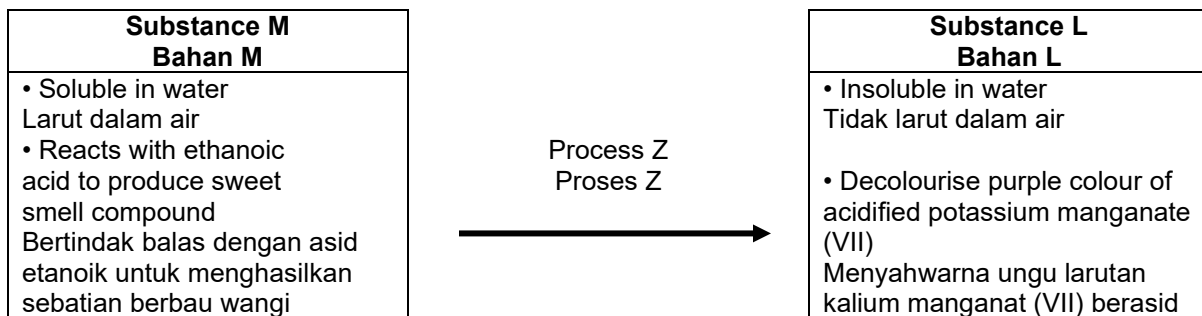


Diagram 386 / Rajah 386

Which of the following is correct about process Z?

Antara yang berikut, yang manakah betul tentang proses Z?

- A Passes through hot porcelain chips
Dialirkan melalui serpihan porselin panas
- B Steamed at $300^{\circ}C$ with phosphoric acid
Distirn pada suhu $300^{\circ}C$ dengan asid fosforik
- C Reacts with hydrogen chloride at room temperature
Bertindak balas dengan hidrogen klorida pada suhu bilik
- D Heated at $180^{\circ}C$ with nickel
Dipanaskan pada suhu $180^{\circ}C$ dengan nikel

387. Diagram 387 shows the structural formula of an ester.
Rajah 387 menunjukkan formula struktur bagi satu ester.

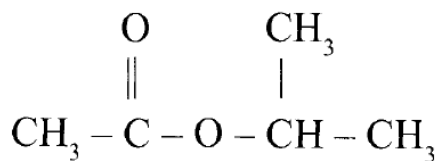


Diagram 387 / *Rajah 387*

What are the names of alcohol and carboxylic acid used to prepare the ester?
Apakah nama alkohol dan nama asid karboksilik yang digunakan untuk menyediakan ester itu?

- A Propan-2-ol and ethanoic acid
Propan-2-ol dan asid etanoik
- B Propan-1-ol and propanoic acid
Propan-1-ol dan asidpropanoik
- C Ethanol and ethanoic acid
Etanol dan asid etanoik
- D Ethanol and propanoic acid
Etanol dan asid propanoik

388. Which substance is used to differentiate between butane and butene?
Bahan manakah yang digunakan untuk membezakan antara butana dan butena?

- A Lime water
Air kapur
- B Bromine water
Air bromin
- C Phosphoric acid
Asid fosforik
- D Sodium hydroxide
Natrium hidroksida

389. Diagram 389 shows a structure formula which represents a food flavouring substance.
Rajah 389 menunjukkan formula struktur yang mewakili satu bahan perisa makanan.

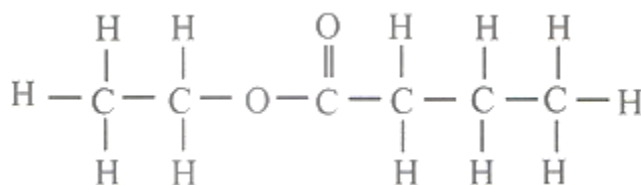


Diagram 389 / *Rajah 389*

Which of the following can be used to make the flavouring?
Antara yang berikut, yang manakah boleh digunakan untuk membuat perisa itu?

- A Propanol and propanoic acid
Propanol dan asid propanoik
- B Butanol and ethanoic acid
Butanol dan asid etanoik
- C Etanol and butanoic acid
Etanol dan asid butanoik
- D Propil propanoat and etanol
Propil propanoat dan etanol

390. Diagram 390 shows a simple voltaic cell.
Rajah 390 menunjukkan suatu sel voltan ringkas.

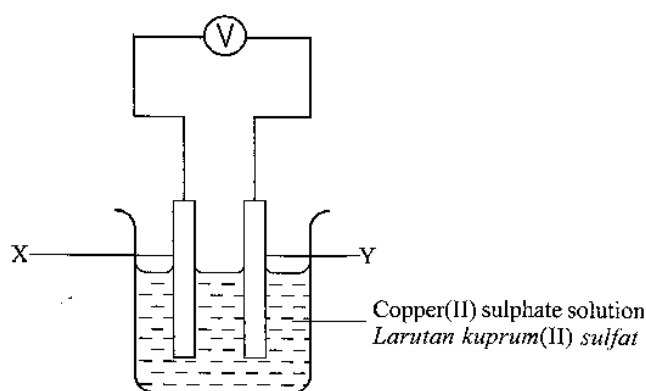


Diagram 389 / *Rajah 389*

Which pair of materials are suitable to be used as electrodes X and Y?
Pasangan bahan manakah yang sesuai digunakan sebagai elektrod X dan Y?

	X	Y
A	Magnesium <i>Magnesium</i>	Copper <i>Kuprum</i>
B	Magnesium <i>Magnesium</i>	Carbon <i>Karbon</i>
C	Carbon <i>Karbon</i>	Carbon <i>Karbon</i>
D	Copper <i>Kuprum</i>	Copper <i>Kuprum</i>

391. Diagram 391 shows a chemical cell. The electrons move from electrode L to electrode M through the circuit.

Rajah 391 menunjukkan satu sel kimia. Elektron bergerak dari elektrod L ke elektrod M melalui litar.

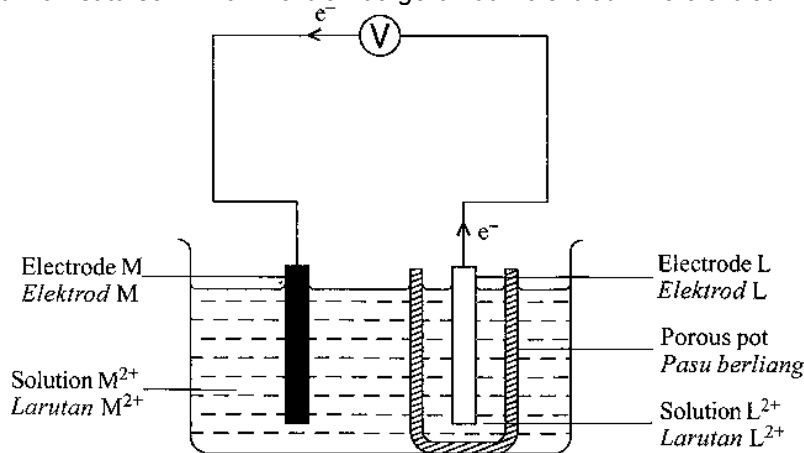


Diagram 391 / Rajah 391

Which statement is correct about the reaction in the chemical cell?

Penyataan manakah yang betul tentang tindak balas dalam sel kimia itu?

- A Ion M^{2+} is oxidised
Ion M^{2+} dioksidakan
- B L is more electropositive than M
L lebih elektropositif daripada M
- C Reduction occurs at electrode L
Penurunan berlaku di elektrod L
- D L is zinc and M is magnesium
L ialah zink dan M ialah magnesium

392. Alcohol undergoes dehydration reaction to form alkenes and water. Which alkene is formed when butan-1-ol undergoes dehydration reaction?

Alkohol mengalami tindak balas pendehidratan untuk membentuk alkena dan air. Alkena manakah yang terbentuk apabila butan-1-ol mengalami tindak balas pendehidratan?

- A $CH_3CH_2CH=CH_2$
- B $CH_3CH=CHCH_3$
- C $\begin{array}{c} CH_3 \\ | \\ CH_3C=CH_2 \end{array}$
- D $\begin{array}{c} CH_3 \\ | \\ CH_2=C-CH_3 \end{array}$

393. Formula empirik bagi suatu hidrokarbon ialah CH_2 .
The empirical formula of a hydrocarbon is CH_2 .

Apakah formula molekul bagi hidrokarbon itu?
[Jisim atom relatif: C = 12, H = 1;
Jisim molar hidrokarbon = 56 g mol^{-1}]

What is the molecular formula of the hydrocarbon?
[Relative atomic mass: C = 12, H = 1;
Molar mass of hydrocarbon = 56 g mol^{-1}]

- | | | | |
|---|---------------------------|---|------------------------|
| A | C_4H_8 | C | C_2H_4 |
| B | C_4H_{10} | D | C_2H_6 |

394. Substances X and Y change the colour of acidified potassium manganate(VII) solution from purple to colourless.

What are X and Y?

Bahan X dan Y menukarkan warna larutan kalium manganat(VII) berasid daripada ungu kepada tidak berwarna.

Apakah X dan Y?

	X	Y
A	$\text{C}_3\text{H}_7\text{COOH}$	C_4H_{10}
B	$\text{C}_4\text{H}_9\text{OH}$	C_4H_8
C	$\text{C}_4\text{H}_9\text{OH}$	C_4H_{10}
D	$\text{C}_3\text{H}_7\text{COOH}$	C_4H_8

395. Which statement shows the difference between butene and butane?

Pernyataan manakah yang menunjukkan perbezaan antara butena dengan butana?

- A Butene dissolved in water but butane does not
Butena terlarut dalam air tetapi butana tidak terlarut dalam air
- B The carbon percentage per molecule of butene is higher
Peratus karbon per molekul bagi butena lebih tinggi
- C The number of hydrogen atoms per molecule of butene is higher
Bilangan atom hidrogen per molekul bagi butena lebih banyak
- D Butane decolourised the brown colour of bromine water but butene does not
Butana menyahwarnakan warna perang air bromin tetapi butena tidak menyahkan warna perang air bromin.

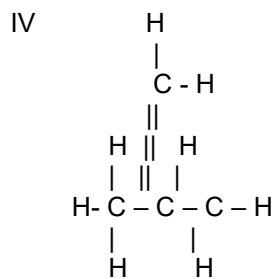
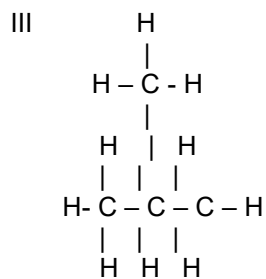
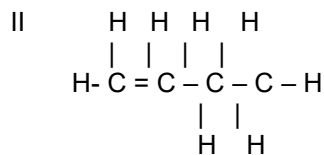
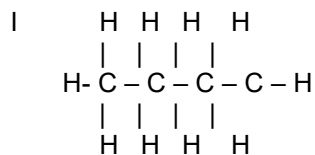
396. Which of the following is the similarity between ethene and ethanol?

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 menyahwarnakan air bromin
- D Both decolourised acidified potassium manganate(VII) solution
Kedua-duanya menyahwarnakan larutan kalium manganat(VII) berasid

397. Which structural formulae are isomers of butane?

Formula struktur manakah adalah isomer bagi butana?



A I and II
I dan II

C II and IV
II dan IV

B I and III
I dan III

D III and IV
III dan IV

398. Which structural formula does not correspond to the named compound?

Formula struktur manakah yang tidak sepadan dengan sebatian yang dinamakan?

	Compound name <i>Nama sebatian</i>	Structural formula <i>Formula struktur</i>
A	Ethanoic acid <i>Asid etanoik</i>	$\begin{array}{cccc} & \text{H} & \text{H} & \text{O} & \text{H} & \text{H} \\ & & & & & \\ \text{H} & - \text{C} & - \text{C} & - \text{O} & - \text{C} & - \text{C} - \text{H} \\ & & & & & \\ & \text{H} & \text{H} & & \text{H} & \text{H} \end{array}$
B	Ethanol <i>Etanol</i>	$\begin{array}{c} \text{H} \quad \text{H} \\ \quad \\ \text{H} - \text{C} - \text{C} - \text{O} - \text{H} \\ \quad \\ \text{H} \quad \text{H} \end{array}$
C	Ethene <i>Etena</i>	$\begin{array}{c} \text{H} \quad \text{H} \\ \quad \\ \text{H} - \text{C} = \text{C} - \text{H} \end{array}$
D	Ethane <i>Etana</i>	$\begin{array}{c} \text{H} \quad \text{H} \\ \quad \\ \text{H} - \text{C} - \text{C} - \text{H} \\ \quad \\ \text{H} \quad \text{H} \end{array}$

399. Which statement is correct about alkanes?
Pernyataan manakah yang betul tentang alkana?

- A Undergo polymerization reaction
Mengalami tindak balas pempolimeran
- B Undergo hydrogenation reaction
Mengalami tindak balas penghidrogenan
- C Undergo substitution reaction
Mengalami tindak balas penukargantian
- D Undergo hydration reaction
Mengalami tindak balas penghidratan

400. What is the meaning of saturated hydrocarbons?
Apakah yang dimaksudkan dengan hidrokarbon tepu?

- A Compounds containing only hydrogen atoms and carbon atoms
Sebatian yang mengandungi atom hidrogen dan atom karbon sahaja
- B Compounds containing only hydrogen atoms and carbon atoms with only single bond
Sebatian yang mengandungi atom hidrogen dan atom karbon sahaja dengan hanya ikatan tunggal
- C Compounds containing only hydrogen atoms and carbon atoms with one double bonds
Sebatian yang mengandungi atom hidrogen dan atom karbon sahaja dengan satu ikatan ganda dua
- D Compounds containing only hydrogen atoms and carbon atoms with one triple bonds
Sebatian yang mengandungi atom hidrogen dan atom karbon sahaja dengan satu ikatan ganda tiga

401. Diagram 401 shows a process of preparing margarine from palm oil through process X.
Rajah 401 menunjukkan proses menyediakan marjerin daripada minyak kelapa sawit melalui proses

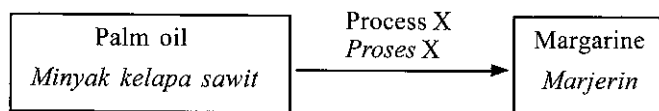


Diagram 401 / Rajah 401

What is process X?
Apakah proses X?

