

4541/1
Kimia
Kertas 1
Ogos
2016
 1 ¼ jam



SEKOLAH MENENGAH TEKNIK JOHOR BAHRU
KEMENTERIAN PENDIDIKAN MALAYSIA

PEPERIKSAAN PERCUBAAN
SIJIL PELAJARAN MALAYSIA 2016

<https://cikguadura.wordpress.com/>

KIMIA

Kertas 1

Satu jam lima belas minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

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

Disediakan oleh,

.....
 MD SIHAT BIN MD AMIN
 Ketua Panitia Kimia
 SM Teknik Johor Bahru

Disemak oleh,

.....
 HJH FATIMAH BINTI HASHIM
 GKMP Sains dan Matematik
 SM Teknik Johor Bahru

Kertas soalan ini mengandungi 31 halaman bercetak.

- 1 Diagram 1 shows a pack of strawberry jam.
Rajah 1 menunjukkan satu pek jem stroberi.



Diagram 1
Rajah 1

What is the function of pectin in the jam?
Apakah fungsi pektin di dalam jem itu?

- A As thickener
Sebagai pemekat
- B As antioxidant
Sebagai antioksidasi
- C As preservative
Sebagai pengawet
- D As flavouring
Sebagai perisa
- 2 Diagram 2 shows a match. By striking the match, a chemical reaction is initiated.
Rajah 2 menunjukkan sebatang mancis. Apabila mancis digores, tindak balas kimia berlaku.

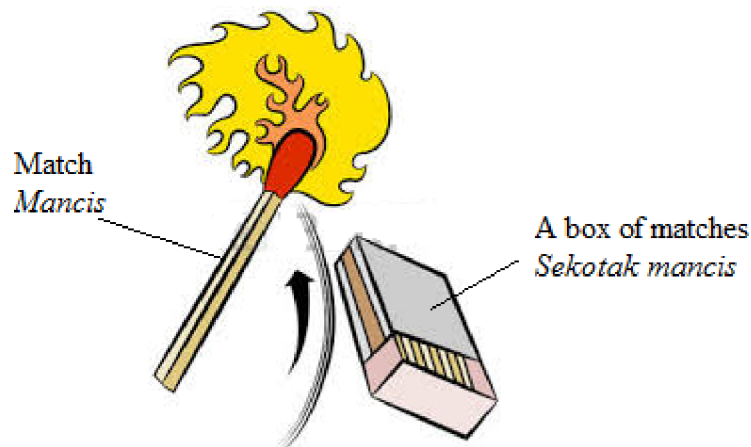


Diagram 2 / *Rajah 2*

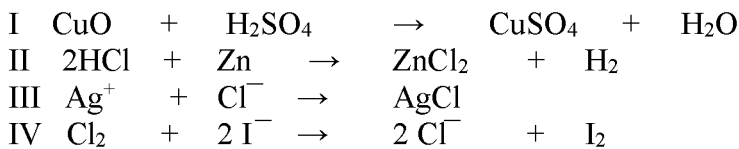
Which statement about the chemical reaction is correct?

Penyataan manakah berkaitan tindak balas di atas adalah benar?

- A** Reaction is endothermic because energy is used to strike the match
Tindak balas adalah endotermik kerana tenaga digunakan untuk menggores mancis
- B** Reaction is endothermic because energy is given out as the match burns
Tindak balas adalah endotermik kerana tenaga dibebaskan semasa mancis terbakar
- C** Reaction is exothermic because energy is used to strike the match
Tindak balas adalah eksotermik kerana tenaga digunakan untuk menggores mancis
- D** Reaction is exothermic because energy is given out as the match burns
Tindak balas adalah eksotermik kerana tenaga dibebaskan semasa mancis terbakar

3 Which of the following equations represent a redox reaction?

Persamaan manakah mewakili tindak balas redoks?



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

4 Diagram 2 shows the set up apparatus for the reaction of yeast with glucose solution.
Rajah 2 menunjukkan susunan radas bagi tindak balas antara yis dengan larutan glukosa.

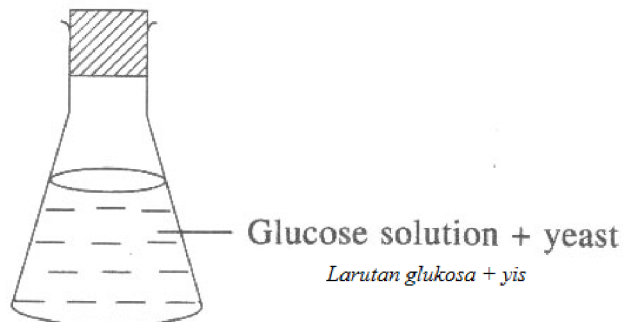


Diagram 3
Rajah 3

What is the name of reaction in the conical flask?
Apakah nama tindak balas di dalam kelalang kon?

