

1 Antara bahan berikut, yang manakah wujud sebagai atom?

Which of the following substances exists as atoms?

- A Magnesium
Magnesium
- B Gas nitrogen
Nitrogen gas
- C Naftalena
Naphtalene
- D Plumbum(II) bromide
Lead (II)bromide

2 Geiger miller adalah suatu alat yang digunakan untuk mengesan isotop.

Isotop itu dimasukkan ke dalam baja bagi menyiasat kadar metabolisme pokok.

Apakah isotop tersebut?

Geiger miller is an apparatus which used to detect an isotope. The isotope is added into the fertilizer to study the metabolism rate of plant.

What is the isotope?

- A Carbon-14
Karbon-14
- B Uranium-235
Uranium-235
- C Phosphorus-32
Fosforus-32
- D Sodium-24
Natrium-24

3 Formula kimia yang manakah betul

Which chemical formulae are correct

- A KCO_3
- B AgCl_2
- C BaSO_4
- D CaOH

- 4 Mengapa saiz unsur Kumpulan 1 bertambah apabila menuruni kumpulan dalam Jadual Berkala Unsur?

Why the size of element in Group 1 increase when going down the group in Periodic Table of Elements.

- A Bilangan electron bertambah
Number of electrons increases
- B Jisim atom relatif bertambah
Relative atomic mass increase
- C Bilangan electron valens bertambah
Number of valence electrons increases
- D Bilangan petala yang berisi electron bertambah
Number of shells filled with valence electrons increases.

- 5 Antara berikut, unsur manakah yang dapat membentuk oksida asid apabila bertindakbalas dengan oksigen?

Which of the following element can form oxide of acid when react with oxygen?

- A Natrium
Sodium
- B Aluminium
Aluminium
- C Karbon
Carbon
- D Klorin
Chlorine

- 6 Antara berikut, bahan yang manakah mempunyai nilai pH yang paling tinggi?

Which of the following substance has highest pH value?

- A Natrium hidroksida
Sodium hydroxide
- B Natrium klorida
Sodium chloride
- C Asid hidroklorik
Hydrochloric acid
- D Ammonium hidroksida
Ammonium hydroxide

- 7 Antara berikut, garam yang manakah dapat dihasilkan melalui tindak balas peneutralan?
Which of the following salts could be produced through neutralisation reaction?
- A Magnesium karbonat
Magnesium carbonate
 - B Natrium sulfat
Sodium sulphate
 - C Plumbum(II) klorida
Lead (II) chloride
 - D Zink nitrat
Zinc nitrate
- 8 Antara berikut, bahan yang manakah terdiri daripada ikatan kovalen?
Which of the following substances consist of covalent bond?
- A Barium sulfat
Barium sulphate
 - B Gas nitrogen
Nitrogen gas
 - C Kalium oksida
Potassium oxide
 - D Magnesium klorida
Magnesium chloride
- 9 Antara berikut, yang manakah adalah sifat seramik?
Which of the following are the properties of ceramics?
- I Keras dan kuat
Hard and strong
 - II Mudah ditempa
Malleable
 - III Lengai secara kimia
Chemically inert
 - IV Konduktor elektrik yang baik
Good electrical conductor
- A I dan II
I and II
 - B I dan III
I and III
 - C II dan IV
II and IV
 - D III dan IV
III and IV

10 Maklumat tentang bahan X adalah seperti yang berikut.

The information about substance X are as follow.

- Terdiri daripada gentian kaca silika dan plastik
Made up of silica glass fibre and plastic
- Menghantar maklumat dan data dalam bentuk cahaya
Transmit information and data in the form of light
- Menghubungkan komputer dalam Rangkaian Kawasan Setempat
Connects computers in Local Area Network(LAN)

Apakah bahan X?

What is substance X?

- A Gentian optik
Optical fibre
- B Kaca gentian
Fibre glass
- C Silikon karbida
Silicon carbide
- D Superkonduktor
Superconductor

11 Antara berikut, bahan bergaris yang manakah bertindak sebagai agen penurunan?

Which of the following underlined substances acts as a reducing agent?

- A $4\text{Al} + 3\underline{\text{O}_2} \rightarrow 2\text{Al}_2\text{O}_3$
- B $\text{Cu} + \underline{\text{N}_2\text{O}} \rightarrow \text{CuO} + \text{N}_2$
- C $\text{Zn} + 2\underline{\text{HCl}} \rightarrow \text{ZnCl}_2 + \text{H}_2$
- D $3\text{CuO} + 2\underline{\text{NH}_3} \rightarrow 3\text{Cu} + \text{N}_2 + 3\text{H}_2\text{O}$

12 Besi diekstrak daripada hematit dalam relau bagas.

Gas yang manakah dihasilkan sebagai bahan buangan?

Iron is extracted from haematite in the blast furnace.

Which gas is produced as a waste product?

- A Hidrogen
Hydrogen
- B Nitrogen
Nitrogen
- C Karbon dioksida
Carbon dioxide
- D Sulfur dioksida
Sulphur dioxide

- 13 Antara berikut, yang manakah monomer bagi getah asli?
Which of the following is the monomer of natural rubber?

A Disulfur diklorida
Disulphur dichloride

B 1,6-diaminoheksana
1,6-diaminehexane

C 2-metilbut-1,3-diena
2-methylbut-1,3-diene

D Dekanadiol diklorida
Decanedioyl dichloride

- 14 Rajah 1 menunjukkan ramuan di dalam jem strawberi.
Diagram 1 shows the ingredient in strawberry jam.



Rajah 1
Diagram 1

- Antara berikut, yang manakah berfungsi memekatkan jem itu?
Which of the following functions to thicken the jam?

A Gula
Sugar

B Pektin
Pectin

C Sebatian azo
Azo compounds

D Asid askorbik
Ascorbic acid

- 15 Jadual 1 menunjukkan sebahagian daripada langkah-langkah dalam proses rawatan air sisa.

Table 1 shows some of the steps in wastewater treatment process.

