



MODUL GEMILANG SPM 2026

KIMIA

Kertas 1

Satu jam lima belas minit



JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. Kertas soalan ini dalam dwibahasa.
2. Soalan adalah dalam Bahasa Melayu mendahului soalan yang sepadan dalam Bahasa Inggeris.
3. Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.

Kertas soalan ini mengandungi 23 halaman bercetak

- 1 Antara yang berikut, bahan manakah yang merupakan unsur?
Which of the following substance is an element?
- A Ammonia, NH_3
Ammonia, NH_3
 - B Oksigen, O_2
Oxygen, O_2
 - C Naftalena, C_{10}H_8
Naphthalene, C_{10}H_8
 - D Metana, CH_4
Methane, CH_4
- 2 Antara yang berikut, unsur manakah yang wujud dalam keadaan gas pada suhu bilik?
Which of the following elements exist in a gaseous state at room temperature?
- A Iodin
Iodine
 - B Klorin
Chlorine
 - C Kalium
Potassium
 - D Magnesium
Magnesium
- 3 Antara yang berikut, yang manakah betul tentang jisim molar?
Which of the following is correct about molar mass?
- A Jisim satu mol bahan
Mass of one mole of substance
 - B Jisim purata satu atom
Average mass of an atom
 - C Jisim relatif suatu bahan
Relative mass of a substance
 - D Jisim satu atom karbon-12
Mass of one carbon-12 atom
- 4 Apakah yang dimaksudkan dengan ikatan logam?
What is meant with metallic bonding?
- A Daya antara atom
Force between atoms
 - B Pemindahan elektron antara atom
Transfer of electrons between atoms
 - C Perkongsian elektron antara dua atom
Sharing of electrons between two atoms
 - D Daya tarikan antara ion positif dan lautan elektron
The force of attraction between positive ions and sea of electrons

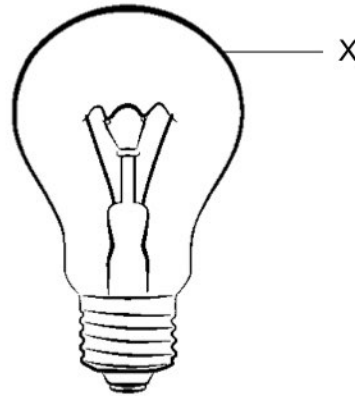
- 5 Apakah warna penunjuk semesta selepas dititiskan ke dalam air?
What is the colour of universal indicator after added into water?
- A Merah
Red
- B Kuning
Yellow
- C Hijau
Green
- D Biru
Blue
- 6 Antara yang berikut, padanan manakah yang betul tentang kadar tindak balas?
Which of the following matches is correct about rate of reaction?

	Kadar tindak balas rendah <i>Low rate of reaction</i>	Kadar tindak balas tinggi <i>High rate of reaction</i>
A	Peneutralan antara asid dan alkali <i>Neutralisation between acid and alkali</i>	Pengaratan besi <i>Rusting of iron</i>
B	Penguraian ganda dua <i>Double decomposition</i>	Peneutralan antara asid dan alkali <i>Neutralisation between acid and alkali</i>
C	Pengaratan besi <i>Rusting of iron</i>	Penapaian larutan glukosa <i>Fermentation of glucose solution</i>
D	Penapaian larutan glukosa <i>Fermentation of glucose solution</i>	Penguraian ganda dua <i>Double decomposition</i>



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- 7 Rajah 1 menunjukkan suatu bahan yang diperbuat daripada kaca X.
Diagram 1 shows a substance made from glass X.



Rajah 1
Diagram 1

Apakah X?
What is X?

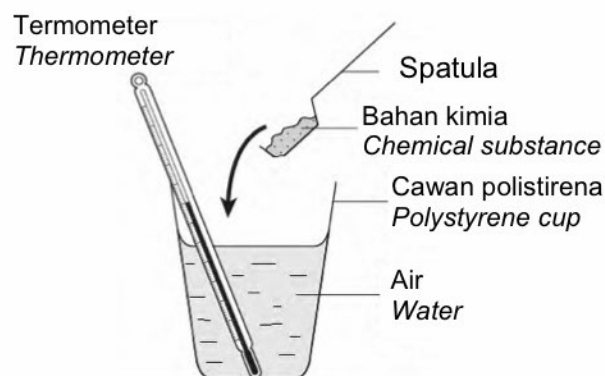
- A Kaca borosilikat
Borosilicate glass
 - B Kaca silika terlakur
Fused silica glass
 - C Kaca soda kapur
Soda lime glass
 - D Kaca plumbum
Lead glass
- 8 Antara yang berikut, ion manakah yang membentuk kekat dalam air sabun?
Which of the following ion forms scum in soap water?
- A Cu^{2+}
 - B Mg^{2+}
 - C Pb^{2+}
 - D Zn^{2+}

- 9 Antara yang berikut, bahan manakah yang menukar warna larutan kalium dikromat(VI) berasid daripada jingga kepada hijau?
Which of the following substances changes the colour of acidified potassium dichromate(VI) solution from orange to green?