- | | |
|--|---|
| <ul style="list-style-type: none"> A Halogenation
Penghalogenan B Hydrogenation
Penghidrogenan | <ul style="list-style-type: none"> C Saponification
Saponifikasi D Oxidation
Pengoksidaan |
|--|---|

402. Which of the following is correct about alkanes?
 Antara yang berikut, yang manakah betul tentang alkana?

- A The compound has hydroxyl group
Sebatian mempunyai kumpulan hidroksil
- B The compound is a saturated hydrocarbon
Sebatian adalah satu hidrokarbon tepu
- C The compound has general formula of C_nH_{2n}
Sebatian mempunyai formula am C_nH_{2n}
- D The compound consists of double bond between carbon atoms
Sebatian mengandungi ikatan ganda dua antara atom-atom karbon

403. Diagram 403 shows the structural formula of an organic compound.
 Rajah 403 menunjukkan formula struktur suatu sebatian organik.

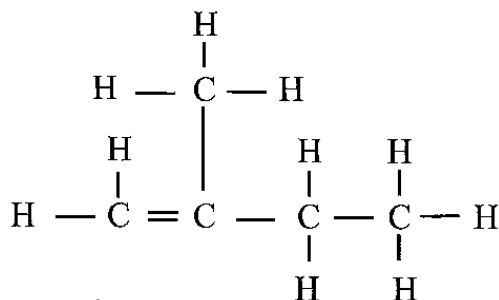


Diagram 403 / Rajah 403

What is the IUPAC name of the organic compound?
 Apakah nama IUPAC bagi sebatian organik itu /

- A 2-methylbut-1-ene
2-metilbut-1-ena
- B 2-methylbut-2-ene
2-metilbut-2-ena
- C 2-ethylbut-3-ene
2-etilbut-3-ena
- D 3-methylbut-3-ene
3-metilbut-3-ena

404. Diagram 404 shows the structural formulae of two hydrocarbons.
Rajah 404 menunjukkan formula struktur bagi dua hidrokarbon.

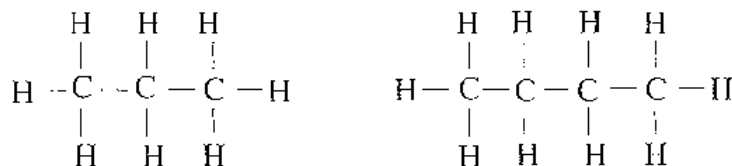


Diagram 404 / Rajah 404

Which property of both compounds is similar?
Sifat manakah yang sama bagi kedua-dua sebatian?

- | | | | |
|---|------------------------------|---|----------------------------|
| A | Melting point
Takat lebur | C | Solubility
Keterlarutan |
| B | Molar mass
Jisim molar | D | Density
Ketumpatan |

405. When but-2-ene is shaken with bromide water, the brown bromine water is decolourised. What is the product of this reaction?

Apabila but-2-ena digoncang dengan air bromin, warna perang air bromin dinyahwarnakan. Apakah hasil bagi tindak balas ini?

- A 1,2-dibromobutene
1,2-dibromobutene
- B 2,3-dibromobutene
2,3-dibromobutena
- C 1,2-dibromobutane
1,2-dibromobutana
- D 2,3-dibromobutane
2,3-dibromobutana

406. Which statement shows the difference between butene and butane?

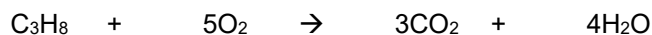
Pernyataan manakah yang menunjukkan perbezaan antara butena dengan butana?

- A Butene dissolved in water but butane does not
Butena terlarut dalam air tetapi butana tidak terlarut dalam air
- B The carbon percentage per molecule of butene is higher
Peratus karbon per molekul bagi butena lebih tinggi
- C The number of hydrogen atoms per molecule of butene is higher
Bilangan atom hidrogen per molekul bagi butena lebih banyak
- D Butane decolourised the brown colour of bromine water but butene does not
Butana menyahwarnakan warna perang air bromin tetapi butena tidak menyahkan warna perang air bromin.

407. Which compound is a saturated hydrocarbon?
Sebatian manakah adalah suatu hidrokarbon tepu?

- A Propene
Propena
- B Propane
Propana
- C Propanol
Propanol
- D Chloropropane
Kloropropana

408. The following equation represents the combustion of propane in excess oxygen. *Persamaan berikut mewakili pembakaran propana dalam oksigen berlebihan.*



What is the volume of carbon dioxide gas produced when 48 cm³ of propane is completely burnt?

[Molar volume of gas = 24 dm³ mol⁻¹ at room temperature]

Apakah isi padu gas karbon dioksida yang terhasil apabila 48 cm³ propana terbakar dengan lengkap?

[Isi padu molar gas = 24 dm³ mol⁻¹ pada suhu bilik]

- A 28 cm³
- B 48 cm³
- C 96 cm³
- D 144 cm³

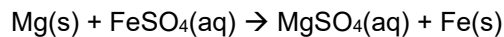
409. What is the correct functional group for the following homologous series?

Apakah kumpulan berfungsi yang betul bagi siri homolog berikut?

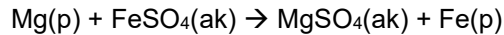
	Homologous series <i>Siri Homolog</i>	Functional group <i>Kumpulan Berfungsi</i>
A	Ester <i>Ester</i>	$\begin{array}{c} \text{O} \\ \\ -\text{C}-\text{O}- \end{array}$
B	Alkane <i>Alkana</i>	$\begin{array}{c} \\ -\text{C}=\text{C}- \end{array}$
C	Alcohol <i>Alkohol</i>	$\begin{array}{c} \text{O} \\ \\ -\text{C}-\text{OH} \end{array}$
D	Carboxylic acid <i>Asid karboksilik</i>	- OH

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410. The following equation represents the reaction between magnesium and iron(II) sulphate solution.



Persamaan berikut mewakili tindak balas antara magnesium dan larutan ferum(II) sulfat.



Which of the following definitions is correct regarding the heat of reaction?

Antara takrifan berikut, yang manakah betul tentang haba tindak balas tersebut?

- A Heat is absorbed when one mol of iron(II) ions change to ferum atoms
Haba diserap apabila satu mol ion ferum(II) berubah kepada atom ferum
- B Heat is absorbed when one mol of magnesium sulphate is formed from its ions
Haba diserap apabila satu mol magnesium sulfat dihasilkan daripada ionnya
- C Heat is released when one mol of magnesium sulphate is formed in the reaction
Haba dibebaskan apabila satu mol magnesium sulfat dihasilkan dalam tindak balas tersebut
- D Heat is released when one mol of iron(II) ions is displaced from iron(II) sulphate solution
Haba dibebaskan apabila satu mol ion ferum(II) disesarkan daripada larutan ferum(II) sulfat

411. Table 411 shows the temperature change when silver nitrate solution reacts with different chloride solutions.

Jadual 411 menunjukkan perubahan suhu apabila larutan argentum nitrat bertindak balas dengan larutan klorida yang berlainan.

Reactants Bahan tindak balas	Temperature change (°C) Perubahan suhu(°C)
50 cm ³ of 1.0 mol dm ⁻³ silver nitrate solution + 50 cm ³ of 1.0 mol dm ⁻³ sodium chloride solution 50 cm ³ larutan argentum nitrat 1.0 mol dm ⁻³ + 50 cm ³ larutan natrium klorida 1.0 mol dm ⁻³	θ
50 cm ³ of 1.0 mol dm ⁻³ silver nitrate solution + 50 cm ³ of 1.0 mol dm ⁻³ potassium chloride solution larutan argentum nitrat 1.0 mol dm ⁻³ + 50 cm ³ larutan kalium klorida 1.0 mol dm ⁻³	x

Table 411 / Jadual 411

What is x?

Apakah x?

- A $\frac{1}{2} \theta$
- B θ
- C 2θ
- D 4θ

412. Diagram 412 shows an energy level diagram.
Rajah 412 menunjukkan satu rajah aras tenaga.

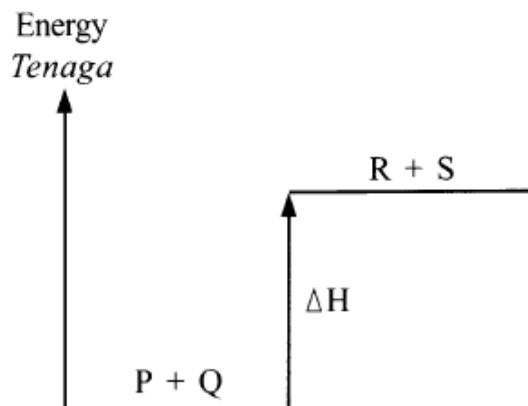


Diagram 412 / Rajah 412

- Which statement is correct about the energy level diagram?
Pernyataan 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

413. Which reaction is endothermic?
Tindak balas manakah adalah endotermik?

- | | |
|-------------------------------------|--|
| A Combustion
<i>Pembakaran</i> | C Neutralisation
<i>Peneutralan</i> |
| B Displacement
<i>Penyesaran</i> | D Decomposition
<i>Penguraian</i> |

414. Apabila bahan X ditambah ke dalam air suling, tindak balas endotermik berlaku. Apakah bahan X?
When substance X is added to distilled water, an endothermic reaction occurs. What is substance X?

- | | |
|--|---|
| A Potassium oxide
<i>Kalium oksida</i> | C Sodium hydroxide
<i>Natrium hidroksida</i> |
| B Calcium chloride
<i>Kalsium klorida</i> | D Ammonium nitrate
<i>Ammonium nitrat</i> |

415 Rajah 415 menunjukkan aras tenaga untuk tindak balas pemendakan argentum klorida.
Diagram 415 shows an energy level for the precipitation reaction of silver chloride.

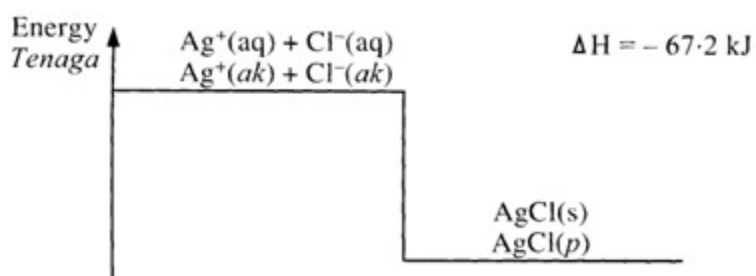


Diagram 415 / Rajah 415

What is the heat released when 14.35 g of silver chloride is formed?

[Relative atomic mass : Cl = 35.5, Ag = 108]

Berapakah haba yang dibebaskan apabila 14.35 g argentum klorida terbentuk?

[Jisim atom relatif: Cl = 35.5, Ag = 108]

- A 0.672 kJ
- B 6.72 kJ
- C 67.2 kJ
- D 672.0 kJ

416. Rajah 416 menunjukkan pemerhatian bagi satu eksperimen.

Diagram 416 shows the observation of an experiment.

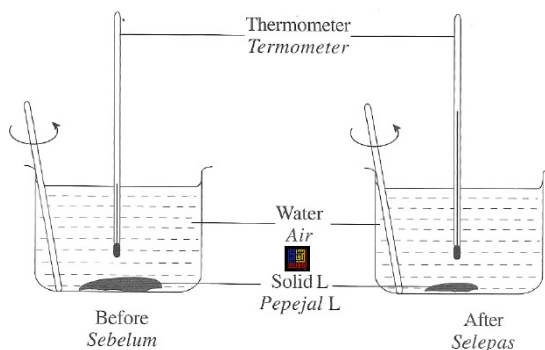


Diagram 416 / Rajah 416

What is L?

Apakah L?

- A Ammonium chloride
Ammonium klorida
- B Sodium thiosulphate
Natrium tiosulfat
- C Potassium nitrate
Kalium nitrat
- D Calcium oxide
Kalsium oksida

417. *Rajah 417 menunjukkan formula struktur satu sebatian T.*
Diagram 417 shows the structural formula of compound T.

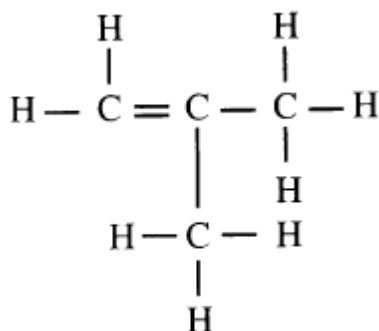


Diagram / *Rajah* 417

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 % |

418. 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> |

419. Which of the following absorbs heat?

Antara yang berikut, yang manakah menyerap haba?