P	Proses elektro-penggumpalan <i>Electrocoagulation process</i>
Q	Pelepasan efluen ke sumber air <i>Discharge of effluent to the water waste</i>
R	Air sisa dipam masuk <i>Wastewater is pumped in</i>
S	Pengumpulan enapcemar <i>Collection of sludge</i>

Jadual 1

Table 1

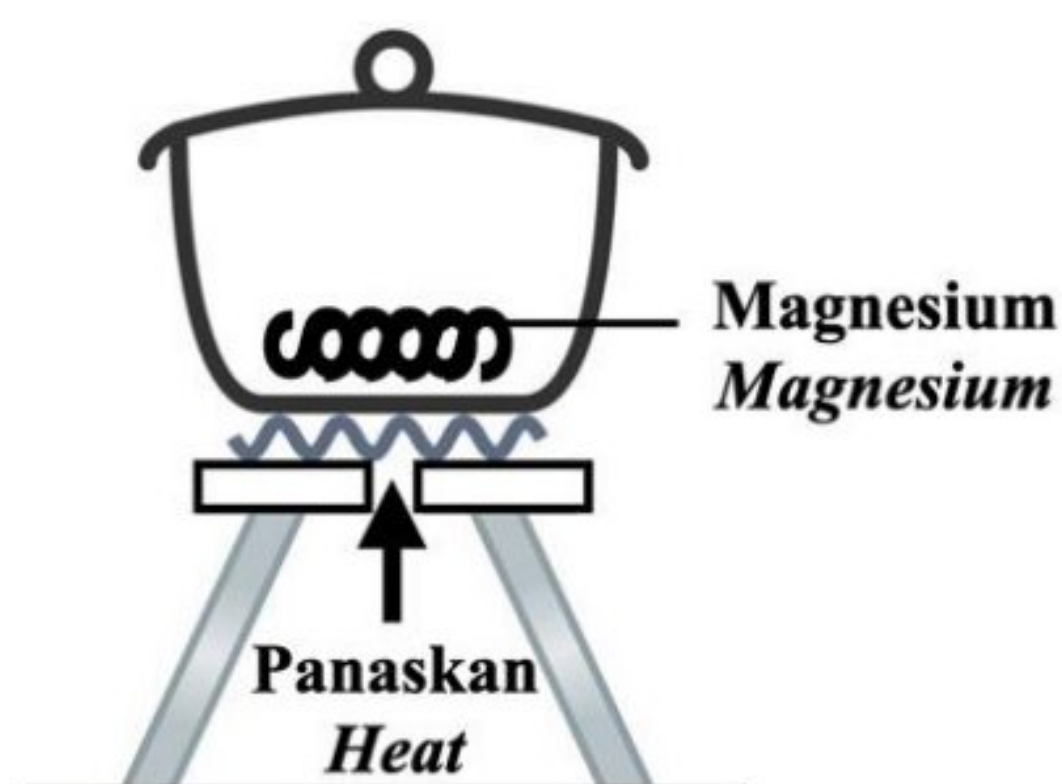
Antara berikut, yang manakah susunan yang betul bagi proses itu?

Which of the following is the correct sequence of the process?

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

- 16 Rajah 2 menunjukkan susunan radas untuk menentukan formula empirik magnesium oksida.

Diagram 2 shows the apparatus set-up to determine the empirical formula of magnesium oxide.



Rajah 2

Diagram 2

Antara berikut, logam manakah boleh menggantikan magnesium?

Which of the following metal can replace magnesium?

- A Natrium
Sodium
- B Zink
Zinc

- | | |
|----------|------------------------|
| C | Plumbum
<i>Lead</i> |
| D | Stannum
<i>Tin</i> |

17 Pernyataan berikut menunjukkan ciri-ciri unsur X.
The statements below show the properties of X.

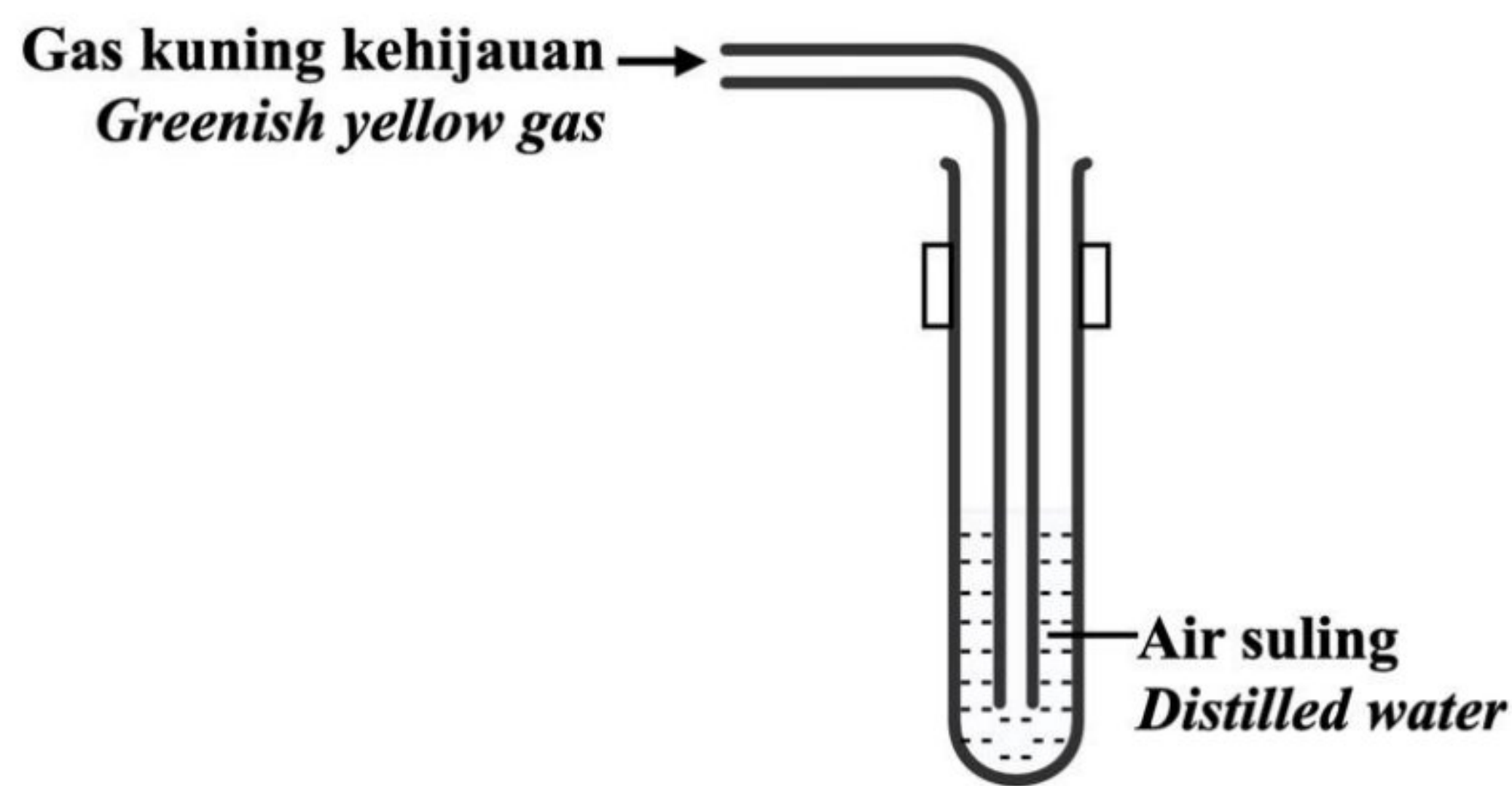
- Digunakan dalam Proses Haber
Used in Haber process
- Boleh mengkonduksikan haba dan elektrik
Able to conduct heat and electricity
- Membentuk ion berwarna hijau dan perang
Forms green and brown coloured ions

Antara berikut, di manakah kedudukan X dalam Jadual Berkala Unsur?