- I C_3H_6
- II $\text{C}_3\text{H}_7\text{OH}$
- III C_4H_{10}
- IV $\text{C}_4\text{H}_9\text{COOH}$

- 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

- 10 Rajah 2 menunjukkan susunan radas bagi suatu eksperimen.
Diagram 2 shows the apparatus set-up for an experiment.



Rajah 2
Diagram 2

Antara yang berikut, bahan kimia manakah yang akan menyebabkan suhu campuran menurun?
Which of the following chemical substance will cause the temperature of the mixture to decrease?

- A Aluminium klorida
Aluminium chloride
- B Ammonium klorida
Ammonium chloride
- C Kalsium hidroksida
Calcium hydroxide
- D Natrium hidroksida
Sodium hydroxide



11 Antara yang berikut, yang manakah merupakan polimer elastomer?

Which of the following is an elastomer polymer?

- A Politena
Polythene
- B Poliisoprena
Polyisoprene
- C Polipropena
Polypropene
- D Polistirena
Polystyrene

12 Logam yang lebih elektropositif dapat menyesarkan logam yang kurang elektropositif daripada larutan garamnya.

Antara yang berikut, logam manakah yang boleh menyesarkan zink daripada larutan zink nitrat?

Metal which is more electropositive can displace metal which is less electropositive from its salt solution.

Which of the following metals can displace zinc from zinc nitrate solution?

- I Aluminium
Aluminium
- II Argentum
Silver
- III Kuprum
Copper
- IV Magnesium
Magnesium

- 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

- 13 Antara yang berikut, bahan tambah makanan manakah yang memberikan rasa manis dalam minuman?

Which of the following food additive provides sweetness in beverages?

- A Aspartam
Aspartame
- B Natrium klorida
Sodium chloride
- C Propil etanoat
Propyl ethanoate
- D Monosodium glutamat
Monosodium glutamate

- 14 Jadual 1 menunjukkan sebahagian komposisi beberapa jenis bahan komposit.

Table 1 shows part of the composition of several types of composite material.

Bahan komposit <i>Composite material</i>	Komposisi unsur <i>Composition of element</i>
X	Argentum, kuprum <i>Silver, copper</i>
W	Besi, karbon <i>Iron, carbon</i>
Y	Kuprum, oksigen <i>Copper, oxygen</i>
Z	Silikon, oksigen <i>Silicon, oxygen</i>

Jadual 1

Table 1

Antara yang berikut, yang manakah boleh dijadikan superkonduktor?

Which of the following can be made into a superconductor?

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

- 15 Rajah 3 menunjukkan perwakilan piawai bagi suatu atom.
Diagram 3 shows the standard representation of an atom.



Rajah 3
Diagram 3

Apakah yang diwakili oleh nombor 17?
What is represented by the number 17?

- A Bilangan elektron
Number of electrons
 - B Bilangan neutron
Number of neutrons
 - C Nombor proton
Proton number
 - D Nombor nukleon
Nucleon number
- 16 Jadual 2 menunjukkan maklumat bagi zarah X dan zarah Y.
Table 2 shows the information for particles X and Y.

Zarah Particle	Bilangan neutron Number of neutrons	Bilangan proton Number of protons	Bilangan elektron Number of electrons
X	12	11	10
Y	13	11	11

Jadual 2
Table 2

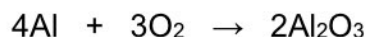
Antara yang berikut, pernyataan manakah yang betul tentang X dan Y?
Which of the following statements is correct about X and Y?

- A X dan Y mempunyai sifat fizik yang sama
X and Y have similar physical properties
- B X dan Y terletak dalam Kumpulan 17
X and Y are located in Group 17
- C X dan Y ialah atom neutral
X and Y are neutral atoms
- D X dan Y ialah isotop
X and Y are isotopes



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- 17 Persamaan berikut mewakili tindak balas antara aluminium dan oksigen.
The following equation represents the reaction between aluminium and oxygen.