- A Water → steam
 Air → *stirn*
- B Liquid sulphur → solid sulphur
 Cecair sulfur → *pepejal sulfur*
- C Hydrogen + nitrogen → ammonia
 Hidrogen + nitrogen → *ammonia*
- D Magnesium + hydrochloric acid → magnesium chloride + hydrogen
 Magnesium + asid hidroklorik → *magnesium klorida + hidrogen*

420. Diagram 420 shows an energy level of a reaction.
Rajah 420 menunjukkan aras tenaga bagi satu tindak balas.

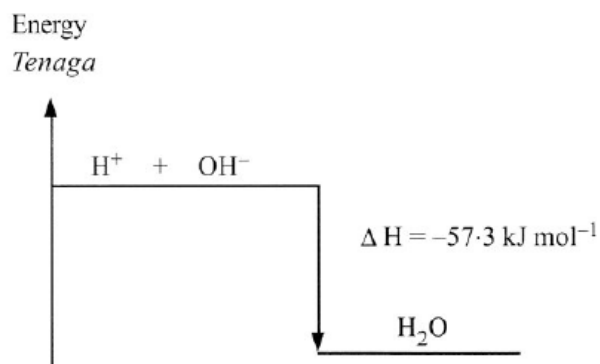


Diagram 420 / Rajah 420

What is the type of the reaction?
Apakah jenis tindak balas itu?

- A Endothermic
Endotermik
- B Exothennic
Eksotermik
- C Oxidation
Pengoksidaan
- D Reduction
Penurunan

421. Maklumat berikut menunjukkan keputusan bagi suatu eksperimen untuk menentukan haba pembakaran bahan api X.

The following information shows the results of an experiment to determine the heat of combustion of fuel X.

Jisim bahan api X yang terbakar = 18.0 g

Mass of fuel X burnt = 18.0 g

Isi padu air dalam bekas kuprum = 250.0 cm³

Volume of water in the copper container = 250.0 cm³

Peningkatan suhu = 16.0 °C

Increase in temperature = 16.0 °C

Berapakah haba pembakaran bahan api X?

[Jisim molar bahan api X = 180 g mol⁻¹;

Muatan haba tentu air = 4.2 J g⁻¹ °C⁻¹; ketumpatan air = 1.0 g cm⁻³]

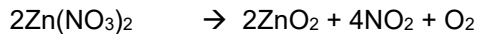
What is the heat of combustion of fuel X?

[Molar mass of fuel X = 180 g mol⁻¹;

Specific heat capacity of water = 4.2 J g⁻¹ °C⁻¹; Density of water = 1.0 g cm⁻³]

- A -1.68 kJ mol⁻¹
- B -18.00 kJ mol⁻¹
- C -168.00 kJ mol⁻¹
- D -180.00 kJ mol⁻¹

422. Persamaan berikut mewakili tindak balas penguraian zink nitrat.
The following equation represents the decomposition reaction of zinc nitrate.



Berapakah isi padu maksimum gas nitrogen dioksida yang terbebas pada suhu dan tekanan piawai (STP) apabila 18.9 g zink nitrat dipanaskan?

[Jisim formula relatif: $\text{Zn}(\text{NO}_3)_2 = 189 \text{ g mol}^{-1}$; Isi padu molar gas pada STP = $22.4 \text{ dm}^3 \text{ mol}^{-1}$]

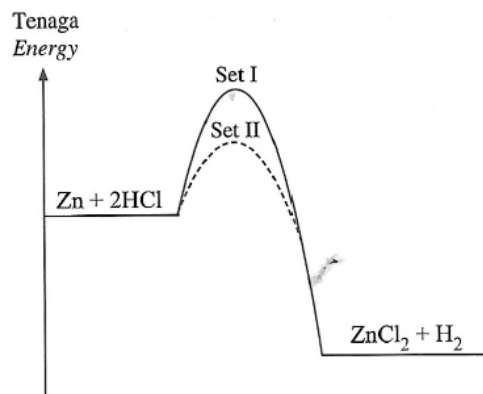
What is the maximum volume of nitrogen dioxide gas released at standard temperature and pressure (STP) when 18.9 g of zinc nitrate was heated?

[Relative formula mass: $\text{Zn}(\text{NO}_3)_2 = 189 \text{ g mol}^{-1}$; Molar volume of gas at STP = $22.4 \text{ dm}^3 \text{ mol}^{-1}$]

- A 1.12 dm³ C 3.36 dm³
B 2.24 dm³ D 4.48 dm³

423. Rajah 423 menunjukkan suatu gambar rajah aras tenaga yang diperolehi daripada dua set eksperimen.

Diagram 423 shows energy profile diagram that obtained from two sets of experiment.



Rajah 423 / Diagram 423

Antara yang berikut, pernyataan manakah yang betul tentang Set I dan Set II?
Which of the following statements are correct about Set I and Set II?

	Set I	Set II
A	Tindak balas membebaskan haba tanpa kehadiran mangkin The reaction releases heat without the presence of catalyst	Tindak balas membebaskan haba dengan kehadiran mangkin The reaction releases heat with the presence of catalyst
B	Tindak balas membebaskan haba dengan kehadiran mangkin The reaction releases heat with the presence of catalyst	Tindak balas membebaskan haba tanpa kehadiran mangkin The reaction releases heat without the presence of catalyst
C	Tindak balas menyerap haba dengan kehadiran mangkin The reaction absorbs heat with the presence of catalyst	Tindak balas menyerap haba tanpa kehadiran mangkin The reaction absorbs heat without the presence of catalyst
D	Tindak balas menyerap haba tanpa kehadiran mangkin The reaction absorbs heat without the presence of catalyst	Tindak balas menyerap haba dengan kehadiran mangkin The reaction absorbs heat with the presence of catalyst

424. Diagram 424 shows the change in thermometer readings for a reaction that occurs when two different substances are mixed.

Rajah 424 menunjukkan perubahan bacaan termometer bagi satu tindak balas yang berlaku apabila dua bahan berbeza dicampur.

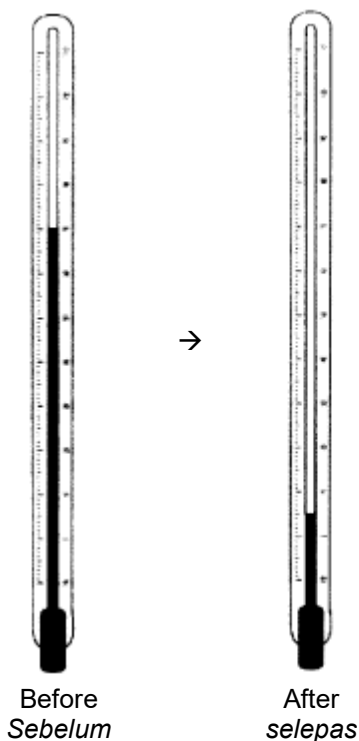


Diagram 424 / Rajah 424

What are the substances?
Apakah bahan tersebut?

- | | | | |
|---|---|---|---|
| A | HNO_3 and NaOH
<i>HNO_3 dan NaOH</i> | C | NaHCO_3 and HCl
<i>NaHCO_3 dan HCl</i> |
| B | NaCl and AgNO_3
<i>NaCl dan AgNO_3</i> | D | CuSO_4 and BaCl_2
<i>CuSO_4 dan BaCl_2</i> |

425. Given that heat of combustion of ethanol is $-1\,376\text{ kJ mol}^{-1}$.

What is the fuel value of ethanol?

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

Diberi haba pembakaran etanol ialah -1376 kJ mol^{-1} .

Berapakah nilai bahan api bagi etanol?

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

- A 18.6 kJ g^{-1}
- B 22.9 kJ g^{-1}
- C 29.9 kJ g^{-1}
- D 31.3 kJ g^{-1}

426. Diagram 426 shows the set-up of apparatus to determine the heat of precipitation of silver chloride. *Rajah 426 menunjukkan susunan radas bagi menentukan haba pemendakan argentum klorida.*

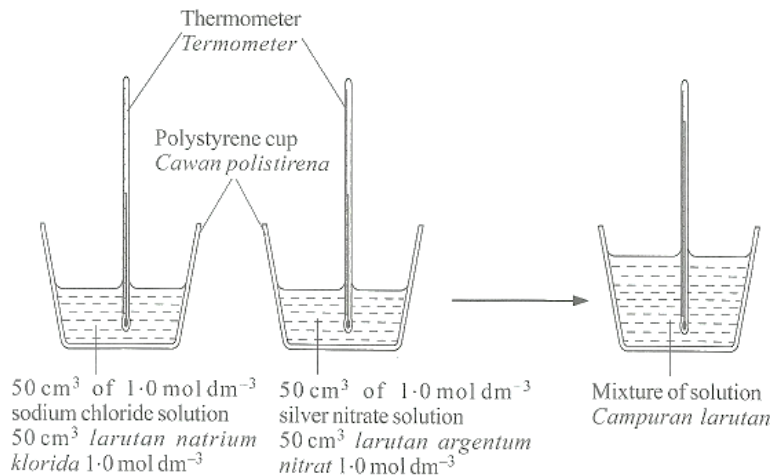


Diagram 426 / Rajah 426

The temperature of the mixture rises by 5 °C. Which solution can be used to replace sodium chloride solution to get the same rise in temperature?

Suhu campuran meningkat sebanyak 5 °C. Larutan manakah boleh digunakan bagi menggantikan larutan natrium klorida bagi mendapatkan kenaikan suhu yang sama?

- A 50 cm³ of 1.0 mol dm⁻³ of potassium chloride solution
50 cm³ larutan kalium klorida 1.0 mol dm⁻³
- B 50 cm³ of 1.0 mol dm⁻³ magnesium chloride solution
50 cm³ larutan magnesium klorida 1.0 mol dm⁻³
- C 50 cm³ of 1.0 mol dm⁻³ barium chloride solution
50 cm³ larutan barium klorida 1.0 mol dm⁻³
- D 50 cm³ of 1.0 mol dm⁻³ aluminium chloride solution
50 cm³ larutan aluminium klorida 1.0 mol dm⁻³

427. Excess zinc powder is added to 20.0 cm³ of 0.1 mol dm⁻³ silver nitrate solution. The temperature of the mixture increases by 10.0 °C. What is the heat of displacement of silver by zinc?

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

Serbuk zink berlebihan ditambahkan kepada 20.0 cm³ larutan argentum nitrat 0.1 mol dm⁻³. Suhu campuran meningkat sebanyak 10.0 °C. Berapakah haba penyesaran bagi argentum oleh zink?

[Muatan haba tentu larutan = 4.2 J g⁻¹ °C⁻¹]

- A - 210 kJ mol⁻¹
- B - 420 kJ mol⁻¹
- C - 840 kJ mol⁻¹
- D - 1 680 kJ mol⁻¹

428. The heat of combustion obtained from an experiment is normally less than the theoretical value. Which precaution can be taken to increase the accuracy of the result?

Haba pembakaran yang diperolehi daripada eksperimen biasanya kurang daripada nilai teori. Langkah berjaga-jaga manakah yang boleh diambil untuk meningkatkan ketepatan keputusan ini?

- A Light the wick before placing the lamp under the container
Nyalakan sumbu sebelum meletakkan pelita di bawah bekas
- B Stir the water continuously throughout the experiment
Kacau air berterusan sepanjang eksperimen
- C Heat the water in a glass beaker
Panaskan air dalam bikar kaca
- D Weigh the lamp when it is cold
Timbang pelita apabila ia sejuk

429. Diagram 429 shows the apparatus set-up for an experiment to determine the heat of combustion of a fuel.

Rajah 429 menunjukkan susunan radas bagi eksperimen untuk menentukan haba pembakaran suatu bahan api.