Which of the following is the location of X in the Periodic Table of Elements?

[illegible]

18 Rajah 3 menunjukkan susunan radas apabila suatu gas disalurkan ke dalam air suling.
Diagram 3 shows the apparatus set-up when a gas is flowed into distilled water.



Rajah 3
Diagram 3

Antara berikut, berapakah pH larutan yang terbentuk?

Which of the following is the pH of the solution formed?

- A 1
- B 5
- C 7
- D 13

19 Jadual 2 menunjukkan nombor proton bagi empat unsur, P, Q, R dan S.

Table 2 shows the proton numbers of four elements P, Q, R and S.

Unsur <i>Element</i>	Nombor proton <i>Proton number</i>
<i>P</i>	8
<i>Q</i>	11
<i>R</i>	16
<i>S</i>	17

Jadual 2

Table 2

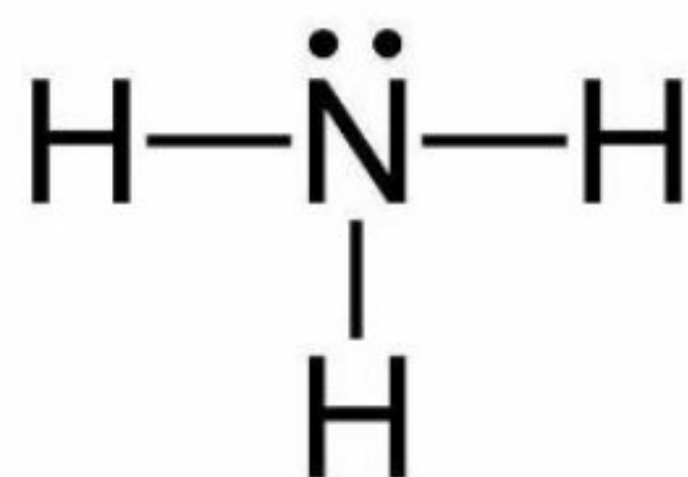
Antara pasangan unsur yang berikut, manakah boleh bergabung dan membentuk satu sebatian ion?

Which of the following pairs of elements can combine to form an ionic compound?

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

- 20 Rajah 4 menunjukkan struktur molekul ammonia.

Diagram 4 shows the structure of ammonia molecule.



Rajah 4

Diagram 4

Berapakah bilangan maksimum ikatan hidrogen yang boleh dibentuk oleh molekul ammonia?

What is the maximum number of hydrogen bonds that can be formed by water molecule?

- A 1
- B 2
- C 3
- D 4

- 21 Antara yang berikut, yang manakah sifat bagi kalium fluorida?

Which of the following is a property of potassium fluoride?

- A Mudah meruap
Volatile
- B Tidak larut dalam air
Insoluble in water
- C Mempunyai takat lebur yang rendah
Has a low melting point
- D Mengalirkan elektrik dalam keadaan leburan
Conducts electricity in molten state

- 22 Jadual 3 menunjukkan darjah penceraian empat larutan alkali yang mempunyai sama kepekatan.

Table 3 shows the degree of dissociation of four solutions of alkalis which have the same concentration.

Larutan <i>Solution</i>	Darjah penceraian <i>Degree of dissociation</i>
W	Tinggi/ <i>High</i>
X	Sederhana/ <i>Medium</i>
Y	Sangat Tinggi/ <i>Very high</i>
Z	Rendah/ <i>Low</i>

Jadual 3

Table 3

Larutan manakah yang mempunyai nilai pH yang paling tinggi?

Which solution has the highest pH value?

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

- 23 Jadual 4 menunjukkan sebahagian langkah-langkah penyediaan larutan piawai natrium karbonat di dalam makmal.

Table 4 shows part of steps to prepare standard solution of sodium carbonate in laboratory

P	Kacau campuran dengan rod kaca sehingga pepejal natrium karbonat terlarut sepenuhnya di dalam air <i>Stir the mixture with a glass rod until all the solid sodium carbonate is completely dissolved in distilled water</i>
Q	Tambah air suling sehingga paras larutan menghampiri tanda senggatan pada kelalang volumetrik. <i>Add distilled water until it approaches the calibration mark on the volumetric flask.</i>
R	Tambah air suling kepada pepejal natrium karbonat di dalam bikar <i>Add distilled water to the solid sodium carbonate in a beaker</i>
S	Bilas bikar dengan air suling. <i>Rinse the beaker with distilled water.</i>
T	Pindahkan larutan natrium karbonat ke dalam kelalang volumetrik. <i>Transfer the sodium carbonate solution into volumetric flask.</i>