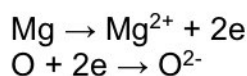


Antara yang berikut, pernyataan manakah yang betul tentang persamaan ini?
Which of the following statements is correct about the equation?

- A 4 mol atom aluminium bertindak balas dengan 3 mol atom oksigen
4 mol of aluminium atoms react with 3 mol of oxygen atoms
 - B 4 mol atom aluminium bertindak balas dengan 3 mol molekul oksigen
4 mol of aluminium atoms react with 3 mol of oxygen molecules
 - C 4 mol molekul aluminium bertindak balas dengan 3 mol molekul oksigen
4 mol of aluminium molecules react with 3 mol of oxygen molecules
 - D 4 mol molekul aluminium bertindak balas dengan 3 mol atom oksigen
4 mol of aluminium molecules react with 3 mol of oxygen atoms
- 18 Susunan elektron bagi atom X ialah 2.8.1.
Antara yang berikut, yang manakah betul tentang X?
The electron arrangement of atom X is 2.8.1.
Which is the following is correct about X?

- A Tidak reaktif
Non reactive
- B Berkongsi elektron
Shares electron
- C Menerima elektron
Accepts electron
- D Melepaskan elektron
Releases electron

- 19 Berikut merupakan setengah persamaan bagi pembentukan suatu sebatian.
The following half-equation is for a formation of a compound.

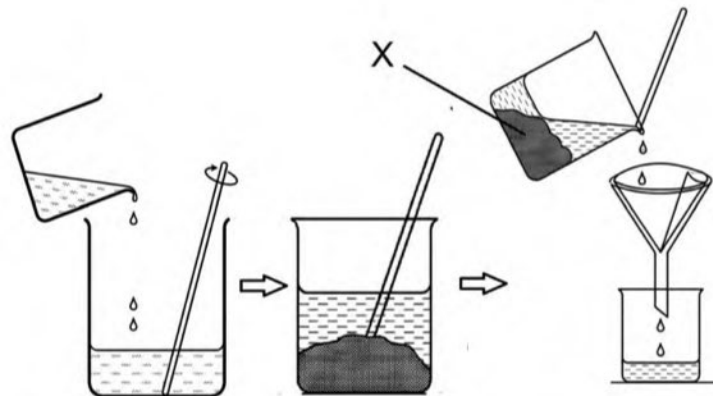


Antara yang berikut, pernyataan manakah yang betul tentang pembentukan sebatian itu?

Which of the following statements is correct about the formation of the substance?

- A Elektron dipindahkan daripada atom Mg kepada atom O
Electrons are transferred from Mg atom to O atom
- B Ion O^{2-} dan ion Mg^{2+} terbentuk selepas menyumbang 2 elektron
 O^{2-} and Mg^{2+} ions are formed after contributing 2 electrons
- C Pasangan elektron bebas dikongsi hanya berasal daripada atom O sahaja
Lone pair of electrons are shared from O atom only.
- D Ion Mg^{2+} membentuk daya tarikan elektrostatik yang kuat dengan lautan elektron
 Mg^{2+} ions form strong electrostatic force with sea of electrons

- 20 Rajah 4 menunjukkan susunan radas bagi penyediaan suatu garam.
Diagram 4 shows the apparatus set-up to prepare a salt.

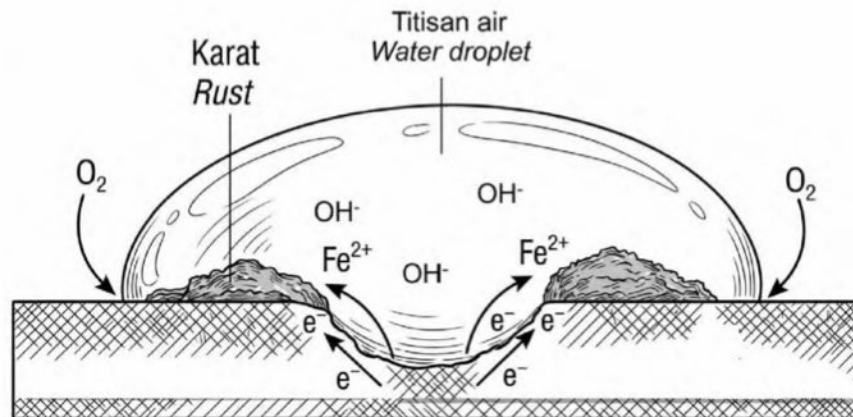


Rajah 4
Diagram 4

Apakah X?
What is X?