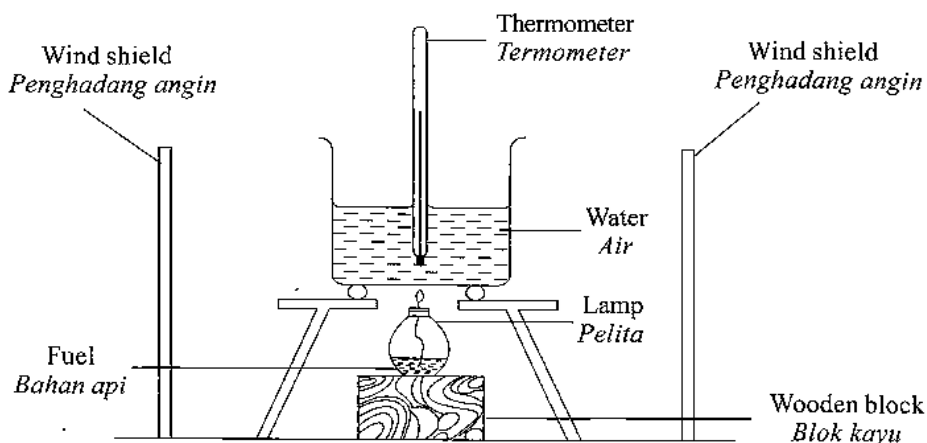


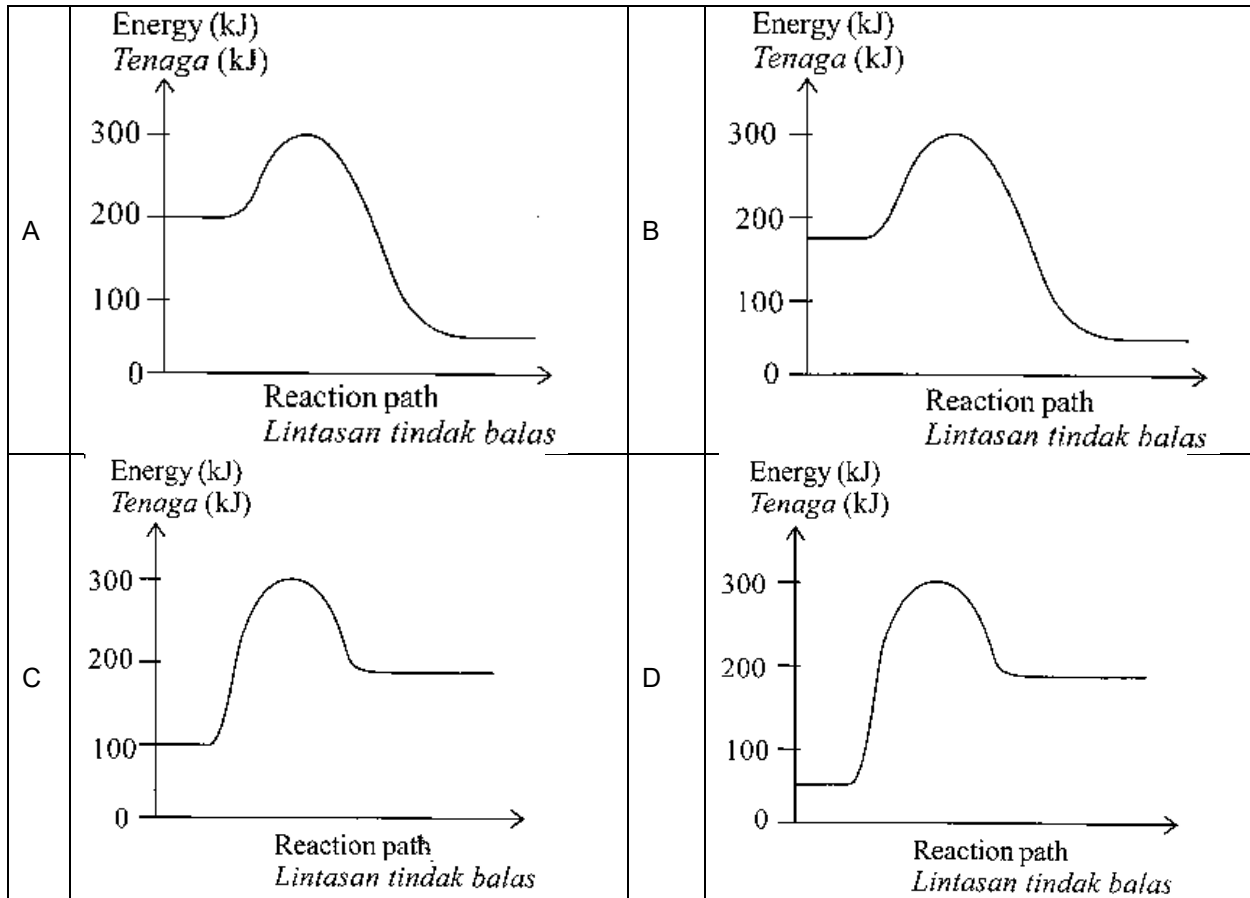
Diagram 429 / Rajah 429

Which of the following are used to determine the heat released of the fuel?

Antara yang berikut, yang manakah digunakan untuk menentukan haba terbebas bahan api tersebut?

- | | |
|---|--|
| I Rise of water temperature
<i>Kenaikan suhu air</i> | III Mass of water
<i>Jisim air</i> |
| II Density of fuel
<i>Ketumpatan bahan api</i> | IV Volume of fuel
<i>Isi padu bahan api</i> |
| A I and II
<i>I dan II</i> | C II and IV
<i>II dan IV</i> |
| B I and III
<i>I dan III</i> | D III and IV
<i>III dan IV</i> |

430. Which energy profile diagram shows the lowest activation energy?
 Rajah profil tenaga manakah yang menunjukkan tenaga pengaktifan paling rendah?



431. Diagram 431 shows an energy profile for manufacturing ammonia through Haber process.
 Rajah 431 menunjukkan profil tenaga bagi pembuatan ammonia melalui proses Haber.

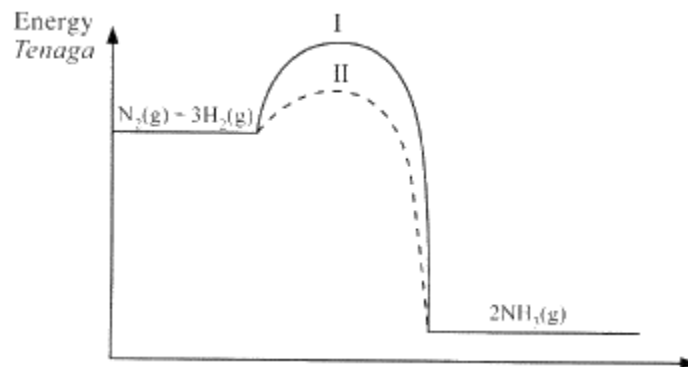


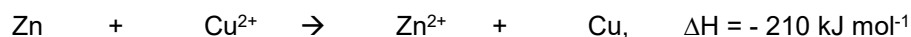
Diagram 431
Rajah 431

What is the change needed to be done to get curve II from curve I?
 Apakah perubahan yang perlu dilakukan untuk mendapatkan lengkung II daripada lengkung I?

- A The mixture is passed through layers of iron
Campuran dilalukan melalui lapisan besi
- B The mixture is cooled to produce ammonia in liquid form
Campuran disejukkan untuk menghasilkan ammonia dalam bentuk cecair
- C The mixture is compressed to pressure of 200 atmosphere
Campuran dimampatkan sehingga tekanan 200 atmosfera
- D The mixture is heated to temperature of 450 °C
Campuran dipanaskan sehingga suhu 450 °C

432. The following thermochemical equation shows a displacement reaction. Based on the equation, which statement is correct?

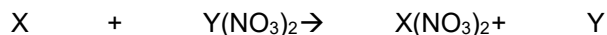
Persamaan termokimia berikut menunjukkan tindak balas penyesaran. Berdasarkan persamaan itu, pernyataan manakah yang betul?



- A The reaction is endothermic
Tindak balas adalah endotermik
- B The activation energy is 210 kJ mol⁻¹
Tenaga pengaktifan ialah 210 kJ mol⁻¹
- C The temperature of the mixture increases
Suhu campuran meningkat
- D The total energy of the reactants is lower than the products
Jumlah tenaga bahan tindak balas adalah lebih rendah daripada hasil tindak balas

433. The following equation shows the displacement of metal Y from its salt solution.

Persamaan berikut menunjukkan penyesaran logam Y daripada larutan garamnya.



What are metal X and metal Y?

Apakah logam X dan logam Y?

	X	Y
A	Zinc <i>Zink</i>	Magnesium <i>Magnesium</i>
B	Zinc <i>Zink</i>	Iron <i>Ferum</i>
C	Copper <i>Kuprum</i>	Magnesium <i>Magnesium</i>
D	Copper <i>Kuprum</i>	Iron <i>Ferum</i>

434. Apabila serbuk zink berlebihan ditambah kepada 25 cm³ larutan kuprum(II) sulfat 0.2 mol dm⁻³, suhu meningkat daripada 30 °C kepada 40 °C. Berapakah haba penyesaran bagi kuprum?

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

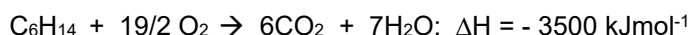
When excess zinc powder is added to 25 cm³ of 0.2 mol dm⁻³ copper(II) sulphate solution, the temperature increases from 30 °C to 40 °C. What is the heat of displacement of copper?

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

- A - 21 kJ mol⁻¹
- B - 42 kJ mol⁻¹
- C - 210 kJ mol⁻¹
- D - 420 kJ mol⁻¹

435.

Persamaan termokimia berikut menunjukkan tindak balas pembakaran antara heksana, C₆H₁₄ dan oksigen.
The following thermochemical equation shows a combustion reaction between hexane. C₆H₁₄ and oxygen.



What is the mass of hexane need to be burnt to produce heat that can heat up 2 kg of water from 25 °C to 100 °C?

[Relative atomic mass : C=12, H=1; specific heat capacity of water = 4.2 Jg⁻¹ °C⁻¹]

Berapakah jisim heksana yang perlu dibakar untuk menghasilkan haba yang dapat memanaskan 2 kg air daripada 25 °C ke 100 °C?

[Jisim atom relatif : C =12, H =1; Muatan haba tentu air = 4.2 J g⁻¹ °C⁻¹]

- A 5.16 g
- B 5.56 g
- C 15.48 g
- D 16.67 g

436. 100 cm³ of water is heated by the burning of a sample of ethanol. The heat released by the combustion is 10.5 kJ. What is the maximum increases in temperature of the water? [Specific heat capacity of water = 4.2 J g⁻¹ °C⁻¹]

100 cm³ air dipanaskan dengan pembakaran suatu sampel etanol. Haba dibebaskan daripada pembakaran itu ialah 10.5 kJ. Berapakah kenaikan maksimum suhu air itu?

[Muatan haba tentu air = 4.2 J g⁻¹ °C⁻¹]

- | | |
|------------|----------|
| A 0.025 °C | C 2.5 °C |
| B 0.25 °C | D 25 °C |

44. What is the meaning of heat of neutralization?

Apakah maksud haba peneutralan?

- A The heat absorbed when acid reacts with an alkali
Haba yang diserap apabila asid bertindak balas dengan alkali
- B The heat released when acid reacts with alkali
Haba yang dibebaskan apabila asid bertindak balas dengan alkali
- C The heat change when one mole of water is formed from the reaction between acid and alkali
Perubahan haba apabila satu mol air terbentuk daripada tindak balas antara asid dengan alkali
- D The heat change when one mole of salt is formed from the reaction between acid and alkali
Perubahan haba apabila satu mol garam terbentuk daripada tindak balas antara asid dengan alkali

437. Which statement is correct about exothermic reaction?

Pernyataan manakah yang betul mengenai tindak balas eksotermik?

- A The heat absorbed during bond breaking is more than the heat released during bond formation
Haba yang diserap semasa pemecahan ikatan adalah lebih daripada haba yang dibebaskan semasa pembentukan ikatan.
- B The heat absorbed during bond breaking is less than the heat released during bond formation
Haba yang diserap semasa pemecahan ikatan adalah kurang daripada haba yang dibebaskan semasa pembentukan ikatan
- C The heat absorbed during bond breaking is equal to the heat released during bond formation
Haba yang diserap semasa pemecahan ikatan adalah sama dengan haba yang dibebaskan semasa pembentukan ikatan
- D No heat is absorbed or released during bond breaking and bond formation
Tiada haba diserap atau dibebaskan semasa pemecahan ikatan dan pembentukan ikatan

438. A group of students visit a rubber estate. They want to bring back the latex for conducting their experiment in the school laboratory. Which substance can prevent coagulation of latex?

Sekumpulan pelajar melawat estet getah. Mereka hendak membawa pulang lateks untuk menjalankan eksperimen di dalam makmal sekolah. Bahan manakah boleh mengelakkan penggumpalan lateks?

- A Ethanol
Etanol
- B Methanoic acid
Asid metanoik
- C Sodium chloride
Natrium klorida
- D Ammonium hydroxide
Ammonium hidroksida

439. The following equation represents the reaction between 100 cm³ of 1.0 mol dm⁻³ sulphuric acid and excess sodium carbonate.

Persamaan berikut mewakili tindak balas antara 100 cm³ asid sulfurik 1.0 mol dm⁻³ dan natrium karbonat berlebihan.



What is the volume of carbon dioxide released at standard temperature and pressure?

[Molar volume of gas at standard temperature and pressure = 22.4 dm³ mol⁻¹]

Berapakah isi padu karbon dioksida yang terbebas pada suhu dan tekanan piawai [Isi padu molar gas pada suhu dan tekanan piawai = 22.4 dm³ mol⁻¹]

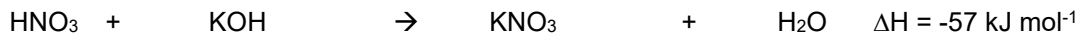
- A 1.12 dm³
- B 2.24 dm³
- C 4.48 dm³
- D 22.4 dm³

440. Tindak balas antara kalsium karbonat berlebihan dan asid hidroklorik menghasilkan 20 cm³ karbon dioksida dalam 10 s. Tindak balas adalah lengkap dalam 1 minit dan isi padu maksimum karbon dioksida yang diperolehi ialah 40 cm³. Apakah kadar tindak balas purata pada 10 s?

The reaction between excess calcium carbonate and hydrochloric acid produces 20 cm³ of carbon dioxide in 10 s. The reaction is completed in 1 minute and the maximum volume of carbon dioxide obtained is 40 cm³. What is the average rate of reaction at 10 s?

- A 4.0 cm³ s⁻¹
- B 2.0 cm³ s⁻¹
- C 0.7 cm³ s⁻¹
- D 0.3 cm³ s⁻¹

441. Persamaan termokimia mewakili tindak balas antara asid nitrik dan larutan kalium hidroksida. The thermochemical equation represents the reaction between nitric acid and potassium hydroxide solution.