- A Oxidation
Pengoksidaan
- B Fermentation
Penapaian
- C Hydrogenation
Penghidrogenan
- D Halogenation
Penghalogenan

- 5 Diagram 4 shows the apparatus setup for the reaction between excess dilute hydrochloric acid and marble chips.
Rajah 4 menunjukkan susunan radas bagi tindak balas antara asid hidroklorik berlebihan ketulan marmar.

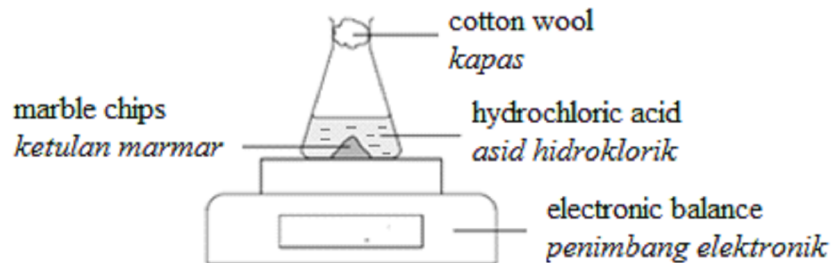
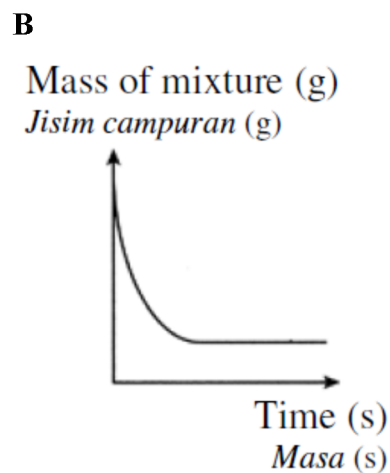
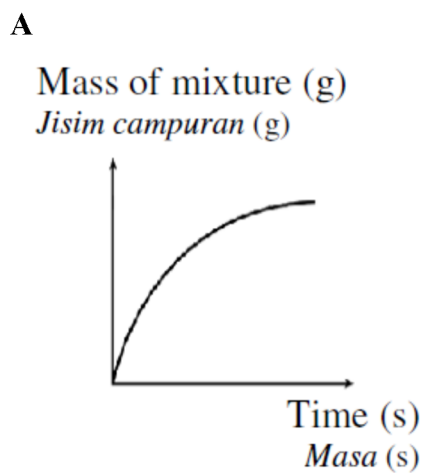


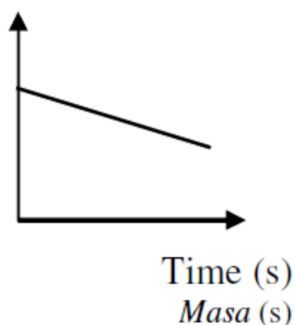
Diagram 4
Rajah 4

Which of the following graphs best represents the changes in the mass of mixture against time?
Antara graf berikut yang manakah terbaik mewakili perubahan jisim campuran melawan masa?



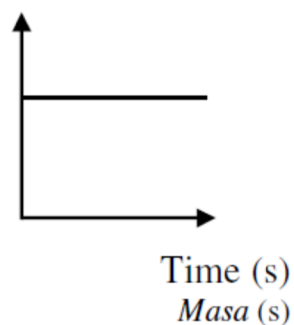
C

Mass of mixture (g)
Jisim campuran (g)



D

Mass of mixture (g)
Jisim campuran (g)



- 6 Sulphur dioxide gas, SO_2 causes environmental pollution. Which of the following environmental pollutions is affected by sulphur dioxide, SO_2 ?
Gas sulfur dioksida, SO_2 boleh menyebabkan pencemaran alam sekitar. Di antara pencemaran alam berikut, yang manakah disebabkan oleh sulfur dioksida?

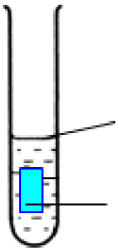
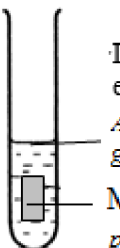
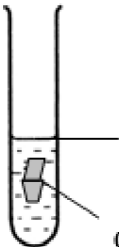
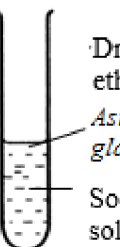
- I pH of the soil increases
pH tanah meningkat
 - II pH of lakes and rivers increases
pH tasik dan sungai meningkat
 - III Salts are leached out of the top soil
Garam meresap keluar daripada tanah atas
 - IV Buildings and metal structures will corrode
Bangunan dan struktur logam mengkakis
- A I and II
I dan II
 - B II and IV
II dan IV
 - C I and III
I dan III
 - D III and IV
III dan IV

- 7 Which of the following is a salt and soluble in water?
Antara berikut, yang manakah garam dan boleh melarut dalam air?