- A Plumbum(II) nitrat
Lead(II) nitrate
 - B Barium klorida
Barium chloride
 - C Natrium karbonat
Sodium carbonate
 - D Kalsium sulfat
Calcium sulphate
- 21 Tayangan siaran langsung satu pertandingan bola sepak di Brazil boleh ditonton secara dalam talian di Malaysia.
Antara yang berikut, bahan komposit manakah boleh memastikan siaran langsung dapat ditonton tanpa gangguan?
Live streaming of a football match in Brazil can be watched online in Malaysia.
Which of the following composite material can ensure that the live broadcast can be watched without interruption?
- A Kaca gentian
Fibre glass
 - B Gentian optik
Optical fibre
 - C Superkonduktor
Superconductor
 - D Silikon karbida
Silicon carbide

- 22 Rajah 5 menunjukkan satu tindak balas redoks.
Diagram 5 shows a redox reaction.



Rajah 5
Diagram 5

Antara yang berikut, pernyataan manakah yang betul tentang tindak balas redoks itu?

Which of the following statements is correct about the redox reaction?

- A Ferum dioksidakan kepada ion ferum(II)
Iron is oxidised to iron(II) ions
- B Oksigen dalam udara bertindak sebagai anod
Oxygen in the air acts as anode
- C Tindak balas berlaku dengan kehadiran air sahaja
Reaction occurs during the presence of water only
- D Ion Fe^{2+} dan ion OH^- bertindak balas membentuk mendakan perang
 Fe^{2+} and OH^- ions reacts to form brown precipitate



- 23 Jadual 3 menunjukkan maklumat tentang dua atom.
Table 3 shows the information about two atoms.

Atom <i>Atom</i>	Nombor proton <i>Proton number</i>	Susunan elektron <i>Electron arrangement</i>
X	9	2.7
Y	17	2.8.7

Jadual 3
Table 3

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

- A Atom Y lebih mudah melepaskan elektron daripada atom X
Atom Y more easily to release electron than atom X
 - B Kedua-dua atom mempunyai 7 elektron valens
Both atoms have 7 valence electrons
 - C Kedua-dua atom ialah gas adi
Both atoms are noble gases
 - D Takat lebur atom X lebih tinggi daripada atom Y
Melting point of atom X is higher than atom Y
- 24 Antara yang berikut, pernyataan manakah yang betul tentang unsur Kumpulan 1?
Which of the following statements is correct about Group 1 elements?
- A Litium bergerak dengan laju pada permukaan air
Lithium moves quickly on the surface of water.
 - B Natrium bergerak dengan perlahan pada permukaan air
Sodium moves slowly on the surface of water.
 - C Litium terbakar dengan nyalaan merah dalam oksigen
Lithium burns with a red flame in oxygen.
 - D Natrium terbakar dengan nyalaan kuning dalam oksigen
Sodium burns with a yellow flame in oxygen.

- 25 Apabila suhu asid hidroklorik yang bertindak balas dengan serbuk zink meningkat, kadar tindak balas meningkat.

Antara yang berikut, pernyataan manakah betul tentang tindak balas itu?

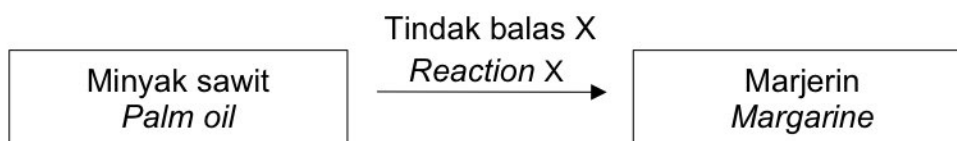
When the temperature of hydrochloric acid reacting with zinc powder increases, the rate of reaction increases.

Which of the following statements is correct about the reaction?

- A Jumlah luas permukaan zarah-zarah bahan tindak balas bertambah
The total surface area of the reactant particles increases
- B Jumlah bilangan zarah-zarah bahan tindak balas per unit isi padu bertambah
The total number of reactant particles per unit volume increases
- C Zarah-zarah bahan tindak balas bergerak lebih cepat dan berlanggar lebih kerap antara satu sama lain
The reactant particles move faster and collide more often with one another
- D Zarah-zarah bahan tindak balas yang berlanggar lebih kerap boleh mencapai tenaga pengaktifan yang lebih rendah
The reactant particles which collide more often are able to achieve the lower activation energy

- 26 Rajah 6 menunjukkan maklumat tentang pembuatan marjerin.

Diagram 6 shows information on the manufacturing of margarine.