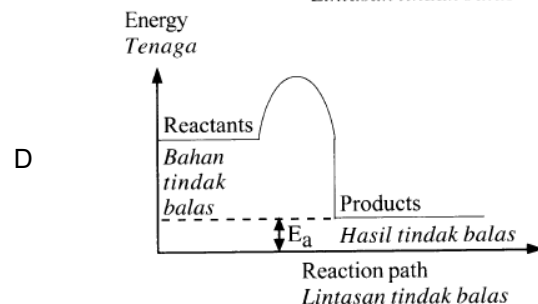
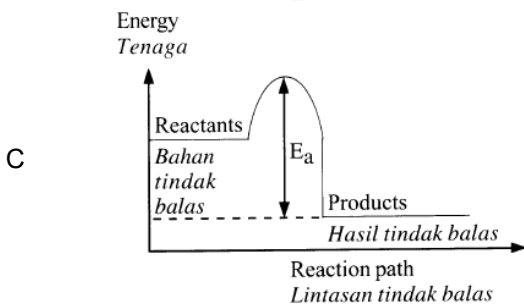
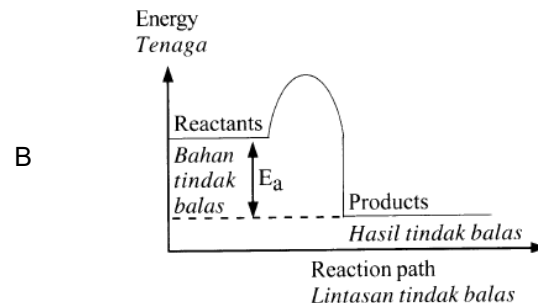
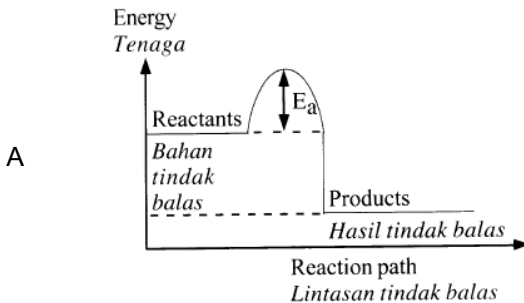


Berapakah haba yang terbebas apabila 50 cm³ asid nitrik 2.0 mol dm⁻³ ditambahkan kepada 25 cm³ larutan kalium hidroksida 2.0 mol dm⁻³?

What is the heat released when 50 cm³ of 2.0 mol dm⁻³ nitric acid is added to 25 cm³ of 2.0 mol dm⁻³ potassium hydroxide solution?

- A 2.85 kJ
- B 5.70 kJ
- C 11.40 kJ
- D 57.00 kJ

442. Which diagram shows the correct label of activation energy, E_a?
Rajah manakah menunjukkan label tenaga pengaktifan, E_a yang betul?



443. Which of the following is correct about an endothermic reaction?
Antara yang berikut, yang manakah betul tentang suatu tindak balas endotermik?

- A Total energy content of product is lower than total energy content of reactant
Jumlah kandungan tenaga hasil tindak balas adalah lebih rendah daripada jumlah kandungan tenaga bahan tindak balas
- B Heat is released to the surroundings
Haba dibebaskan ke persekitaran
- C Heat of reaction value is negative
Nilai haba tindak balas adalah negatif
- D The container becomes cold
Bekas menjadi sejuk

444. Which statement is not correct about latex?
Pernyataan 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

446. Diagram 446 shows the thermometer readings when excess magnesium powder is added to 50 cm³ of 0.5 mol dm⁻³ copper(II) chloride solution in a polystyrene cup.

Rajah 446 menunjukkan bacaan termometer apabila serbuk magnesium berlebihan ditambah kepada 50 cm³ larutan kuprum(II) klorida 0.5 mol dm⁻³ dalam cawan polisterina.

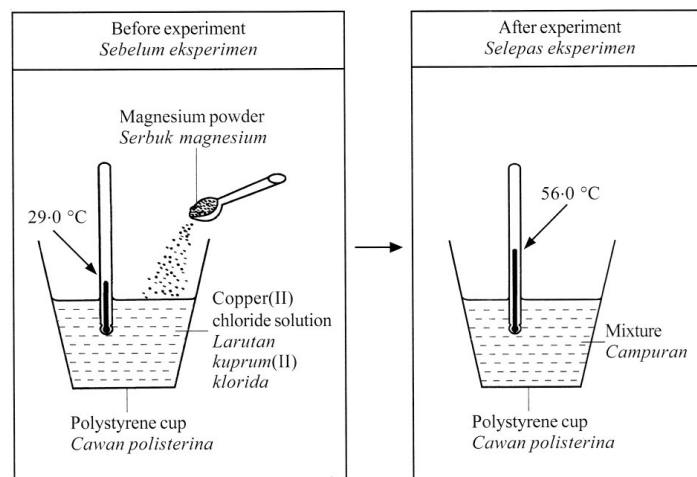


Diagram 446 / Rajah 446

What is the heat of displacement for the reaction?

[Specific heat capacity of water = $4.2 \text{ Jg}^{-1}\text{C}^{-1}$; Density of water = 1.0 g cm^{-3}]

Berapakah baba penyesaran bagi tindak balas itu?

[Muatan haba tentu air = $4.2 \text{ Jg}^{-1}\text{C}^{-1}$; Ketumpatan air = 1.0 g cm^{-3}]

- | | | | |
|---|-----------------------------|---|------------------------------|
| A | - 226.8 kJmol^{-1} | C | - 470.4 kJmol^{-1} |
| B | - 243.6 kJmol^{-1} | D | - 5670.0 kJmol^{-1} |

447. Which reaction is endothermic?

Tindak balas manakah adalah endotermik?

- | | | | |
|---|--------------------------------------|---|------------------------------------|
| A | Combustion
<i>Pembakaran</i> | B | Displacement
<i>Penyesaran</i> |
| C | Neutralisation
<i>Peneutralan</i> | D | Decomposition
<i>Penguraian</i> |

448. 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?

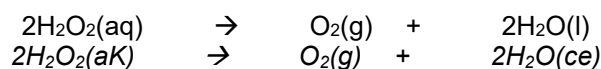
- | | | | |
|---|---|---|--|
| A | Protease
<i>Protease</i> | C | Sodium carbonate
<i>Natrium karbonat</i> |
| B | Sodium silicate
<i>Natrium silikat</i> | D | Fluorescent dyes
<i>Bahan pendarfluor</i> |

449. The heat of combustion obtained from an experiment is normally less than the theoretical value. Which precaution can be taken to increase the accuracy of the result?

Haba pembakaran yang diperolehi daripada eksperimen biasanya kurang daripada nilai teori. Langkah berjaga-jaga manakah yang boleh diambil untuk meningkatkan ketepatan keputusan ini?

- A Light the wick before placing the lamp under the container
Nyalakan sumbu sebelum meletakkan pelita di bawah bekas
- B Stir the water continuously throughout the experiment
Kacau air berterusan sepanjang eksperimen
- C Heat the water in a glass beaker
Panaskan air dalam bikar kaca
- D Weigh the lamp when it is cold
Timbang pelita apabila ia sejuk

450. The following equation represents the decomposition of hydrogen peroxide, H_2O_2 .
Persamaan berikut mewakili penguraian hidrogen peroksida, H_2O_2



2 g of manganese(IV) oxide, MnO_2 is added to hydrogen peroxide. What is the difference of adding manganese(IV) oxide to hydrogen peroxide compared to the decomposition without manganese(IV) oxide?

2 g mangan(IV) oksida, MnO_2 ditambah kepada hidrogen peroksida. Apakah perbezaan penambahan mangan(IV) oksida kepada hidrogen peroksida berbanding penguraian tanpa mangan(IV) oksida?

- A More heat is released
Lebih banyak haba terbebas
- B Total volume of oxygen becomes lower
Jumlah isi padu oksigen menjadi kurang
- C Concentration of hydrogen peroxide becomes higher
Kepekatan hidrogen peroksida menjadi lebih tinggi
- D Initial rate of decomposition of hydrogen peroxide becomes higher
Kadar awal penguraian hidrogen peroksida menjadi lebih tinggi

451. Which of the following is an example of endothermic reaction?
Antara yang berikut, yang manakah contoh bagi tindak balas endotermik?

- A Solid sodium hydroxide dissolved in distilled water
Pepejal natrium hidroksida dilarutkan dalam air suling
- B Solid ammonium nitrate dissolved in distilled water
Pepejal ammonium nitrat dilarutkan dalam air suling
- C Dilute hydrochloric acid added to silver nitrate solution
Asid hidroklorik cair ditambahkan kepada larutan argentum nitrat
- D Dilute hydrochloric acid added to potassium hydroxide solution
Asid hidroklorik cair ditambahkan kepada larutan kalium hidroksida

452. What is the food additive used to prevent crackers from turning rancid and changing its taste?
Apakah bahan tambah makanan yang digunakan untuk mencegah keropok daripada menjadi tengik dan berubah rasanya?

- A Stabiliser
Penstabil
- B Flavouring
Perisa
- C Antioxidant
Pengantioksida
- D Preservative
Pengawet

453. When 50.0 cm³ of 0.5 mol dm⁻³ silver nitrate solution is added to 50.0 cm³ of 0.5 mol dm⁻³ sodium chloride solution, temperature of the mixture rises 3.4 °C. What is the heat released in the experiment? [Specific heat capacity of solution, $c = 4.2 \text{ J g}^{-1} \text{ }^{\circ}\text{C}^{-1}$; Density of solution = 1 g cm⁻³]

Apabila 50.0 cm³ larutan argentum nitrat 0.5 mol dm⁻³ dicampurkan kepada 50.0 cm³ larutan natrium klorida 0.5 mol dm⁻³, suhu campuran meningkat sebanyak 3.4 °C. Berapakah haba yang dibebaskan dalam eksperimen itu?

[Muatan haba tentu larutan, $c = 4.2 \text{ J g}^{-1} \text{ }^{\circ}\text{C}^{-1}$; Ketumpatan larutan: 1 g cm⁻³]

- | | | | |
|---|---------|---|--------|
| A | 61.76 J | C | 1 428J |
| B | 714 J | D | 2 856J |

454. 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>

455. 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 |

456. Cold packs contain chemicals that react to absorb heat. Which substance is used in cold packs?

Pek sejuk mengandungi bahan kimia yang bertindak balas untuk menyerap haba. Bahan manakah yang digunakan dalam pek sejuk?

- | | | | |
|---|---|---|---|
| A | Calcium chloride
<i>Kalsium klorida</i> | C | Magnesium sulphate
<i>Magnesium sulfat</i> |
| B | Sodium carbonate
<i>Natrium karbonat</i> | D | Ammonium nitrate
<i>Ammonium nitrat</i> |

BAHAN BUATAN INDUSTRI , KIMIA KONSUMER DAN INDUSTRI & POLIMER

457. What is the function of penicillin?

Apakah fungsi penisilin?

- A Treats anxiety
Merawat kebimbangan
- B Relieves pain
Melegakan kesakitan
- C Retards the growth of bacteria
Merencatkan pertumbuhan bakteria
- D Controls the level of sugar in the blood
Mengawal tahap gula dalam darah

458. Which cation forms scum with soap?

Kation manakah yang membentuk kekat dengan sabun?

- | | | | |
|---|------------------|---|------------------------------|
| A | Na ⁺ | C | Al ³⁺ |
| B | Mg ²⁺ | D | NH ₄ ⁺ |

459. Diagram 459 shows the formation of acid rain in an industrial area.

Rajah 459 menunjukkan pembentukan hujan asid di kawasan perindustrian.

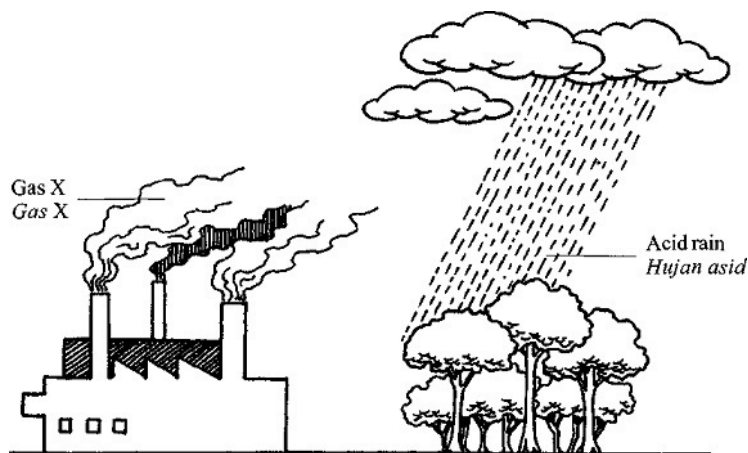


Diagram 459 / Rajah 459

What is gas X?

Apakah gas X?

- | | | | |
|---|-----------------------------|---|--|
| A | Nitrogen
<i>Nitrogen</i> | C | Sulphur dioxide
<i>Sulfur dioksida</i> |
| B | Ammonia
<i>Ammonia</i> | D | Hydrogen chloride
<i>Hidrogen klorida</i> |

460. Y is located in the same group as argon in the Periodic Table of Elements. Which of the following are the characteristics of Y?

Y terletak dalam kumpulan yang sama dengan argon dalam Jadual Berkala Unsur. Antara yang berikut, yang manakah ciri-ciri bagi Y?

- | | | | |
|-----|---|---|---------------------------------|
| I | A monoatomic particle
<i>Zarah monoatom</i> | | |
| II | Chemically inert
<i>Lengai secara kimia</i> | | |
| III | Liquid at room temperature
<i>Cecair pada suhu bilik</i> | | |
| IV | Conduct electricity
<i>Mengkonduksi elektrik</i> | | |
| A | I and II
<i>I dan II</i> | C | II and IV
<i>II dan IV</i> |
| B | I and III
<i>I dan III</i> | D | III and IV
<i>III dan IV</i> |

461. Which statement is correct about fats and oils?

Penyataan manakah yang betul mengenai lemak dan minyak?