Jadual 4

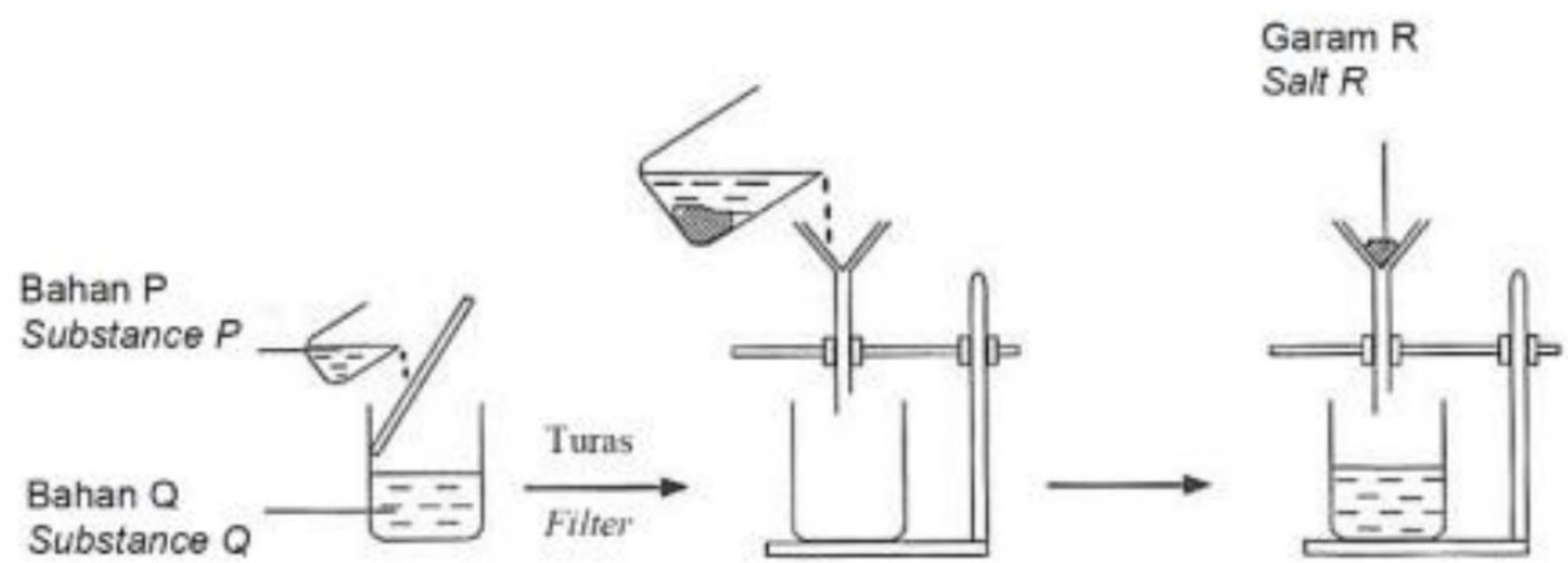
Jadual 4

Pilih susunan langkah-langkah yang betul bagi penyediaan larutan piawai natrium karbonat.

Choose the correct arrangement of steps to prepare the standard solution of sodium carbonate.

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

- 24 Rajah 5 menunjukkan susunan radas untuk menyediakan suatu garam.
Diagram 5 shows the apparatus set-up to prepare a salt.



Rajah 5
Diagram 5

Padanan manakah betul?
Which of the following is correct?

	Bahan P <i>Substance P</i>	Bahan Q <i>Substance Q</i>	Garam R <i>Salt R</i>
A	Magnesium nitrat <i>Magnesium nitrate</i>	Kalsium sulfat <i>Calcium sulphate</i>	Magnesium sulfat <i>Magnesium sulphate</i>
B	Barium nitrat <i>Barium nitrate</i>	Natrium sulfat <i>Sodium sulphate</i>	Barium sulfat <i>Barium sulphate</i>
C	Kalium sulfat <i>Potassium sulphate</i>	Argentum nitrat <i>Silver nitrate</i>	Kalium nitrat <i>Potassium nitrate</i>
D	Asid sulfurik <i>Sulphuric acid</i>	Larutan natrium hidroksida <i>Sodium hydroxide solution</i>	Natrium sulfat <i>Sodium sulphate</i>

- 25 Seorang tukang masak ingin menang dalam pertandingan memasak dengan menyediakan paf durian dalam masa yang singkat. Untuk menyelesaikan masalah itu, beliau perlu membuat perubahan dalam penyediaan bahan makanan tersebut.
Pilih perubahan yang betul untuk menyelesaikan masalah itu.
A chef wants to win in a cooking competition by preparing durian puff in the shortest time. In order to win, he had to make changes in the preparation of the food.
Choose the correct changes to solve the problem.
- A Tambah air di luar paf durian semasa memasak
 Add on water outside of the durian puff while cooking
- B Tambah lebih inti durian
 Add more durian filling
- C Mengecilkan saiz paf durian
 Reduce the size of durian puff

- D Suhu ketuhar lebih tinggi ($180^{\circ}\text{C} - 350^{\circ}\text{C}$)
Higher temperature of oven ($180^{\circ}\text{C} - 350^{\circ}\text{C}$)

- 26 Bagi menghasilkan kaca yang lebih tahan terhadap haba dan bahan kimia, bahan X telah ditambah ke dalam kaca soda kapur dalam proses pembuatannya. Apakah bahan X?

In order to produce a glass that is more resistant to heat and chemical, substance X is added to soda lime glass in the manufacturing process. What is X?

- A Boron oksida
Boron oxide
 B Plumbum (II) oksida
Lead (II) oxide
 C Natrium karbonat
Sodium carbonate
 D Kalsium karbonat
Calcium karbonat

- 27 Jadual 5 menunjukkan keupayaan elektrod piawai bagi ion logam P, Q, R dan S.
 P, Q, R dan S bukan simbol sebenar unsur.

Table 5 show standard electrode potential of metal ion P, Q, R and S.

P, Q, R and S are not the actual symbol of the element.

Ion logam/ Logam Metal ion/ Metal	$E^{\circ}(\text{V})$
P^{+} / P	+ 0.80
Q^{2+} / Q	-0.76
R^{2+} / R	-0.14
S^{2+} / S	-0.25

Jadual 5

Table 5

Berdasarkan maklumat diatas, manakah susunan yang betul mengikut urutan menaik kekuatan agen pengoksidaan?

Based on the above information, which is the correct arrangement of the strength of oxidation agent in ascending order.

- A P,Q,R,S
 B Q,S,R,P
 C $\text{R}^{2+}, \text{S}^{2+}, \text{Q}^{2+}, \text{P}^{+}$
 D $\text{Q}^{2+}, \text{S}^{2+}, \text{R}^{2+}, \text{P}^{+}$

28 Formula struktur manakah yang **tidak** sepadan dengan sebatian yang dinamakan?

Which structural formula does **not** correspond to the named compound?

	Nama sebatian <i>Compound name</i>	Formula Struktur <i>Structural formula</i>
A	Asid etanoik <i>Ethanoic acid</i>	
B	Etanol <i>Ethanol</i>	
C	Etena <i>Ethene</i>	
D	Etana <i>Ethane</i>	

29 Antara bahan tambah makanan berikut, manakah yang digunakan untuk memekatkan jem?

Which of the following food additive is added to thicken jam?