Rajah 6
Diagram 6

Antara yang berikut, tindak balas manakah yang berlaku sama seperti dalam tindak balas X?

Which of the following reactions occur same as in reaction X?

- A Menitiskan air bromin ke dalam etena
Dropping bromine water into ethene
- B Menyalurkan gas hidrogen ke dalam propena
Channelling hydrogen gas into propene
- C Mengalirkan wap propanol ke atas serpihan porselin yang telah dipanaskan
Flowing propanol vapour onto porcelain chips which have been heated
- D Memanaskan etanol bersama larutan kalium manganat(VII) berasid dengan perlahan
Heating ethanol with acidified potassium manganate(VII) solution slowly

- 27 Antara yang berikut, pernyataan manakah yang betul tentang suatu tindak balas endotermik?

Which of the following statements is correct about an endothermic reaction?

- A Haba yang diserap semasa pemecahan ikatan adalah kurang daripada haba yang dibebaskan semasa pembentukan ikatan
The heat absorbed during bond breaking is more than the heat released during bond formation
- B Haba yang diserap semasa pemecahan ikatan adalah lebih daripada haba yang dibebaskan semasa pembentukan ikatan
The heat absorbed during bond breaking is less than the heat released during bond formation
- C Haba yang diserap semasa pemecahan ikatan adalah sama dengan haba yang dibebaskan semasa pembentukan ikatan
The heat absorbed during bond breaking is equal to the heat released during bond formation
- D Tiada haba diserap atau dibebaskan semasa pemecahan ikatan dan pembentukan ikatan
No heat is absorbed or released during bond breaking and bond formation

- 28 Antara yang berikut, penghasilan polimer manakah yang akan menghasilkan hasil sampingan?

Which of the following polymer production will produce by-products?

- A Polivinil klorida
Polyvinyl chloride
- B Polipropena
Polypropene
- C Polietena
Polyethene
- D Poliester
Polyester



- 29 Rajah 7 menunjukkan muka seorang lelaki sebelum dan selepas makan makanan laut.

Diagram 7 shows the face of a man before and after eating seafood.



Sebelum
Before



Selepas
After

Rajah 7
Diagram 7

Antara yang berikut, ubat manakah akan diberikan oleh seorang pegawai perubatan kepada lelaki itu?

Which of the following medications will be given by a medical officer to the man?

- A Prednisolone
Prednisolone
- B Haloperidol
Haloperidol
- C Klozapin
Clozapine
- D Kodeina
Codeine

- 30 Antara yang berikut, padanan manakah yang betul tentang nama sebatian dengan formula strukturnya?

Which of the following matches is correct on the name of the compound with its structural formula?

	Nama sebatian Name of compound	Formula struktur Structural formula
A	Etana <i>Ethane</i>	$\begin{array}{c} \text{H} \quad \text{H} \\ \quad \\ \text{C} = \text{C} \\ \quad \\ \text{H} \quad \text{H} \end{array}$
B	Etena <i>Ethene</i>	$\begin{array}{c} \text{H} \quad \text{H} \\ \quad \\ \text{H}-\text{C}-\text{C}-\text{H} \\ \quad \\ \text{H} \quad \text{H} \end{array}$
C	Asid etanoik <i>Ethanoic acid</i>	$\begin{array}{c} \text{O} \quad \text{H} \\ \quad \\ \text{HO}-\text{C}-\text{C}-\text{H} \\ \\ \text{H} \end{array}$
D	Etil etanoat <i>Ethyl ethanoate</i>	$\begin{array}{c} \text{H} \quad \text{H} \quad \text{O} \quad \text{H} \quad \text{H} \\ \quad \quad \quad \quad \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{O}-\text{C}-\text{C}-\text{H} \\ \quad \quad \quad \quad \\ \text{H} \quad \text{H} \quad \quad \text{H} \quad \text{H} \end{array}$

- 31 Jadual 4 menunjukkan peratus komposisi mengikut jisim unsur-unsur bagi suatu sebatian yang terdapat dalam racun serangga.

Table 4 shows the percentage of composition by mass of elements of a compound found in insecticide.

Unsur Element	Peratus komposisi (%) Percentage of composition (%)
C	49.00
H	2.72
Cl	48.30

Jadual 4
Table 4

Analisis makmal menunjukkan bahawa sebatian itu mempunyai jisim molar 147.0 g mol⁻¹.

Apakah formula molekul bagi sebatian itu?

A laboratory analysis shows that the compound has a molar mass of 147.0 g mol⁻¹.

What is the molecular formula of the compound?