- A Fats and oils are not important because lead to health problems
Lemak dan minyak tidak penting kerana membawa masalah kesihatan
- B Fats found in animals while oils found in plants
Lemak didapati dalam haiwan manakala minyak didapati dalam tumbuhan
- C Fats and oils are mixtures of organic acids and glycerol
Lemak dan minyak adalah campuran asid organik dan gliserol
- D Fats and oils are chemically different
Lemak dan minyak berbeza daripada segi kimia

462. Diagram 462 shows the preparation of a detergent.
Rajah 462 menunjukkan penyediaan detergen.

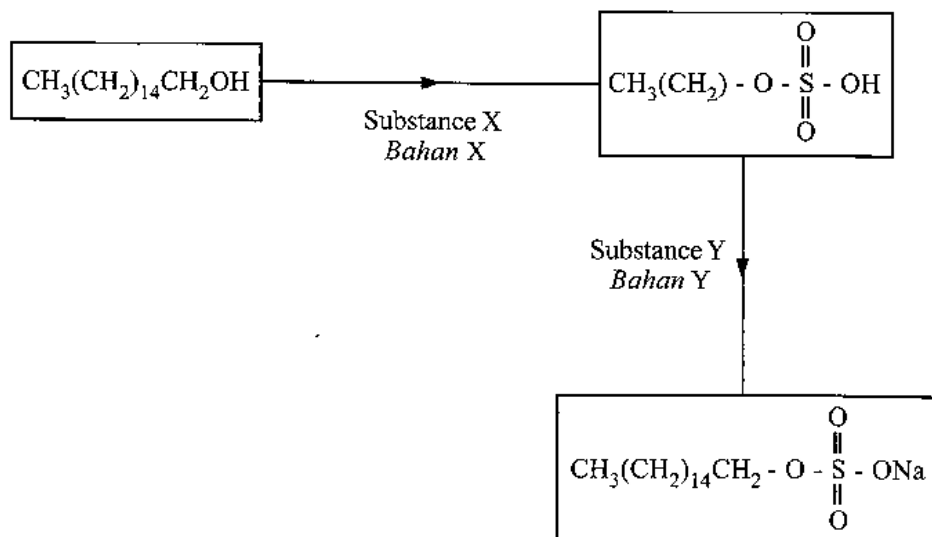


Diagram 462 / Rajah 462

What are substance X and substance Y?
Apakah bahan X dan bahan Y?

	Substance X <i>Bahan X</i>	Substance Y <i>Bahan Y</i>
A	Sulphur <i>Sulfur</i>	Sodium hydroxide solution <i>Larutan natrium hidroksida</i>
B	Sulphur <i>Sulfur</i>	Sodium chloride solution <i>Larutan natrium klorida</i>
C	Sulphuric acid <i>Asid sulfurik</i>	Sodium chloride solution <i>Larutan natrium klorida</i>
D	Sulphuric acid <i>Asid sulfurik</i>	Sodium hydroxide solution <i>Larutan natrium hidroksida</i>

463. Which pair of monomer and polymer is correct?
Pasangan monomer dan polimer manakah yang betul?

	Monomer <i>Monomer</i>	Polymer <i>Polimer</i>
A	Methyl methacrylate <i>Metil metakrilat</i>	Ethene <i>Etena</i>
B	Chloroethene <i>Kloroetena</i>	Polyvinyl chloride <i>Polivinil klorida</i>
C	Isoprene <i>Isoprena</i>	Polystyrene <i>Polistirena</i>
D	Propene <i>Propena</i>	Perspex <i>Perspeks</i>

464. What happens when natural rubber is vulcanized?

Apakah yang berlaku apabila getah asli divulkankan?

- A The melting point of rubber decreases
Takat lebur getah berkurangan
- B The vulcanised rubber is less resistant to heat
Getah tervulkan kurang rintangan terhadap haba
- C Rubber molecules slide more easily over each other
Molekul getah menggelongsor lebih mudah antara satu sama lain
- D Sulphur atoms form cross-links between rubber molecules
Atom sulphur membentuk pautan silang diantara molekul getah

465. Which pair is matched correctly?

Pasangan manakah yang dipadankan dengan betul?

	Alloy <i>Aloi</i>	Major component <i>Komponen utama</i>
A	Brass <i>Loyang</i>	Copper <i>Kuprum</i>
B	Pewter <i>Piuter</i>	Zinc <i>Zink</i>
C	Bronze <i>Gangsa</i>	Tin <i>Stanum</i>
D	Steel <i>Keluli</i>	Carbon <i>Karbon</i>

466. Ammonium sulphate is used as a fertilizer. What is the percentage by mass of nitrogen in ammonium sulphate?

[Relative atomic mass : H = 1; N = 14; O = 16; S = 32]

Ammonium sulfat digunakan sebagai baja. Berapakah peratusan nitrogen mengikut jisim dalam ammonium sulfat

[Jisim atom relatif: H = 1; N = 14; O = 16; S = 32]

- A 10.6 %
- B 12.3 %
- C 13.3 %
- D 21.2 %

467. Alloy of copper is harder than pure copper. Which statement is correct about the alloy?

Aloi bagi kuprum adalah lebih keras daripada kuprum tulen. Pernyataan manakah yang betul mengenai aloi itu?

- A Atoms are orderly arranged
Atom tersusun dengan teratur
- B Spaces between atoms decrease
Ruang kosong antara atom berkurang
- C Attractive forces between copper atoms decrease
Daya tarikan antara atom kuprum berkurang
- D Layers of copper atoms are more difficult to slide
Lapisan atom kuprum lebih sukar menggelongsor

468. Diagram 1 shows an example of food packaging.
Rajah 1 menunjukkan suatu contoh pembungkus makanan.



Diagram 468 / Rajah 468

Which of the following explains why the plastic packaging pollutes the environment?
Antara yang berikut, yang manakah menerangkan mengapa plastik pembungkus itu mencemarkan alam sekitar?

- I Not easily biodegradable
Tidak terbiodegradasi dengan mudah
 - II Releases poisonous gases
Membebaskan gas beracun
 - III Causes the formation of algae
Menyebabkan pembentukan alga
 - IV Causes blockage of drainage system and flash flood
Menyebabkan sistem perparitan tersumbat dan banjir kilat
- A I and II only
I dan II sahaja
 - B II and III only
II dan III sahaja
 - C I, II and IV only
I, II dan IV sahaja
 - D I, III and IV only
I, III dan IV sahaja

469. In order to produce a glass that is more resistant to heat and chemicals, substance X is added to soda lime glass in the manufacturing process. What is X?

Bagi menghasilkan kaca yang lebih tahan terhadap haba dan bahan kimia, bahan X ditambah ke dalam kaca soda kapur dalam proses pembuatannya. Apakah X?

- A Boron oxide
Boron oksida
- B Lead(II) oxide
Plumbum(II) oksida
- C Sodium carbonate
Natrium karbonat
- D Calcium carbonate
Kalsium karbonat

470. Which substance is a natural polymer?

Bahan manakah adalah polimer semulajadi?

- A Polythene
Politena
- B Polypropene
Polipropena
- C Polyisoprene
Poliisoprena
- D Polyvinyl chloride
Polivinil klorida

471. Which substance is a composite material?

Bahan manakah adalah bahan komposit?

- A Alloy
Aloi
- B Glass
Kaca
- C Ceramics
Seramik
- D Fibre glass
Gentian kaca

472. Why is sodium chloride used in the preparation of soap?
Mengapakah natrium klorida digunakan dalam penyediaan sabun?

- A To speed up the reaction to produce soap
Mempercepatkan tindak balas untuk menghasilkan sabun
- B To produce soap which foams easily
Menghasilkan sabun yang berbuih dengan mudah
- C To reduce solubility of soap
Mengurangkan keterlarutan sabun
- D To make soap softer.
Menjadikan sabun lebih lembut

473. Which alloy is correctly matched to its uses?
Aloi manakah yang dipadankan betul dengan kegunaannya?

	Alloy Aloi	Uses Kegunaan
A	Brass <i>Loyang</i>	Building of monument <i>Pembinaan tugu</i>
B	Bronze <i>Gangsa</i>	Making of surgical instrument <i>Pembuatan alatan pembedahan</i>
C	Stainless steel <i>Keluli nirkarat</i>	Making of medals <i>Pembuatan pingat</i>
D	Duralumin <i>Duralumin</i>	Making of the body of aeroplanes <i>Pembuatan badan kapal terbang</i>

474. Polymer, glass, alloy and composite material are some examples of manufactured substances in industry. Which statement is correct about these substances?
Polimer, kaca, aloi dan badan komposit adalah beberapa contoh bahan buatan dalam industri. Pernyataan manakah yang betul mengenai bahan-bahan ini?

- A A polymer is a large molecule formed by joining many monomers
Polimer ialah suatu molekul besar yang berbentuk dengan mencantumkan banyak monomer
- B Soda lime glass is able to withstand very high temperature
Kaca soda kapur boleh tahan suhu yang sangat tinggi
- C An alloy is a mixture of two or more non-metals in a fixed composition
Aloi ialah suatu campuran bagi dua atau lebih bukan logam dalam komposisi
- D A composite material is a substance which has low melting point
Bahan komposit ialah suatu bahan yang mempunyai takat lebur yang rendah

475. Digital communication plays a very important role in modern living. Effective transmission of data, voices and images in a digital format requires a suitable material. What is the material?
Komunikasi digital memainkan peranan yang sangat penting dalam kehidupan moden. Penghantaran data, suara dan imej secara berkesan dalam format digital memerlukan satu bahan yang sesuai. Apakah bahan itu?

- A Copper
Kuprum
- B Aluminium
Aluminium
- C Fibre optic
Gentian optik
- D Superconductor
Superkonduktor

476. Which statements are correct about soap and detergent?
Pernyataan manakah yang betul tentang sabun dan detergen?

	Soap Sabun	Detergent Detergen
A	Contains acid <i>Mengandungi acid</i>	Contains alkali <i>Mengandungi alkali</i>
B	Effective in hard water <i>Berkesan dalam air liat</i>	Less effective in hard water <i>Kurang berkesan dalam air liat</i>
C	Made from vegetable oil <i>Diperbuat daripada minyak sayuran</i>	Made from petroleum <i>Diperbuat daripada petroleum</i>
D	Does not form scum in hard water <i>Tidak membentuk kekat dalam air liat</i>	Forms scum in hard water <i>Membentuk kekat dalam air liat</i>

477. Which pair is correctly matched?
Pasangan manakah yang dipadankan dengan betul?

	Food additive Bahan tambah makanan	Example Contoh
A	Preservative <i>Pengawet</i>	Ascorbic acid <i>Asid askorbik</i>
B	Flavouring <i>Perisa</i>	Tartrazine <i>Tartrazina</i>
C	Antioxidant <i>Pengantioksida</i>	Aspartame <i>Aspartam</i>
D	Thickener <i>Pemekat</i>	Acacia gum <i>Gam akasia</i>

478. A rubber tapper finds that latex coagulates after several hours.

What substance should be added into the latex to prevent it from coagulating?

Seorang penoreh getah mendapati susu getah menggumpal selepas beberapa jam. Apakah bahan yang perlu ditambah ke dalam susu getah untuk mengelakkannya daripada menggumpal?

- A Sodium chloride solution
Larutan natrium klorida
- B Ammonia solution
Larutan ammonia
- C Ethanoic acid
Asid etanoik
- D Nitric acid
Asid nitrik

479. Which pair is correctly matched?

Pasangan manakah yang dipadankan dengan betul?

	Polymer <i>Polimer</i>	Monomer <i>Monomer</i>
A	Starch <i>Kanji</i>	Glucose <i>Glukosa</i>
B	Natural rubber <i>Getah asli</i>	Amino acid <i>Asid amino</i>
C	Protein <i>Protein</i>	Isoprene <i>Isoprena</i>
D	Polythene <i>Politena</i>	Propene <i>Propena</i>

480. Substance X slows down the spoilage of food caused by microorganisms. Food will turn bad easily without substance X. What is substance X?

Bahan X melambatkan kerosakan makanan disebabkan oleh mikroorganisma. Makanan akan mudah rosak tanpa bahan X. Apakah bahan X?

- A Stabilisers
Penstabil
- B Flavourings
Perisa
- C Antioxidants
Pengantioksida
- D Preservatives
Pengawet

481. Which statement is correct about cleansing action of soap?
Pernyataan manakah yang betul tentang tindakan pencucian bagi sabun?

- A The hydrophilic part of soap molecules dissolves in water
Bahagian hidrofilik molekul sabun larut dalam air
- B Increases the surface tension of water
Menambah ketegangan permukaan air
- C Soap molecules emulsify water
Molekul sabun mengemulsikan air
- D Reacts with acid to form salt
Bertindak balas dengan asid untuk membentuk garam

482. Sulphuric acid is manufactured in industry through the Contact Process involving three stages. Which stage is correct?
Asid sulfurik dihasilkan dalam industri melalui Proses Sentuh yang melibatkan tiga peringkat. Peringkat manakah yang betul?

- A Sulphur trioxide gas is dissolved in concentrated sulphuric acid
Gas sulfur trioksida dilarutkan dalam asid sulfurik pekat
- B Sulphur dioxide gas is dissolved in concentrated sulphuric acid
Gas sulfur dioksida dilarutkan dalam asid sulfurik pekat
- C Sulphur trioxide gas is dissolved in water
Gas sulfur trioksida dilarutkan dalam air
- D Sulphur dioxide gas is dissolved in water
Gas sulfur dioksida dilarutkan dalam air

483. Which substance coagulates latex?
Bahan manakah yang menggumpalkan lateks?

- A Ammonia
Ammonia
- B Formic acid
Asid formik
- C Sodium chloride
Natrium klorida
- D Sodium hydroxide
Natrium hidroksida

484. Which pair is correctly matched?

Pasangan manakah yang dipadankan dengan betul?

	Polymer <i>Polimer</i>	Monomer <i>Monomer</i>
A	Starch <i>Kanji</i>	Glucose <i>Glukosa</i>
B	Natural rubber <i>Getah asli</i>	Amino acid <i>Asid amino</i>
C	Protein <i>Protein</i>	Isoprene <i>Isoprena</i>
D	Polythene <i>Politena</i>	Propene <i>Propena</i>

485. Substance X slows down the spoilage of food caused by microorganisms. Food will turn bad easily without substance X. What is substance X?