- A Pektin
Pectin
- B Aspartam
Aspartame
- C Natrium nitrit
Sodium nitrite
- D Monogliserida
Monoglyceride

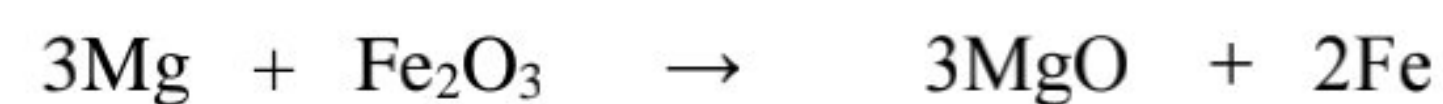
30 Antara berikut, yang manakah kesan sampingan merkuri dalam produk rawatan kulit?

Which of the following is the side effect of mercury in the skin treatment product?

- A Kerosakan buah pinggang
Damage to the kidneys
- B Menyebabkan alahan kulit
Cause skin allergy
- C Pori-pori kulit tersumbat
Clogging of skin pores
- D Skin become dry
Kulit menjadi kering

31 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 16.0g ferum(III) oksida?

[Jisim atom relatif : Fe=56, Mg=24, O=16]

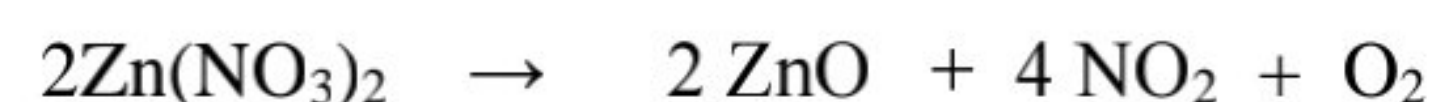
What is the mass of magnesium needed to reduce 16.0g of iron(III) oxide?

[Relative atomic mass : Fe=56, Mg=24, O=16]

- A 2.4g
- B 5.6g
- C 7.2g
- D 16.0g

32 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 18.9g zink nitrat dipanaskan?

[Jisim formula relatif : $\text{Zn}(\text{NO}_3)_2 = 189\text{g mol}^{-1}$: Isipadu 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 18.9g of zinc nitrate was heated?

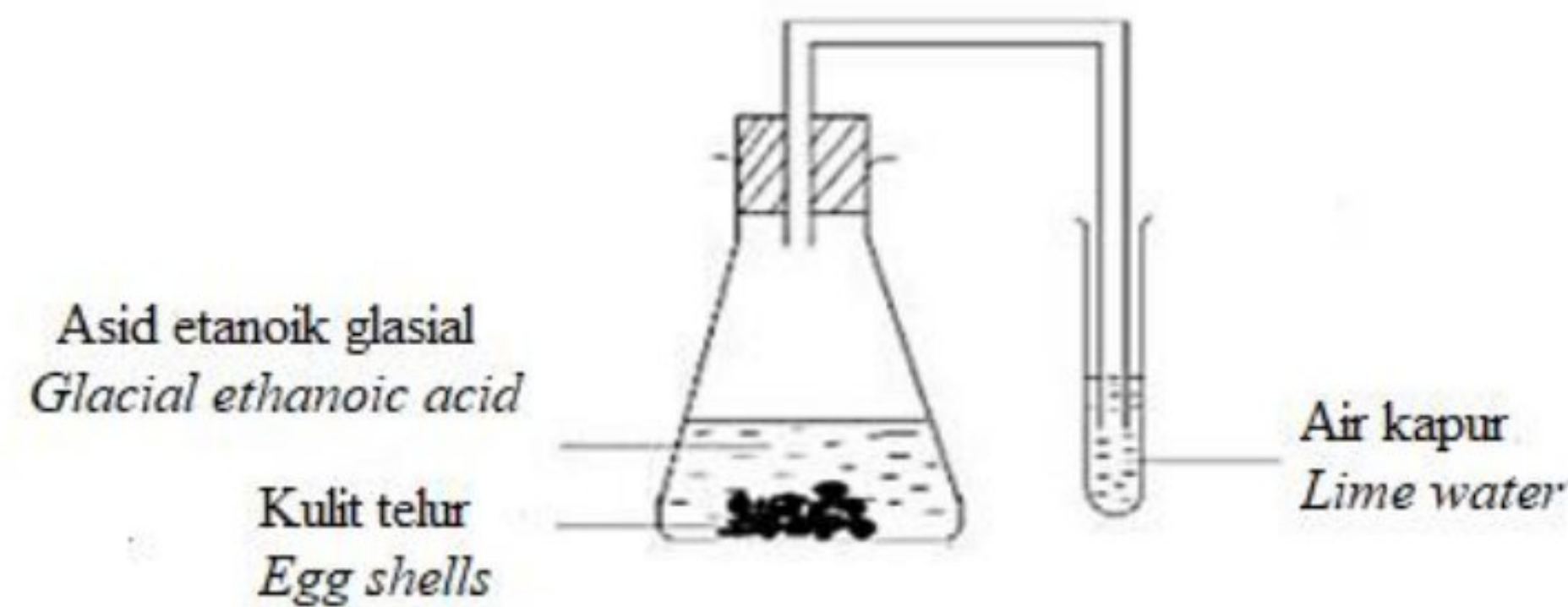
[Relative formula mass : $\text{Zn}(\text{NO}_3)_2 = 189\text{g mol}^{-1}$: Molar volume of gas at STP = $22.4\text{dm}^3\text{mol}^{-1}$]

- A 1.12 dm^3
- B 2.24 dm^3

- C 3.36 dm³
D 4.48 dm³

33 Rajah 6 menunjukkan tindak balas antara kulit telur dan asid etanoik glasial

Diagram 6 shows the reaction between egg shells and ethanoic acid



Rajah 6
Diagram 6

Tiada perubahan yang diperhatikan.

Apakah yang perlu dilakukan untuk mengeruhkan air kapur?

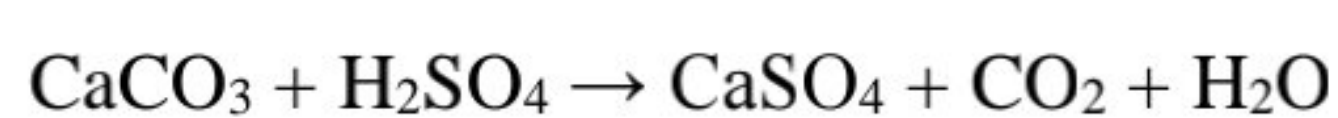
No changes are observed.

What should be done in order to turn the lime water cloudy?

- A Goncangkan campuran dengan kuat
Shake vigorously the mixture
B Tambahkan air kepada campuran.
Add water to the mixture
C Gunakan serbuk kulit telur
Use powdered egg shells
D Panaskan campuran
Heat the mixture

34 Persamaan berikut mewakili tindak balas antara 50 cm³ asid sulfurik 1.0 mol dm⁻³ dengan ketulan kalsium karbonat.

The following equation represents the reaction between 50 cm³ of 1.0 moldm⁻³ sulphuric acid with calcium carbonate chips.