[Jisim atom relatif: H = 1; C = 12; Cl = 35.5]

[Relative atomic mass: H = 1; C = 12; Cl = 35.5]

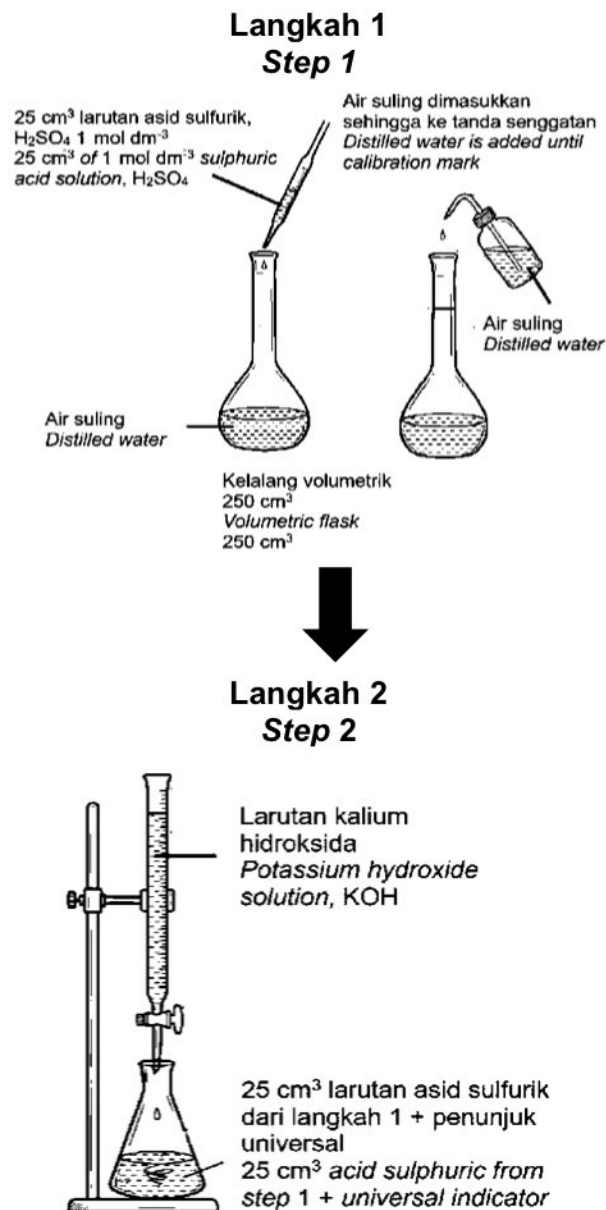
- A C₃H₂Cl
B C₆H₄Cl₂
C C₉H₃Cl₃
D C₉H₆Cl₃



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- 32 Rajah 8 menunjukkan langkah-langkah penyediaan asid sulfurik yang akan dititratkan dengan larutan KOH.

Diagram 8 shows the steps to prepare sulphuric acid that will be titrated with KOH solution.



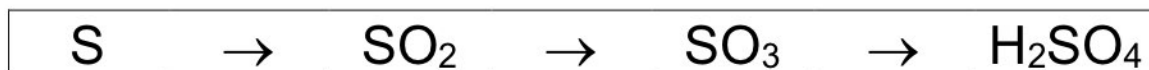
Rajah 8
Diagram 8

Berapakah isi padu larutan KOH berkepekatan 0.5 mol dm⁻³ yang diperlukan untuk mencapai takat akhir?

What is the volume of KOH solution with a concentration of 0.5 mol dm⁻³ needed to reach the end point?

- A 10 cm³
- B 25 cm³
- C 50 cm³
- D 100 cm³

- 33 Rajah 9 menunjukkan carta alir bagi penghasilan asid sulfurik dalam industri
Diagram 9 shows a flow chart for the manufacturing of sulphuric acid in industry.

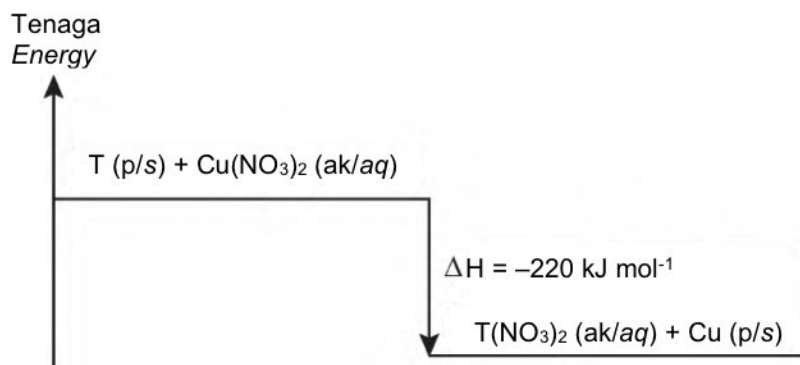


Rajah 9
Diagram 9

Antara yang berikut, yang manakah menunjukkan urutan yang betul bagi perubahan nombor pengoksidaan bagi sulfur?