- A Magnesium nitrate
Magnesium nitrat
- B Aluminium oxide
Aluminium oksida
- C Sodium hydroxide
Natrium hidroksida
- D Calcium carbonate
Kalsium karbonat

- 8 Glacial ethanoic acid is put into four test tubes A, B, C and D.
In which test tube does a reaction occur?

*Asid etanoik glasial dimasukkan ke dalam empat tabung uji A, B, C dan D.
Dalam tabung uji manakah tindak balas berlaku?*

| | | | | | |
|---|---|---|---|--|--|
| A |  | <p>Dry glacial ethanoic acid <i>Asid etanoik glasial kering</i></p> <p>pH paper <i>kertas pH</i></p> | B |  | <p>Dry glacial ethanoic acid <i>Asid etanoik glasial kering</i></p> <p>Magnesium ribbon <i>pita magnesium</i></p> |
| C |  | <p>Dry glacial ethanoic acid <i>Asid etanoik glasial kering</i></p> <p>Calcium carbonate chip <i>ketulan kalsium karbonat</i></p> | D |  | <p>Dry glacial ethanoic acid <i>Asid etanoik glasial kering</i></p> <p>Sodium carbonate solution <i>larutan natrium karbonat</i></p> |

- 9 Which of the following substances is an electrolyte?
Yang manakah antara berikut adalah elektrolit?

- A Glucose
Glukosa
- B Ethanol
Etanol
- C Acetamide
Asetamida
- D Sodium chloride
Natrium klorida

- 10 X is an element that has the following properties:
X ialah satu unsur yang mempunyai sifat-sifat berikut:

- Soft solid
Pepejal lembut
- Reacts with cold water to form alkaline solution
Bertindak balas dengan air sejuk membentuk larutan beralkali
- Store in paraffin oil
Disimpan dalam minyak paraffin

Among elements A, B, C and D in the Periodic Table of elements, which element represent X?

Di antara unsur A, B, C dan D di dalam Jadual Berkala berikut, unsur yang manakah mewakili X?

| | | | | | | | |
|----------|----------|--|--|----------|--|--|----------|
| | | | | | | | |
| A | | | | | | | D |
| | B | | | C | | | |
| | | | | | | | |

- 11 Diagram 5 shows the positions of elements T, W, X, Y and Z in the Periodic Table. T, W, X, Y and Z are not the actual symbols of elements.

Rajah 5 menunjukkan kedudukan unsur-unsur T, W, X, Y dan Z dalam Jadual Berkala. T, W, X, Y dan Z bukan simbol sebenar unsur-unsur.

| | | | | | | | |
|----------|----------|--|--|--|----------|----------|----------|
| | | | | | | | Z |
| T | | | | | X | Y | |
| | W | | | | | | |
| | | | | | | | |

Diagram 5

Rajah 5

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

Antara pasangan unsur berikut yang manakah bertindak balas membentuk sebatian ion?

- I X, Z
- II T, Z
- III T, Y
- IV W, Y

A I and II
I dan II

B I and III
I and III

C II and IV
II dan IV

D III and IV
III dan IV

- 12 Diagram 6 shows the apparatus set-up to determine the empirical formula of copper(II) oxide.

Rajah 6 menunjukkan susunan radas bagi menentukan formula empirik kuprum(II) oksida.

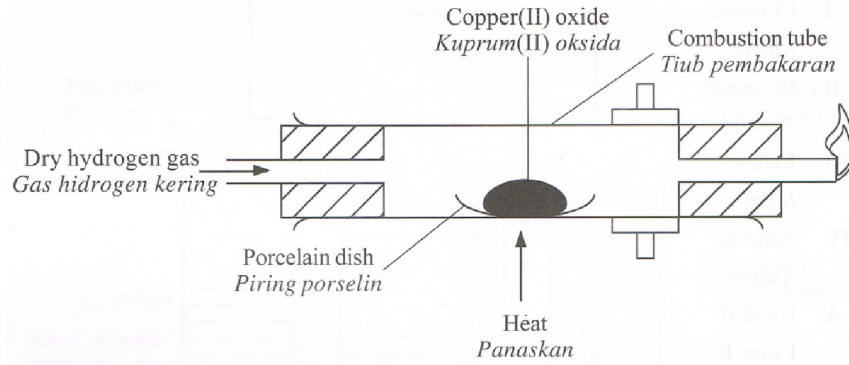


Diagram 6 /Rajah 6

The dry hydrogen gas must be flowed through the apparatus after heating until the products cool. What is the reason for this action to be taken?