Berapakah bilangan atom dalam gas karbon dioksida yang dibebaskan?

[Pemalar Avogadro: 6.02 x 10²³ mol⁻¹]

What is the number of carbon dioxide molecules released?

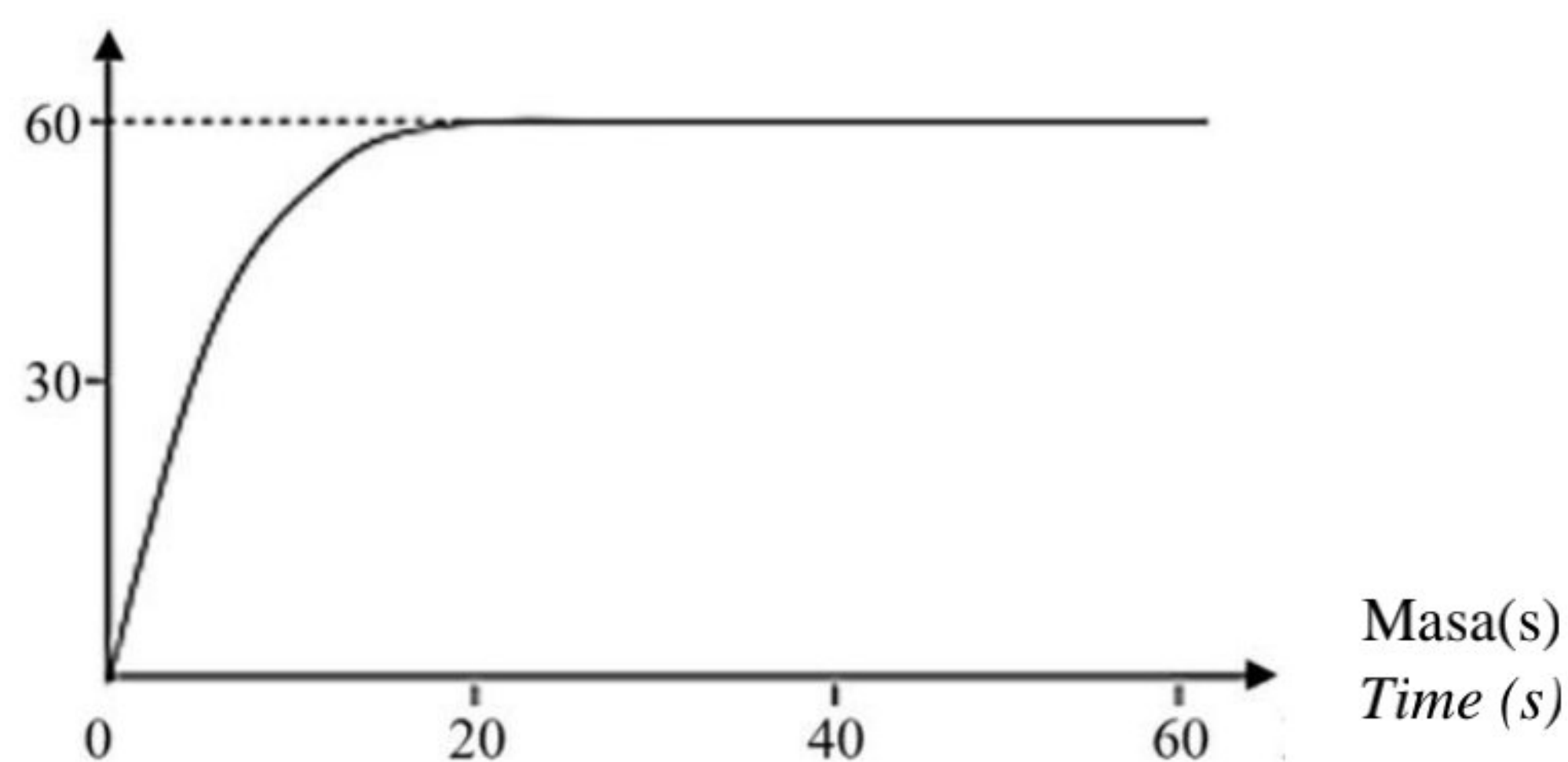
[Avogadro constant: $6.02 \times 10^{23} \text{ mol}^{-1}$]

- A 1.51×10^{22}
- B 3.01×10^{22}
- C 6.02×10^{22}
- D 9.03×10^{22}

- 35 Rajah 7 menunjukkan graf isipadu gas yang terbebas melawan masa bagi tindak balas antara asid sulfurik 1.0 mol dm^{-3} dengan ketulan marmar berlebihan.

Diagram 7 shows a graph of the volume of gas released against time for the reaction between sulphuric acid with excess marble chips.

Isipadu gas karbon dioksida (cm^3)
Volume of carbon dioxide gas (cm^3)