Bahan X melambatkan kerosakan makanan disebabkan oleh mikroorganisma. Makanan akan mudah rosak tanpa bahan X. Apakah bahan X?

- A Stabilisers
Penstabil
- B Flavourings
Perisa
- C Antioxidants
Pengantioksida
- D Preservatives
Pengawet

486. Which statement is correct about cleansing action of soap?

Pernyataan manakah yang betul tentang tindakan pencucian bagi sabun?

- A The hydrophilic part of soap molecules dissolves in water
Bahagian hidrofilik molekul sabun larut dalam air
- B Increases the surface tension of water
Menambah ketegangan permukaan air
- C Soap molecules emulsify water
Molekul sabun mengemulsikan air
- D Reacts with acid to form salt
Bertindak balas dengan asid untuk membentuk garam

487. Which substance coagulates latex?

Bahan manakah yang menggumpalkan lateks?

- A Ammonia
Ammonia
- B Formic acid
Asid formik
- C Sodium chloride
Natrium klorida
- D Sodium hydroxide
Natrium hidroksida

488. Sulphuric acid, H_2SO_4 , is produced in industry through Contact Process. What is the catalyst used in Contact Process?

Asid sulfurik, H_2SO_4 , dihasilkan dalam industri melalui Proses Sentuh. Apakah mangkin yang digunakan dalam Proses Sentuh?

- A Iron
Besi
- B Platinum
Platinum
- C Vanadium(V) oxide
Vanadium(V) oksida
- D Manganese(IV) oxide
Manganat(IV) oksida

489. The molecular formulae of calcium nitrate and potassium phosphate are $Ca(NO_3)_2$ and K_3PO_4 respectively. What is the molecular formula of calcium phosphate?

Formula molekul bagi kalsium nitrat dan kalium fosfat adalah $Ca(NO_3)_2$ dan K_3PO_4 masing-masing. Apakah formula molekul bagi kalsium fosfat?

- A $CaPO_4$
- B Ca_2PO_4
- C $Ca_2(PO_4)_3$
- D $Ca_3(PO_4)_2$

490. Diagram 490 shows a pressure cooker.
Rajah 490 menunjukkan sebuah periuk tekanan.

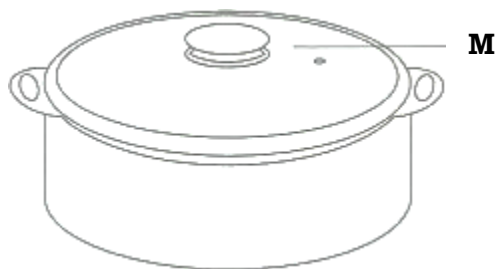


Diagram 490 / Rajah 490

What is substance M?
Apakah bahan M?

- | | | | |
|---|--|---|---|
| A | Lead glass
<i>Kaca plumbum</i> | C | Soda lime glass
<i>Kaca soda kapur</i> |
| B | Photochromic glass
<i>Kaca fotokromik</i> | D | Borosilicate glass
<i>Kaca borosilikat</i> |

491. Which statement explains why alloy is harder than pure metal?
Pernyataan manakah yang menerangkan mengapa aloi lebih keras daripada logam tulen?

- | | |
|---|--|
| A | Atom of other metal reacts with atom of pure metal
<i>Atom logam lain bertindak balas dengan atom logam tulen</i> |
| B | Atom of other metal reduces atom of pure metal from sliding
<i>Atom logam lain mengurangkan atom logam tulen daripada menggelongsor</i> |
| C | Bonds between atom in alloy is stronger
<i>Ikatan antara atom dalam aloi lebih kuat</i> |
| D | Density of alloy is higher
<i>Ketumpatan aloi lebih tinggi</i> |

491. What are the products formed when propane is burnt in excess oxygen?
Apakah bahan yang terhasil apabila propana terbakar dalam oksigen berlebihan?

- | | | | |
|----|-------------------------------|-----|--|
| I | Water
<i>Air</i> | III | Carbon dioxide
<i>Karbon dioksida</i> |
| II | Carbon
<i>Karbon</i> | IV | Carbon monoxide
<i>Karbon monoksida</i> |
| A | I and II
<i>I dan II</i> | C | II and IV
<i>II dan IV</i> |
| B | I and III
<i>I dan III</i> | D | III and IV
<i>III dan IV</i> |

492. What is the type of medicine for paracetamol?
Apakah jenis ubat bagi parasetamol?

- | | | | |
|---|-------------------------|---|--------------------------------|
| A | Stimulant
Stimulan | C | Antibiotics
Antibiotik |
| B | Analgesics
Analgesik | D | Antidepressant
Antidepresan |

493. What is the use of sulphuric acid?
Apakah kegunaan asid sulfurik?

- | | | | |
|---|--|---|---|
| A | Manufacture of paint
Pembuatan cat | C | Manufacture of ceramic
Pembuatan seramik |
| B | Manufacture of glass
Pembuatan kaca | D | Manufacture of water pipe
Pembuatan paip air |

494. Which of the following are the correct properties for vulcanized rubber and unvulcanized rubber?
Antara yang berikut, yang manakah sifat yang betul bagi getah tervulkan dan getah tak tervulkan?

	Vulcanized rubber Getah tervulkan	Unvulcanized rubber Getah tak tervulkan
I	Less elastic Kurang elastik	More elastic Lebih elastik
II	Hard Keras	Soft Lembut
III	Become more sticky when heated Menjadi lebih melekit apabila dipanaskan	Not sticky when heated Tidak melekit apabila dipanaskan
IV	Not easily oxidized Tidak mudah teroksida	Easily oxidized Mudah teroksida

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

495. A mother wants to bake a cake which is sweet and attractive in colour.
Which substance should be added into the cake?

Seorang ibu ingin membakar sebiji kek yang manis dan menarik warnanya. Bahan yang manakah perlu ditambah ke dalam kek?

- | | |
|---|--|
| A | Aspartame and tartrazine
Aspartam dan tartrazina |
| B | Aspartame and benzoic acid
Aspartam dan asid benzoik |
| C | Monosodium glutamate and tartrazine
Mononatrium glutamat dan tartrazina |
| D | Monosodium glutamate and benzoic acid
Mononatrium glutamat dan asid benzoik |

496. What is the effect of alloying pure gold?
Apakah kesan pengaloiian emas tulen?

- A Become less hard
Menjadi kurang keras
- B Easier to be shaped
Lebih mudah dibentuk
- C Easier to melt
Lebih mudah melebur
- D Does not corrode
Tidak terkakis

497. A food technologist intends to destroy bacteria that cause potatoes to rot using radioisotope. Which of the following is suitable to be used?

Seorang ahli teknologi makanan ingin memusnahkan bakteria yang merosakkan ubi kentang dengan menggunakan radio isotop. Antara yang berikut, yang manakah sesuai digunakan?

- | | |
|--------------------------|-------------------------------|
| A Carbon-14
Karbon-14 | C Phosphorus-32
Fosfont-32 |
| B Cobalt-60
Kobalt-60 | D Sodium-24
Natrium-24 |

498. 'Barium meal' is a barium sulphate salt which is given to a patient that suffer stomach ache. Which substances cannot be used to produce this salt?

'Barium meal' adalah garam barium sulfat yang diberikan kepada pesakit yang mengalami sakit perut. Bahan manakah yang tidak boleh digunakan untuk menghasilkan garam ini?

- A Barium chloride and sodium sulphate
Barium klorida dan natrium sulfat
- B Barium hydroxide and potassium sulphate
Barium hidroksida dan kalium sulfat
- C Barium carbonate and sodium sulphate
Barium karbonat dan natrium sulfat
- D Barium nitrate and potassium sulphate
Barium nitrat dan kalium sulfat

499. Pak Abu's leg was injured during loosening the soil in his farm. Pak Abu asked his son to take substance X from the store and mix it into a plastic bag containing water. His son shook the plastic bag and pressed it onto the injured part.

What is substance X?

Kaki Pak Abu terseliuh ketika sedang menggemburkan tanah di kebunnya. Pak Abu meminta anaknya untuk mengambil bahan X dari stor dan mencampurkannya ke dalam beg plastik yang mengandungi air. Anaknya menggoncangkan beg plastik itu dan menepak ke atas bahagian yang terseliuh.

Apakah bahan X itu?

- A Ammonium nitrate
Ammonium nitrat
- B Calcium chloride
Kalsium klorida
- C Calcium oxide
Kalsium oksida
- D Formic acid
Asid formik

500. Diagram 500 shows a beaker containing two layers of substances.
Rajah 500 menunjukkan sebuah bikar yang mengandungi dua lapisan bahan.

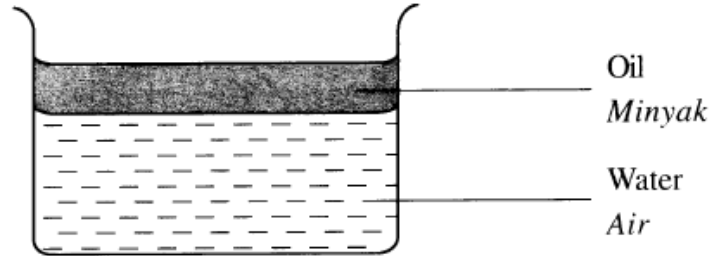


Diagram 500 / Rajah 500

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
<i>Penstabil</i> | C | Preservative
<i>Pengawet</i> |
| B | Antioxidant
<i>Pengantioksida</i> | D | Flavouring
<i>Perisa</i> |

501. A group of scouts go camping by the seashore. They have to do all their washings using sea water. What is the suitable substance for them to wash their clothes effectively?
Sekumpulan pengakap pergi berkhemah di tepi pantai. Mereka perlu menggunakan air laut untuk semua kerja pencucian. Bahan manakah yang sesuai untuk mencuci pakaian mereka dengan berkesan?

- | | | | |
|---|------------------------------|---|---------------------------------|
| A | Soap
<i>Sabun</i> | B | Bleach
<i>Peluntur</i> |
| C | Detergent
<i>Detergen</i> | D | Antiseptic
<i>Antiseptik</i> |

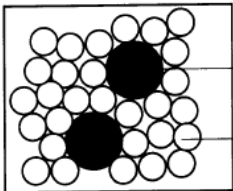
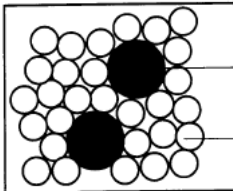
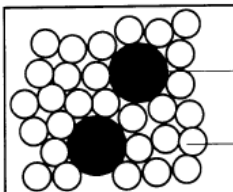
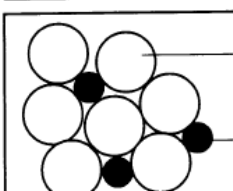
502. The following are the characteristics of substance needed to produce a new product in industry.
Berikut adalah ciri-ciri bahan yang diperlukan untuk menghasilkan satu produk baharu dalam industri.

- 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
<i>Seramik</i> | III | Fibre optic
<i>Gentian optik</i> |
| II | Superconductor
<i>Superkonduktor</i> | IV | Fibre glass
<i>Gentian kaca</i> |
| A | I and III
<i>I dan III</i> | C | II and III
<i>II dan III</i> |
| B | I and IV
<i>I dan IV</i> | D | II and IV
<i>II dan IV</i> |

503. 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 <i>Kuprum</i> Nickel <i>Nikel</i>
B		Tin <i>Timah</i> Copper <i>Kuprum</i>
C		Aluminium <i>Aluminium</i> Magnesium <i>Magnesium</i>
D		Iron <i>Ferum</i> Carbon <i>Karbon</i>

504. Diagram 504 shows the situation that Ameng has been experiencing for a long time.
Rajah 504 menunjukkan situasi dialami oleh Ameng untuk sekian lama.

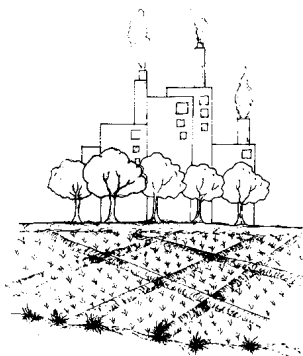


Diagram 504 / Rajah 504

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
<i>Garam biasa</i> | C | Rice husk
<i>Sekam padi</i> |
| B | Wood ash
<i>Abu kayu</i> | D | Lake water
<i>Air tasik</i> |

505. Table 505 shows the information of elements X, Y and Z.
Jadual 505 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>
Melting point (°C) <i>Takat lebur (°C)</i>	1285	650	839
Formula of chloride <i>Formula klorida</i>	XC_{12}	YCl_2	ZCl_2
Formula of oxide <i>Formula oksida</i>	XO	YO	ZO

Table 505 / Jadual 505

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

505. 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 505 / Rajah 505

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 conditions?

[Relative atomic mass: $\text{H} = 1$; $\text{N} = 14$; $\text{O} = 16$; $\text{Cr} = 52$;

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

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. $\text{H} = 1$; $\text{N} = 14$; $\text{O} = 16$; $\text{Cr} = 52$;

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 |

506. Which of the following is a composite material?

Antara yang berikut, yang manakah bahan komposit?

- | | | | |
|---|--|---|---------------------------------------|
| A | Soda lime glass
Kaca soda kapur | C | Lead crystal glass
Kaca plumbum |
| B | Borosilicate glass
Kaca borosilikat | D | Photochromic glass
Kaca fotokromik |

507. Silicon dioxide is a major component of glass.

What type of glass is formed when calcium carbonate is heated with silicon dioxide?

Silikon dioksida adalah komponen utama bagi kaca.

Apakah jenis kaca yang terbentuk apabila kalsium karbonat dipanaskan dengan silikon dioksida?