Gas hidrogen kering mestilah dialirkan ke dalam radas selepas pemanasan sehingga hasil terbentuk menjadi sejuk. Apakah alasan langkah ini dibuat?

- A To ensure all the copper(II) oxide has changed into copper
Untuk memastikan semua kuprum(II) oksida bertukar kepada kuprum
- B To prevent hot copper from reacting with air to form copper(II) oxide again
Untuk menghalang kuprum panas bertindak balas dengan udara membentuk kuprum(II) oksida semula
- C To prevent explosion due to combustion of hydrogen gas and air
Untuk menghalang letupan yang disebabkan oleh pembakaran gas hidrogen dan udara
- D To prevent the water from flowing towards the hot porcelain dish and cracks the combustion tube
Untuk menghalang air daripada mengalir ke arah piring porselin dan memecahkan tiub pembakaran

- 13 Table 1 shows the melting point and boiling point of substances W, X, Y and Z.

Jadual 1 menunjukkan takat lebur dan takat didih sebatian W, X, Y dan Z.

| Substance <i>Sebatian</i> | Melting point (°C) <i>Takat lebur</i> | Boiling point (°C) <i>Takat didih</i> |
|------------------------------|--|--|
| W | -187 | -126 |
| X | -78 | 70 |
| Y | 75 | 130 |
| Z | 114 | 444 |

Table 1 / *Jadual 1*

Which substance is a liquid at room temperature?

Sebatian manakah merupakan cecair pada suhu bilik?

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

- 14 Which of the following medicine and its usage have been matched correctly?
 Yang manakah pasangan yang betul berkaitan ubat dan kegunaannya?

| | Medicine <i>Ubat</i> | Usage <i>Kegunaan</i> |
|-----|-------------------------------------|---|
| I | Streptomycin <i>streptomisin</i> | Pneumonia treatment <i>Rawatan pneumonia</i> |
| II | Aspirin <i>Aspirin</i> | Relief pain <i>Meredakan kesakitan</i> |
| III | Amphetamine <i>Amfetamin</i> | Controlling depression <i>Mengawal tekanan</i> |
| IV | Insulin <i>Insulin</i> | Diabetes mellitus treatment <i>Rawatan diabetes mellitus</i> |

Table 2
 Jadual 2

- A I and II
I dan II
- B I and III
I and III
- C II and IV
II dan IV
- D III and IV
III dan IV
- 15 The diagram 7 shows the electrons arrangement of atom of element Q.
 Rajah 7 menunjukkan susunan elektron bagi atom unsur Q.

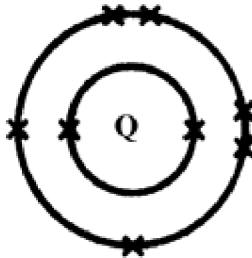


Diagram 7 / Rajah 7

Element P reacts with element Q to form an ionic compound with the formula PQ.
 What is the electron arrangement of atom P?
 Unsur P bertindak balas dengan unsur Q membentuk sebatian ion dengan formula PQ.
 Apakah susunan elektron atom P?

- A 2
- B 2.1
- C 2.8.1
- D 2.8.2

- 16 Aluminium oxide has both acidic and basic properties. What is the name given to this property?

Aluminium oksida mempunyai kedua-dua sifat asid dan bes. Apakah nama yang diberikan kepada sifat ini?

- A** A base oxide
Oksida bes
- B** An acid oxide
Oksida asid
- C** A metalloid oxide
Oksida separuh logam
- D** An amphoteric oxide
Oksida amfoterik

- 17 Diagram 8 shows an electron arrangement of R^{2-} ion.

Rajah 8 menunjukkan susunan elektron bagi ion R^{2-} .

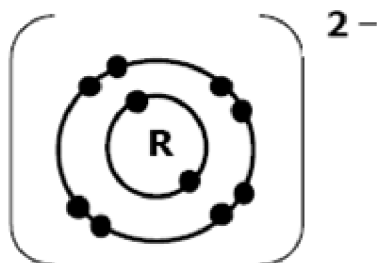


Diagram 8

Rajah 8

How many protons and electrons in atom R?

Berapakah bilangan proton dan elektron yang terdapat dalam atom R?

| | Protons <i>Proton</i> | Electrons <i>elektron</i> |
|----------|---------------------------------|-------------------------------------|
| A | 8 | 6 |
| B | 8 | 10 |
| C | 10 | 10 |
| D | 8 | 8 |

- 18 The following information shows the properties of element Q.

Maklumat berikut menunjukkan ciri-ciri unsur Q.

- Act as a catalyst
Bertindak sebagai mangkin
- Form complex ion
Membentuk ion kolmpleks
- Forms coloured compounds
Membentuk sebatian berwarna
- Has more than one oxidation number
Mempunyai lebih daripada satu nombor pengoksidaan

What is Q?
Apakah Q?