Rajah 7
Diagram 7

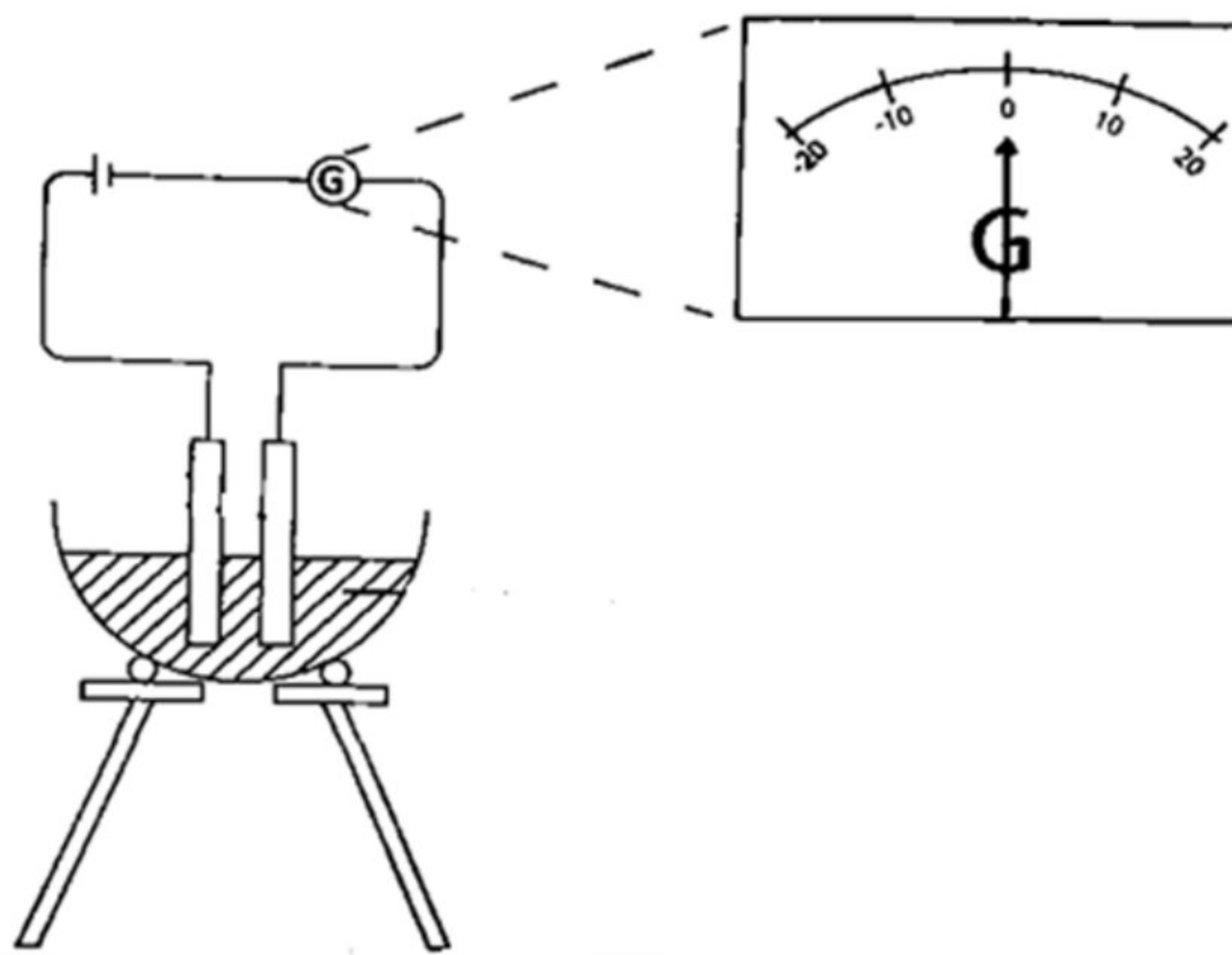
Apakah kadar tindak balas purata bagi tindak balas di atas, sekiranya asid sulfurik digantikan dengan asid hidroklorik dengan kepekatan yang sama.

What is the average rate of the reaction, if sulphuric acid is replaced by the hydrochloric acid with same concentration?

- A $0.5 \text{ cm}^3 \text{ s}^{-1}$
- B $0.7 \text{ cm}^3 \text{ s}^{-1}$
- C $1.5 \text{ cm}^3 \text{ s}^{-1}$
- D $3.0 \text{ cm}^3 \text{ s}^{-1}$

- 36 Rajah 8 di bawah menunjukkan susunan radas bagi elektrolisis pepejal Q.

Diagram 8 shows the apparatus set-up for the electrolysis of solid Q.



Rajah 8
Diagram 8

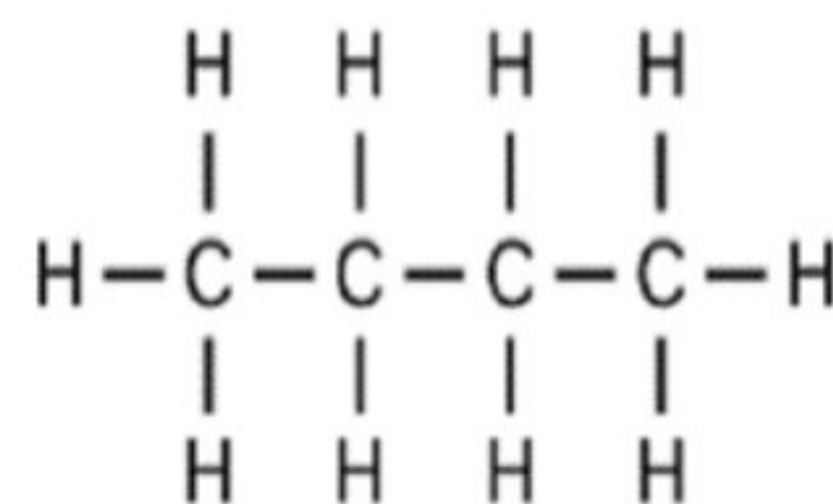
Apakah yang patut dilakukan untuk memesongkan jarum galvanometer itu?

What should be done to deflect the needle of the galvanometer?

- A Panaskan Q
Heat Q
- B Tuang etanol ke dalam Q
Pour ethanol into Q
- C Tambah bilangan sel kering
Increase the number of dry cells
- D Gantikan elektrod karbon dengan elektrod kuprum
Replace carbon electrodes with copper electrodes

- 37 Rajah 9 menunjukkan formula struktur bagi suatu sebatian karbon.

Diagram 9 shows the structural formula for a carbon compound.



Rajah 9
Diagram 9

Antara berikut, yang manakah merupakan isomer bagi sebatian karbon di atas?

Which of the following is the isomer for the above carbon compound?

- A 1-metilpropana
1-methylpropane
- B 2-metilpropana
2-methylpropane
- C 1-metilbutana
1-methylbutane
- D 2-metilbutana
2-methylbutane

- 38 Apabila 50 cm³ larutan plumbum(II) nitrat 2.0 mol dm⁻³ ditambahkan kepada 50 cm³ natrium sulfat 1.5 mol dm⁻³, suhu bertambah sebanyak 9.0 °C. Apakah nilai haba pemendakan?

[Muatan haba tentu larutan = 4.2 Jg⁻¹°C ; ketumpatan larutan = 1.0 gcm⁻³]

When 50 cm³ of 2.0 mol dm⁻³ lead(II) nitrate was added to 50cm³ of 1.5 mol dm⁻³ sodium sulphate, the temperature increased by 9.0 °C. What is the value of heat of precipitation?

[Specific heat capacity of solution = 4.2 Jg⁻¹°C ; Density of solution = 1.0 gcm⁻³]

- A -37.8 kJ mol⁻¹
- B +37.8 kJ mol⁻¹
- C -50.4 kJ mol⁻¹
- D +50.4 kJ mol⁻¹

- 39 Pengeluaran hasil tanaman di suatu ladang berkurangan akibat daripada masalah tanah. Sampel tanah itu dilarutkan dalam air suling dan beberapa ujian telah dijalankan ke atas larutan itu. Di dapati tanah tersebut telah dicemari oleh sejenis asid diprotik X. Asid itu dititratkan dengan 25 cm³ larutan natrium hidroksida 0.001 mol dm⁻³ yang telah ditambah dengan tiga titik fenolftalein.