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

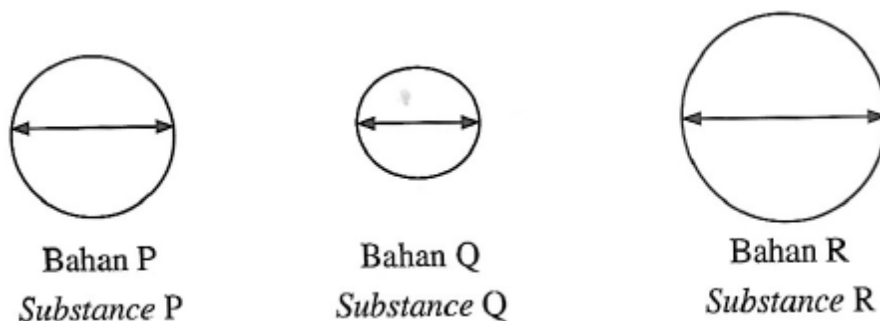
508. Piuter ialah campuran antara R, kuprum dan antimoni. Apakah R?

Pewter is a mixture of R, copper and antimony. What is R?

- | | | | |
|---|-----------------|---|--------------------|
| A | Plumbum
Lead | C | Argentum
Silver |
| B | Stanum
Tin | D | Karbon
Carbon |

509. Rajah 509 menunjukkan diameter lekuk yang terhasil dalam eksperimen untuk mengkaji kekerasan bagi tiga bahan P, Q dan R.

Diagram 509 shows the diameters of the dents which are produced in an experiment to investigate the hardness of three different substances P, Q and R.



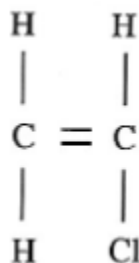
Rajah 509 / Diagram 509

Apakah P, Q dan R serta susunan kekerasan bahan dalam tertib menaik yang betul?

What are P, Q, R and the correct arrangement of hardness of the substances in ascending order ?

	P	Q	R	Susunan Arrangement
A	Keluli Steel	Kuprum Copper	Loyang Brass	R, P, Q
B	Loyang Brass	Keluli Steel	Kuprum Copper	R, P, Q
C	Keluli Steel	Loyang Brass	Kuprum Copper	Q, P, R
D	Loyang Brass	Kuprum Copper	Keluli Steel	Q, P, R

510. Rajah 510 menunjukkan formula struktur suatu monomer.
Diagram 510 shows a structural formula of a monomer.



Rajah 510 / Diagram 510

Antara yang berikut, yang manakah persamaan antara monomer tersebut dengan polimernya?
Which of the following is the similarity between the monomer and its polymer?

- A Formula molekul ialah $\text{C}_2\text{H}_3\text{Cl}$
Molecular formula is $\text{C}_2\text{H}_3\text{Cl}$
- B Mempunyai ikatan ganda dua antara atom-atom karbon
Have double bond between carbon atoms
- C Mempunyai atom karbon, atom hidrogen dan atom klorin
Contain carbon atom, hydrogen atom and chlorine atom
- D Bilangan atom karbon dalam molekul
Number of carbon atoms in the molecule

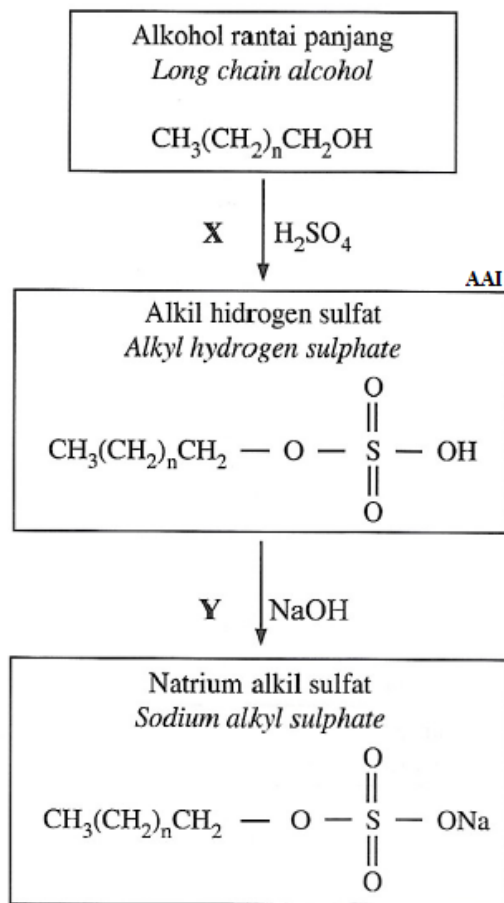
511. Bahan manakah mempercepatkan penggumpalan lateks?
Which substance speeds up the coagulation of latex?

- A Air
Water
- B Metanol
Methanol
- C Larutan ammonia
Ammonia solution
- D Asid metanoik
Methanoic acid

512. Bahan tambah makanan manakah dipadankan dengan betul dengan contohnya?
Which food additives is matched correctly with its example?

	Bahan tambah makanan Food additive	Contoh Example
A	Pengantioksida Antioxidants	Asid askorbik Ascorbic acid
B	Pewarna Colouring	Aspartam Aspartame
C	Pengawet Preservatives	Mononatrium glutamat Monosodium glutamate
D	Pemekat Thickeners	Sebatian azo Azo compound

513. Rajah 513 menunjukkan satu proses dalam penyediaan suatu detergen.
Diagram 513 shows a process in the preparation of a detergent.

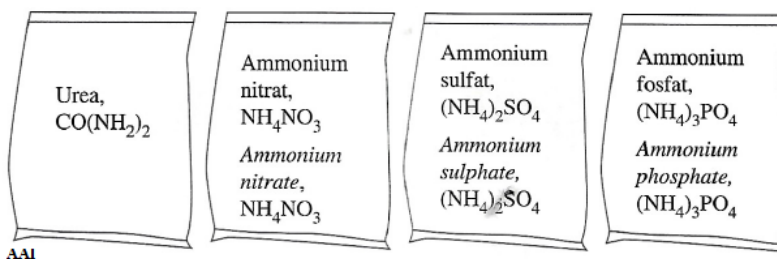


Rajah 513 / Diagram 513

Apakah tindak balas X dan Y?
What are reactions X and Y?

	X	Y
A	Pendehidratan Dehydration	Pensulfatan Sulphation
B	Pensulfatan Sulphation	Peneutralan Neutralisation
C	Peneutralan Neutralisation	Saponifikasi Saponification
D	Saponifikasi Saponification	Pendehidratan Dehydration

514. Rajah 514 menunjukkan empat jenis baja yang dijual di sebuah kedai. Ahmad telah dinasihat supaya membeli baja yang sesuai untuk tumbesaran pokok rambutan yang lebih baik. Diagram 514 shows four types of fertilisers sold in a shop. Ahmad is advised to buy a suitable fertiliser for a better growth of rambutan tree.



Rajah 514 / Diagram 514

Antara yang berikut, baja yang manakah menjadi pilihan Ahmad?

[Jisim atom relatif: H = 1; N = 14; O = 16; P = 31; S = 32; C = 12]

Which of the following fertilisers becomes Ahmad's choice?

[Relatif atomic mass : H = 1; N = 14; O = 16; P = 31; S = 32; C = 12]

- | | | | |
|---|---|---|---|
| A | Urea, $\text{CO}(\text{NH}_2)_2$
Urea, $\text{CO}(\text{NH}_2)_2$ | C | Ammonium sulfat, $(\text{NH}_4)_2\text{SO}_4$
Ammonium sulphate, $(\text{NH}_4)_2\text{SO}_4$ |
| B | Ammonium nitrat, NH_4NO_3
Ammonium nitrate, NH_4NO_3 | D | Ammonium fosfat, $(\text{NH}_4)_3\text{PO}_4$
Ammonium phosphate, $(\text{NH}_4)_3\text{PO}_4$ |

515. Which of the following substances is used in the manufacturing of a car battery and detergent?
Antara bahan berikut, yang manakah digunakan dalam pembuatan bateri kereta dan detergen?

- | | | | |
|---|----------------------------|---|------------------------------------|
| A | Ammonia
Ammonia | C | Sulphuric acid
Asid sulfurik |
| B | Nitric acid
Asid nitric | D | Sulphur dioxide
Sulfur dioksida |

516. Which of the following food additive is used to produce smell like an orange?

Antara bahan tambah makanan berikut, yang manakah digunakan untuk menghasilkan bau seperti buah oren?

- | | | | |
|---|-------------------------------------|---|--------------------------------|
| A | Sodium benzoate
Natrium benzoate | C | Methyl acetate
Metil asetat |
| B | Octyl ethanoate
Oktil etanoat | D | Ascorbic acid
Asid askorbik |

517. Which of the following is correct about saponification?
Antara yang berikut, yang manakah betul mengenai saponifikasi?

- A Reaction of ester with alkali
Tindak balas antara ester dengan alkali
- B Reaction of alkene with water
Tindak balas antara alkena dengan air
- C Reaction of alkane with chlorine
Tindak balas antara alkana dengan klorin
- D Reaction of alcohol with carboxylic acid
Tindak balas antara alkohol dengan asid karboksilik

518. Diagram 518 shows a woman suffering from a disease.
Rajah 518 menunjukkan seorang wanita yang menghidapi sejenis penyakit.



<https://cikquadura.wordpress.com>

Diagram 518 / Rajah 518

Which of the following is used to treat the disease?
Antara yang berikut, yang manakah digunakan untuk merawat penyakit tersebut?

- A Cobalt-60
Kobalt-60
- B Iodine-131
Iodin-131
- C Carbon-12
Karbon-12
- D Uranium-236
Uranium-236

519. Which of the following pair is correct about the type of medicine and its example?
Antara berikut, pasangan manakah yang betul tentang jenis ubat dan contohnya?

	Type of Medicine Jenis Ubat	Example Contoh
A	Stimulants Stimulan	Amphetamine Amfetamin
B	Antibiotics Antibiotik	Aspirin Aspirin
C	Analgesics Analgesik	Barbiturate Barbiturat
D	Antipsychotic Antipsikotik	Penicillin Penisilin

520. Table 520 shows the depth of dent after a weight is dropped on the surface of two different materials.
Jadual 520 menunjukkan kedalaman lekuk selepas satu pemberat dijatuhkan ke atas permukaan dua bahan yang berbeza.

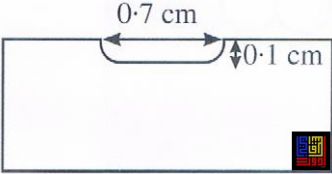
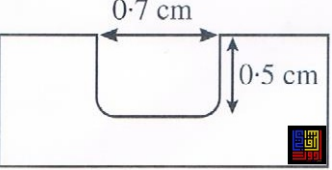
Material Bahan	Depth of Dent (cm) Kedalaman Lekuk (cm)
Duralumin Duralumin	
X	

Table 520 / Jadual 520

What is X?
Apakah X?

- | | | |
|---|-----------|-----------|
| A | Steel | Keluli |
| B | Aluminium | Aluminium |
| C | Bronze | Gangsa |
| D | Pewter | Piwter |



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Kumpulan maya Telegram Guru Kimia Malaysia sebagai rujukan utama guru-guru kimia yang harus dimanfaatkan oleh semua guru untuk lebih berinteraksi bagi meningkatkan kemahiran pedagogi Kimia dan seterusnya melahirkan kecemerlangan Kimia di peringkat sekolah.

KOLEKSI KERTAS 1 SPM : MODUL EXPert KIMIA ini adalah merupakan koleksi 500 soalan peperiksaan KIMIA yang diharapkan dapat membantu untuk meningkatkan pencapaian Kimia pelajar. Sebagai penghargaan jutaan terima kasih diucapkan kepada kepada guru Kimia seluruh negara yang murni hati berkongsi untuk kecemerlangan bersama. Terima kasih juga kepada cikgu Adura Azlin bin Ishak <https://t.me/adin8109> @adin8109 banyak membantu usaha ini. Segala idea rakan-rakan guru Kimia amatlah dihargai. Semoga sumbangan ini dapat membantu usaha untuk meningkatkan kecemerlangan Kimia. Pada masa akan datang usaha Menyusun katalog bahan-bahan BBM / Inovasi PDPC Kimia bagi memudahkan semua guru mendapatkan rujukan untuk meningkatkan pengajaran KIMIA. Semoga mendapat manfaat untuk semua



POLISI PENGGUNAAN : PERCUMA UNTUK TUJUAN PENDIDIKAN SAHAJA

Adalah dengan ini dimaklumkan bahawa bahan dalam Kumpulan maya Telegram Guru KIMIA MALAYSIA ini adalah sumbangan dan usaha guru-guru Kimia seluruh Malaysia yang sedia mendedikasikan usaha mereka untuk kecemerlangan pendidikan kimia amnya dan kecemerlangan pelajar khususnya. Ini bagi memudahkan guru Kimia mendapat bahan sokongan yang berkualiti dalam proses pendidikan. Oleh yang demikian penghasilan bahan ini untuk tujuan peningkatan pendidikan yang dikongsi secara PERCUMA yang tidak berasaskan keuntungan. Maka dengan itu semua pengguna bahan dalam Kumpulan maya Telegram Guru KIMIA Era Baharu KSSM ini hendaklah menghormati mana-mana penyumbang bahan / modul dengan sama sekali TIDAK MENERBITKAN UNTUK TUJUAN PERNIAGAAN / KEUNTUNGAN PERIBADI. Ini bagi membolehkan tujuan murni perkongsian ini bagi membolehkan pelajar kita yang mendapat bahan pebelajaran yang berkualiti dengan kos yang minima.