- A** Iron
Ferum
- B** Sodium
Natrium
- C** Sulphur
Sulfur
- D** Magnesium
Magnesium

- 19** Diagram 9 shows the flow chart of processes in industry.
Rajah 9 menunjukkan carta alir proses-proses dalam industri.

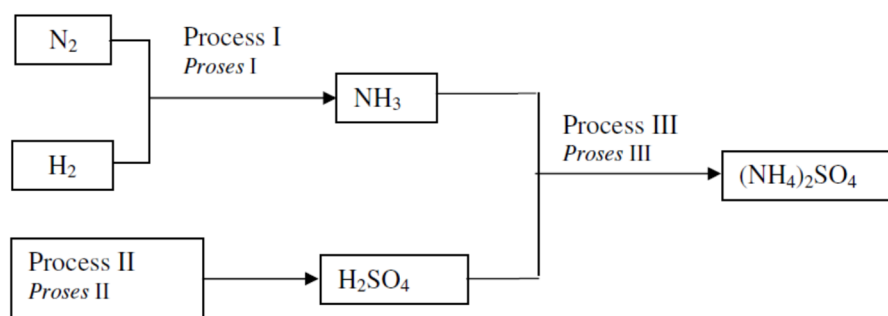


Diagram 9
Rajah 9

What is process I, II and III?
Apakah proses I, II dan III?

| | Process I <i>Proses I</i> | Process II <i>Proses II</i> | Process III <i>Proses III</i> |
|----------|-------------------------------------|---------------------------------------|---|
| A | Haber <i>Haber</i> | Contact <i>Sentuh</i> | Hydrogenation <i>Penghidrogenan</i> |
| B | Contact <i>Sentuh</i> | Haber <i>Haber</i> | Ostwald <i>Ostwald</i> |
| C | Haber <i>Haber</i> | Contact <i>Sentuh</i> | Neutralisation <i>Peneutralan</i> |
| D | Contact <i>Sentuh</i> | Ostwald <i>Ostwald</i> | Haber <i>Haber</i> |

- 20 Diagram 10 shows steps taken to test the presence of ion in the solution K.
Rajah 10 menunjukkan langkah-langkah yang diambil untuk menguji kehadiran ion di dalam larutan K.

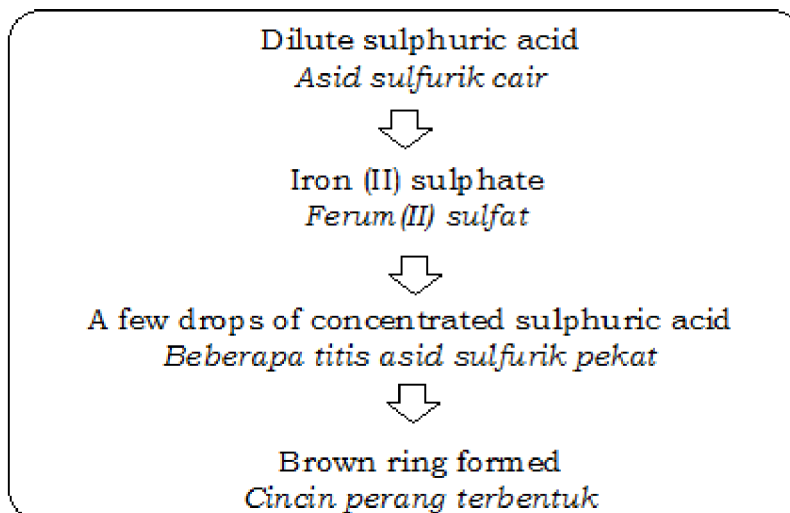


Diagram 10
Rajah 10

Which of the following substances could be K?
Antara berikut sebatian manakah yang mungkin bagi K?

- A** Sodium chloride
Natrium klorida
- B** Potassium carbonate
Kalium karbonat
- C** Magnesium nitrate
Magnesium nitrat
- D** Copper(II) sulphate
Kuprum(II) sulfat
- 21 Table 3 shows the pH values of four acidic solutions which have the same concentration.
Jadual 3 menunjukkan nilai pH bagi empat larutan berasid dengan kepekatan yang sama.

| Solution <i>Larutan</i> | pH value <i>Nilai pH</i> |
|----------------------------|-----------------------------|
| K | 1.0 |
| L | 3.0 |
| M | 5.0 |
| N | 6.0 |

Table 3
Jadual 3

Which acidic solution has the highest degree of dissociation?
Larutan asid manakah mempunyai darjah penceraian yang paling tinggi?

- A.** K **B.** L **C.** M **D.** N

- 22 Diagram 11 shows the set-up of the apparatus used to electrolyse 1 mol dm⁻³ potassium iodide solution by using carbon electrodes.