Which of the following shows the correct sequence of changes in the oxidation number of sulphur?

- A** 0 → +2 → +3 → +4
B 0 → +2 → +6 → +6
C 0 → +4 → +6 → +6
D 0 → +4 → +6 → +8
- 34 Rajah 10 menunjukkan gambar rajah aras tenaga bagi tindak balas antara 50 cm³ larutan kuprum(II) nitrat 0.2 mol dm⁻³ dengan logam T berlebihan.
Diagram 10 shows the energy level diagram for the reaction between 50 cm³ of 0.2 mol dm⁻³ copper(II) nitrate solution with excess metal T.



Apakah perubahan suhu bagi tindak balas tersebut?

[Muatan haba tentu larutan = 4.2 J g⁻¹ °C⁻¹]

What is the temperature change in the reaction?

[Specific heat capacity of solution = 4.2 J g⁻¹ °C⁻¹]

- A** 5.3 °C
B 10.5 °C
C 53.0 °C
D 105.0 °C

- 35 Kobalt klorida kontang yang digunakan sebagai pengesan kelembapan akan bertukar warna daripada biru kepada merah jambu apabila menyerap air dan membentuk kobalt klorida terhidrat, $\text{CoCl}_2 \cdot 6\text{H}_2\text{O}$.

Berapakah peratus komposisi jisim air dalam kobalt klorida terhidrat?

Anhydrous cobalt chloride which is used as a moist detector will change colour from blue to pink when it absorbs water and forms hydrated cobalt chloride, $\text{CoCl}_2 \cdot 6\text{H}_2\text{O}$.

What is the percentage of composition by mass of water in hydrated cobalt chloride?

[Jisim atom relatif: H=1; O=16; Cl=35.5; Co=59]

[Relative atomic mass: H=1; O=16; Cl=35.5; Co=59]

- A 7.56 %
- B 13.85 %
- C 45.38 %
- D 83.08 %

- 36 Diberi haba pembakaran butana ialah $-2878 \text{ kJ mol}^{-1}$.

Berapakah nilai bahan api bagi butana?

Given the heat of combustion of butane is $-2878 \text{ kJ mol}^{-1}$.

What is the fuel value of butane?

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

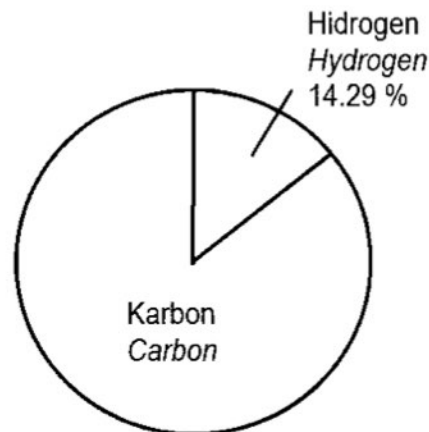
[Relative atomic mass; H = 1, C = 12]

- A 39.97 kJ g^{-1}
- B 49.62 kJ g^{-1}
- C 51.39 kJ g^{-1}
- D 65.41 kJ g^{-1}



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- 37 Rajah 11 menunjukkan peratus komposisi mengikut jisim bagi hidrokarbon Y.
Diagram 11 shows the percentage of composition by mass for hydrocarbon Y.



Rajah 11
Diagram 11

16.8 g hidrokarbon Y terbakar lengkap dalam oksigen berlebihan untuk menghasilkan gas karbon dioksida dan air.

Apakah isipadu gas karbon dioksida yang dihasilkan?

16.8 g of hydrocarbon Y burnt completely in excess oxygen to produce carbon dioxide gas and water.

What is the volume of carbon dioxide gas produced?

[Jisim atom relatif: C=12; H=1; jisim molar Y=56 g mol⁻¹; 1 mol gas menepati 24 dm³ pada keadaan bilik]

[*Relative atomic mass: C=12; H=1; molar mass Y= 56 g mol⁻¹; 1 mol of gas occupied 24 dm³ at room condition*]

- A 7.2 dm³
- B 14.4 dm³
- C 21.6 dm³
- D 28.8 dm³

- 38 Jadual 5 menunjukkan isi padu gas karbon dioksida, CO_2 , yang dikumpul dalam tindak balas antara serbuk batu kapur dengan asid hidroklorik cair.