Jadual 6 menunjukkan keputusan daripada ujian yang telah dijalankan.

The crop production at a farm is decreasing due to soil problem. The soil sample are dissolved in distilled water and a few tests are carried out on the solution. It is found that the soil is polluted by diprotic acid X. The acid is titrated with 25 cm³ of 0.001 mol dm⁻³ of sodium hydroxide solution that is added with three drops of phenolphthalein.

Table 6 shows the results of the test carried out.

Isipadu asid X (cm ³) <i>Volume of acid X (cm³)</i>	25.00	25.50	25.70	25.80	25.90
Warna fenolftalein dalam campuran larutan <i>Colour of phenolphthalein in solution mixture</i>	Merah jambu <i>Pink</i>	Merah jambu <i>Pink</i>	Merah jambu <i>Pink</i>	Tidak bewarna <i>Colourless</i>	Tidak bewarna <i>Colourless</i>

Jadual 6

Table 6

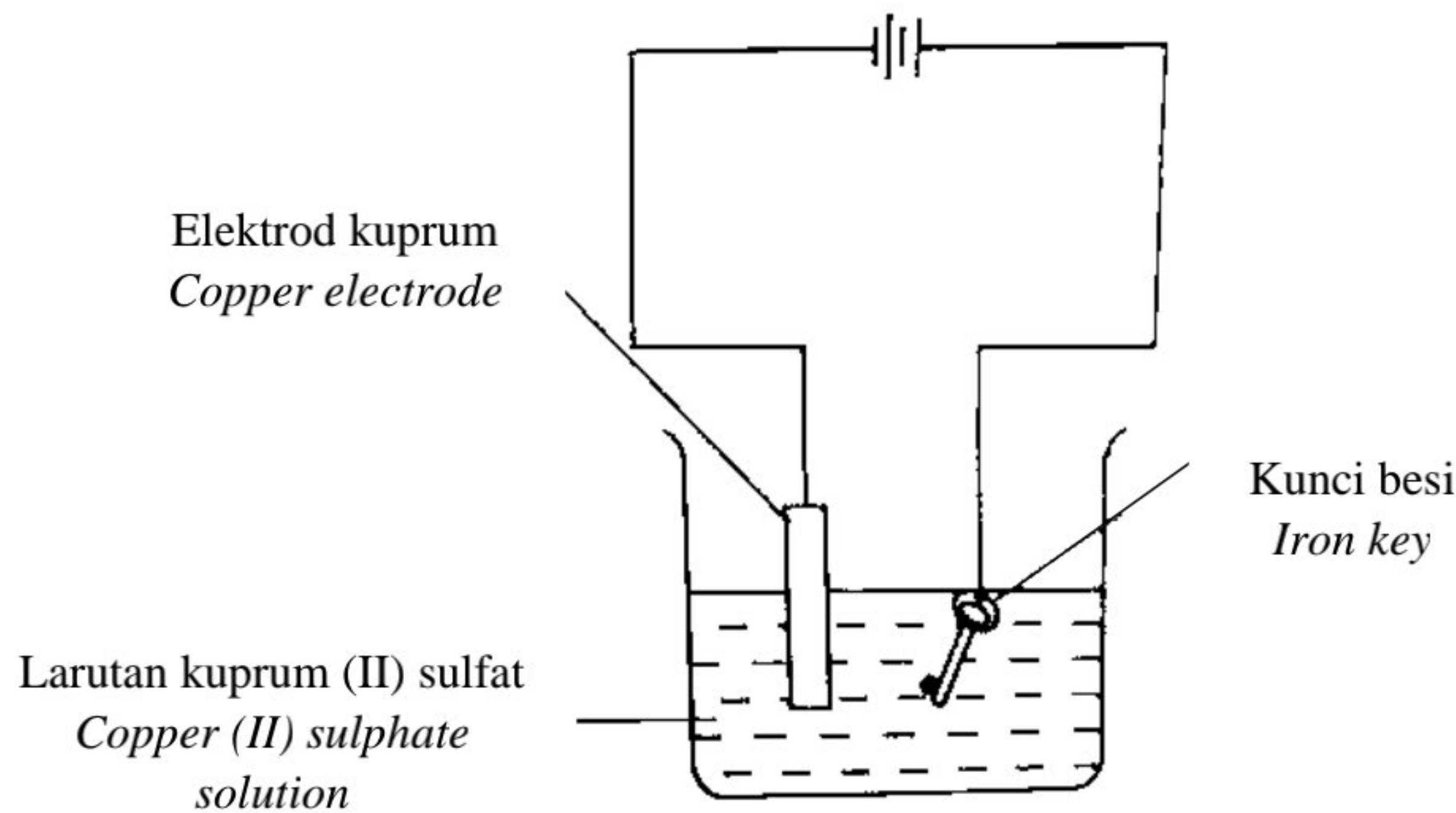
Apakah nilai pH bagi asid X

What is the pH value of acid X?

- A 2.6
- B 2.9
- C 3.0
- D 3.3

- 40 Rajah 10 menunjukkan susunan radas untuk penyaduran kunci besi dengan menggunakan larutan kuprum (II) sulfat 1.0 mol dm^{-3} dan logam kuprum sebagai elektrod.

Diagram 10 shows the apparatus set-up for the electroplating of iron key using 1.0 mol dm^{-3} copper (II) sulphate solution and copper metal as electrode.



Rajah 10
Diagram 10

Selepas 30 minit, jelaskan pemerhatian dalam eksperimen ini.

After 30 minutes, explain the observation in this experiment.

- A. Penyaduran kunci besi oleh logam kuprum tidak berlaku kerana elektrod kuprum kurang elektropositif berbanding paku besi.
The electroplating of iron key by copper metals does not occur because copper electrodes are less electropositive than iron key.
- B. Penyaduran kunci besi tidak berlaku kerana elektrod kuprum perlu disambung pada terminal positif sel kering.
The electroplating of iron key does not occur because copper electrode needs to be connected to the positive terminals of dry cells.
- C. Penyaduran kunci besi tidak berlaku kerana kepekatan larutan kuprum (II) sulfat terlalu rendah.
The electroplating of iron key does not occur because the concentration of copper (II) sulphate is too low.
- D. Penyaduran kunci besi tidak berlaku kerana bilangan sel kering tidak mencukupi.
The electroplating of iron key does not occur due to insufficient number of dry cells.