Rajah 11 menunjukkan susunan radas yang digunakan untuk mengelektrolisis larutan kalium iodida 1 mol dm⁻³ menggunakan elektrod karbon.

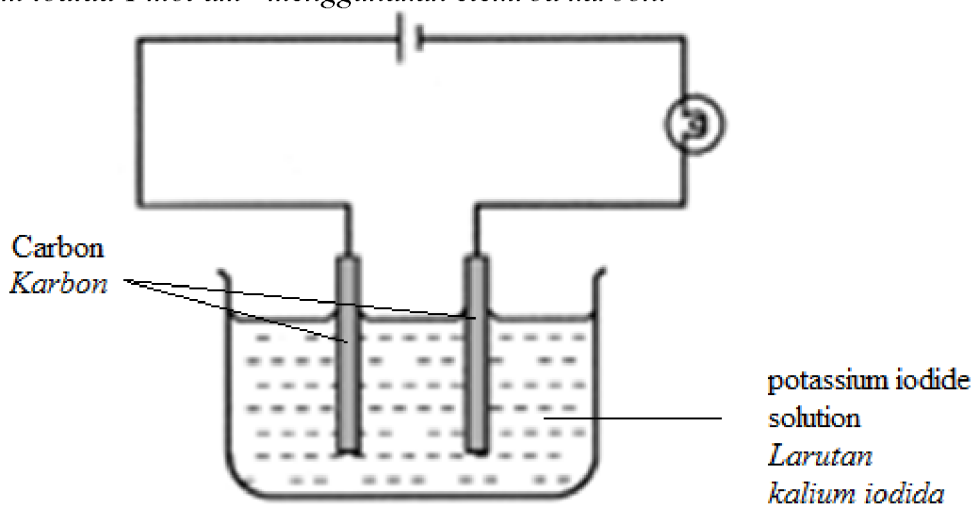


Diagram 11

Rajah 11

What is the most suitable test to confirm the product formed at anode?

Apakah ujian yang paling sesuai untuk mengesahkan hasil yang terbentuk di anod?

- A Burning wooden splinter
Kayu uji menyala
- B Glowing wooden splinter
Kayu uji berbara
- C Moist blue litmus paper
Kertas litmus biru lembap
- D A few drops of starch solution
Beberapa titis larutan kanji
- 23 Table 4 shows the boiling points of three elements in Group 17.
Jadual 4 menunjukkan takat didih bagi tiga unsur Kumpulan 17.

| Halogen <i>Halogen</i> | Boiling point (°C) <i>Takat didih</i> |
|----------------------------|--|
| Fluorine <i>Fluorin</i> | -188 |
| Chlorine <i>Klorin</i> | -35 |
| Bromine <i>Bromin</i> | 59 |

Table 4

Jadual 4

Which of the following best explain why the boiling point increases down the group?

Antara berikut, pernyataan manakah terbaik menerangkan mengapa takat didih semakin bertambah apabila memuruni kumpulan?

- A** Increase in proton number
Pertambahan nombor proton
- B** Increase in strength of the intermolecular forces
Pertambahan kekuatan daya antara molekul
- C** Increase in number of occupied shells of the atom
Pertambahan bilangan petala berisi elektron atom itu
- D** Increase in strength of the covalent bond between the atoms
Pertambahan kekuatan ikatan kovalen di antara atom-atom

- 24** Elements M and N combined to form a compound which has the following characteristics:

Unsur M dan N bergabung membentuk satu sebatian dengan ciri-ciri berikut:

- Low melting point
Takat lebur yang rendah
- Does not dissolve in water
Tidak larut dalam air

Which of the following is true about elements M and N?

Penyataan manakah benar berkaitan unsur M dan N?

- A** M and N have equal number of electrons
M dan N mempunyai bilangan elektron yang sama
- B** Both M and N are transition metals
Kedua-dua M dan N adalah logam peralihan
- C** M is a metal and N is a non metal
M adalah logam dan N adalah bukan logam
- D** Both M and N are non metals
Kedua-dua M dan N adalah bukan logam
- 25** Table 5 shows the electron arrangement and nucleon number for atoms E and G.
Jadual 5 menunjukkan susunan elektron dan nombor nukleon bagi atom-atom E dan G.

| | Atom E <i>Atom E</i> | Atom G <i>Atom G</i> |
|---|--------------------------------|--------------------------------|
| Electron arrangement <i>Susunan elektron</i> | 2.8.3 | 2.8.7 |
| Nucleon number <i>Nombor nukleon</i> | 27 | 35 |

Table 5
Jadual 5

Based on Table 5, what is the relative molecular mass for compound formed when E reacts with G?

Berdasarkan jadual 5, apakah jisim molekul relatif bagi sebatian yang terbentuk apabila E bertindak balas dengan G?