Table 5 shows the volume of carbon dioxide gas, CO_2 , collected in the reaction between limestone powder and dilute hydrochloric acid.

Masa / minit Time / minute	0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5
Isi padu CO_2 / cm^3 Volume of CO_2 / cm^3	0.0	4.5	7.5	10.0	12.5	14.5	16.0	17.0

Jadual 5

Table 5

Berapakah kadar tindak balas purata dalam minit kedua?

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

- A $2.50 \text{ cm}^3 \text{ minit}^{-1}$
 $2.50 \text{ cm}^3 \text{ minute}^{-1}$
- B $5.00 \text{ cm}^3 \text{ minit}^{-1}$
 $5.00 \text{ cm}^3 \text{ minute}^{-1}$
- C $6.25 \text{ cm}^3 \text{ minit}^{-1}$
 $6.25 \text{ cm}^3 \text{ minute}^{-1}$
- D $17.25 \text{ cm}^3 \text{ minit}^{-1}$
 $17.25 \text{ cm}^3 \text{ minute}^{-1}$



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- 39 Jadual 6 menunjukkan pemerhatian bagi dua eksperimen apabila kertas litmus biru dimasukkan ke dalam asid etanoik glasial yang dilarutkan dalam dua pelarut yang berbeza, P dan Q.

Table 6 shows the observations for two experiments when blue litmus paper is immersed into glacial ethanoic acid that is dissolved in two different solvents, solvent P and solvent Q.

Eksperimen Experiment	Bahan Substance	Pemerhatian Observation
I	Asid etanoik glasial + Pelarut P <i>Glacial ethanoic acid + Solvent P</i>	Warna kertas litmus biru berubah menjadi merah. <i>The colour of blue litmus paper changes to red</i>
II	Asid etanoik glasial + Pelarut Q <i>Glacial ethanoic acid + Solvent Q</i>	Tiada perubahan pada kertas litmus biru. <i>No changes to the blue litmus paper.</i>

Jadual 6
Table 6

Hasil daripada Eksperimen I menyebabkan mentol menyala dengan malap dalam litar elektrik.

Antara yang berikut, manakah pernyataan yang betul berdasarkan maklumat di atas?

The product from Experiment I causes a bulb to light up dimly in a electrical circuit. Which of the following statements is correct based on the information above?

- A** Pelarut Q ialah air dan asid etanoik mengalami pengionan lengkap
Solvent Q is water and ethanoic acid undergoes complete ionisation
- B** Pelarut P ialah benzena dan asid etanoik wujud sebagai molekul
Solvent P is benzene and ethanoic acid exists as molecules
- C** Pelarut P ialah air dan asid etanoik merupakan asid lemah
Solvent P is water and ethanoic acid is a weak acid
- D** Pelarut Q ialah aseton dan asid etanoik mempunyai kepekatan ion hidrogen yang tinggi
Solvent Q is acetone and ethanoic acid has high concentration of hydrogen ions

- 40 Jadual 7 menunjukkan nilai keupayaan elektrod piawai, E^0 , bagi dua setengah sel. *Table 7 shows the standard electrode potential value, E^0 , for two half-cells.*

Setengah sel <i>Half cell</i>	Persamaan setengah sel <i>Half-cell equation</i>	E^0 (V) (298K)
I	$\text{Ag}^+ + \text{e} \rightarrow \text{Ag}$	+0.80
II	$\text{Cu}^{2+} + 2\text{e} \rightarrow \text{Cu}$	+0.34

Antara pernyataan berikut, yang manakah benar mengenai sel kimia yang terdiri daripada elektrod argentum dan elektrod kuprum?

Which of the following statement is correct on a chemical cell that has silver electrode and copper electrode?

- A** Logam argentum bertindak sebagai agen penurunan yang lebih kuat daripada logam kuprum
Silver metal acts as the stronger reducing agent compared to copper metal
- B** Elektron mengalir dari elektrod argentum ke elektrod kuprum melalui litar luar
Electrons flow from the silver electrode to the copper electrode through the external circuit
- C** Terminal negatif bagi sel ini ialah elektrod kuprum
The negative terminal for the cell is the copper electrode
- D** Ion argentum, Ag^+ , mengalami proses pengoksidaan
Silver ion, Ag^+ , undergoes oxidation process

KERTAS SOALAN TAMAT
END OF QUESTION PAPER



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