- A 62
 B 64
 C 97
 D 132

- 26 Which of the following particles contain 10 electrons?
Antara zarah-zarah berikut, yang manakah mengandungi 10 elektron?
 [Proton number: Na=11, Ne=10, Cl=17, Mg=12]
 [Nombor proton: Na=11, Ne=10, Cl=17, Mg=12]

- I Na
 II Ne
 III Cl^-
 IV Mg^{2+}

- A I and II
I dan II
- B I and III
I and III
- C II and IV
II dan IV
- D III and IV
III dan IV
- 27 Diagram 12 shows the correct method to wash hands before meal.
Rajah 12 menunjukkan kaedah yang betul untuk membasuh tangan sebelum makan.

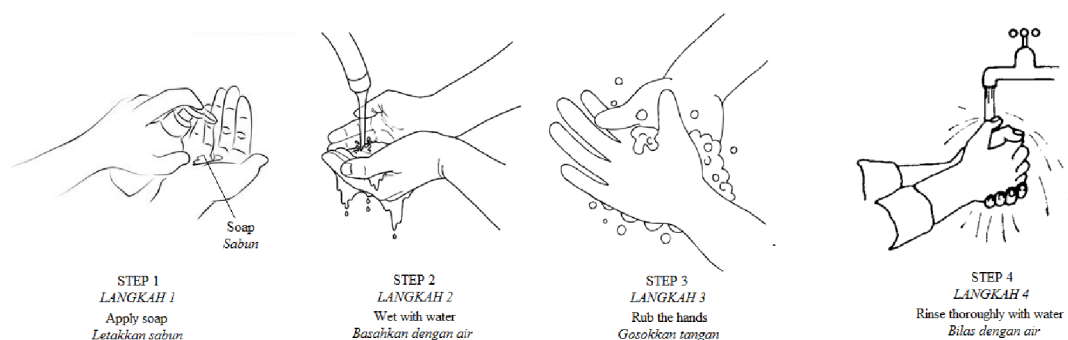
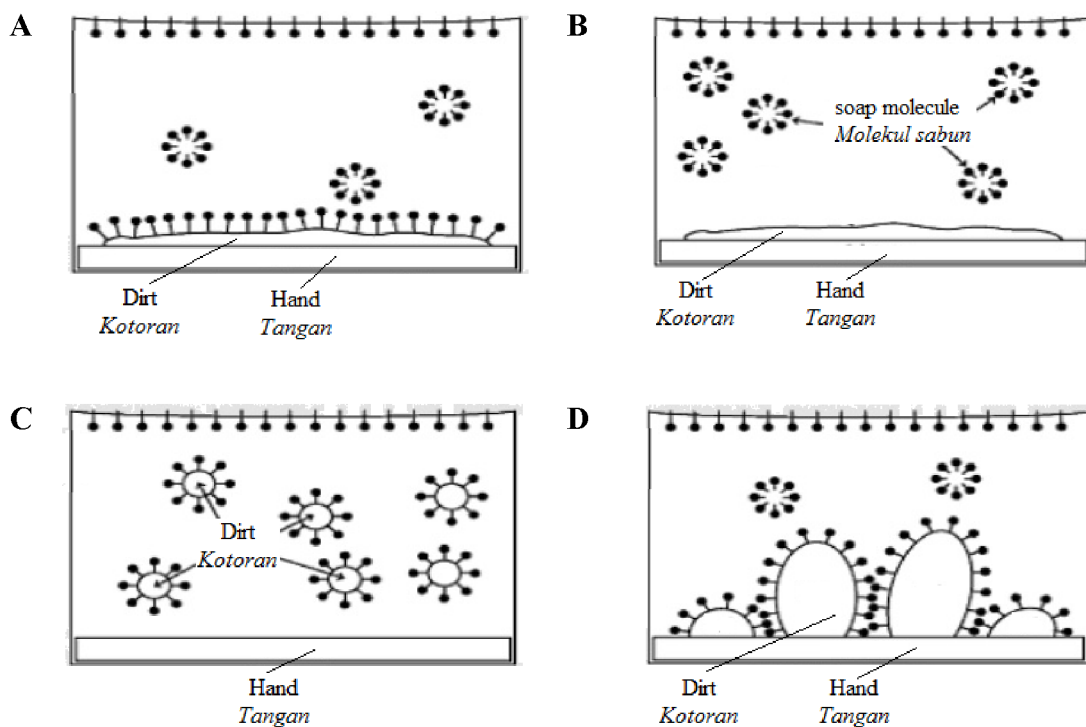


Diagram 12
 Rajah 12

- Which of the following diagram occur during step 3?
Antara rajah berikut yang manakah berlaku semasa langkah 3?



- 28 The equation below shows a displacement reaction and its heat of reaction.
Persamaan berikut menunjukkan tindak balas penyesebaran dan haba tindak balasnya.



Which of the following statements are true about the reaction represented by the above equation?

Penyataan manakah benar berkaitan tindak balas yang diwakili oleh persamaan di atas?

- I The reaction is endothermic
Tindak balas adalah endotermik
- II Magnesium is oxidized
Magnesium teroksida
- III The temperature decreases during the reaction
Suhu menurun semasa tindak balas
- IV The heat released during formation of 0.2 mole of iron is 37.8 kJ
Haba yang dibebaskan semasa 0.2 mol ferum terbentuk adalah 37.8 kJ.

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

- 29 Diagram 13 shows the rusting process of iron.
Rajah 13 menunjukkan proses pengaratan besi/ferum.

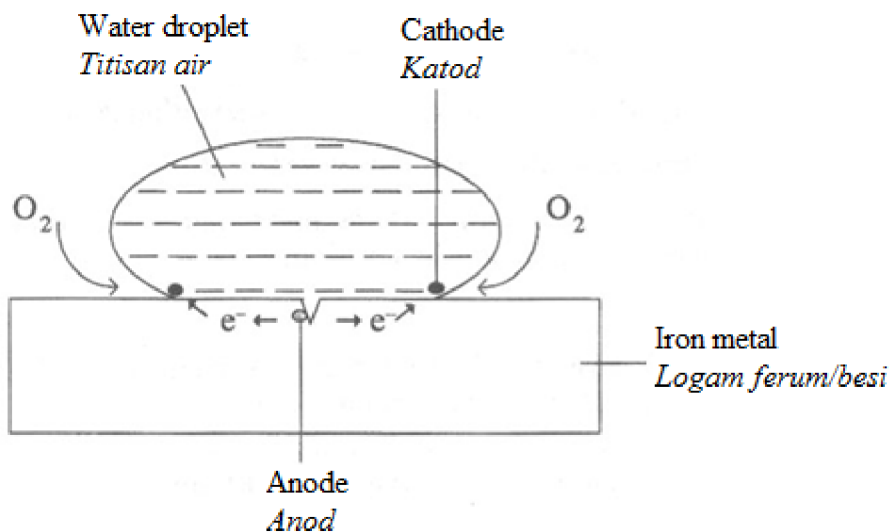


Diagram 13
Rajah 13

Which of the following equations occurs at the cathode?
Antara persamaan setengah berikut, yang manakah 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 $4\text{OH}^- \rightarrow \text{O}_2 + 2\text{H}_2\text{O} + 4\text{e}^-$
- 30 Diagram 14 shows the chemical change that occurs to compound G.
Rajah 14 menunjukkan perubahan kimia yang berlaku kepada sebatian G.

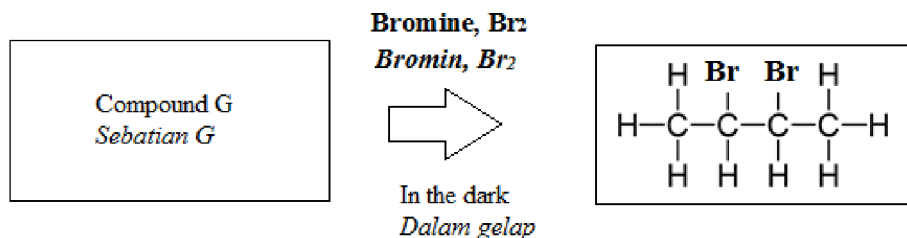


Diagram 14
Rajah 14

What is compound G?
Apakah sebatian G?

- A but-1-ene
but-1-ena
- B but-2 ene
but-2-ena
- C butane
butana
- D 2,2-dibromobutane
2,2-dibromobutana

- 31 Diagram 15 shows a pasar malam trader was grilling satay using charcoal.
Rajah 15 menunjukkan seorang peniaga pasar malam sedang memanggang sate menggunakan kayu arang.



Diagram 15
Rajah 15

The satay can be cooked faster if the temperature is higher. How to increase the temperature without charring the satay?

Sate boleh dimasak lebih cepat jika suhu adalah lebih tinggi. Bagaimana untuk meningkatkan suhu tanpa menghanguskan sate?

- A Add more large chunk of charcoal
Tambahkan kayu arang yang lebih besar
- B Replace charcoal with normal wood
Gantikan kayu arang dengan kayu biasa
- C Use fan to increase air flow
Gunakan kipas untuk meningkatkan aliran udara
- D Use smaller size meat or chicken
Gunakan saiz daging atau ayam yang lebih kecil

- 32 Diagram 16 shows a space shuttle and the outer body is made of material Y.
Rajah 16 menunjukkan sebuah kapal angkasa dan badan luarnya diperbuat daripada bahan Y.

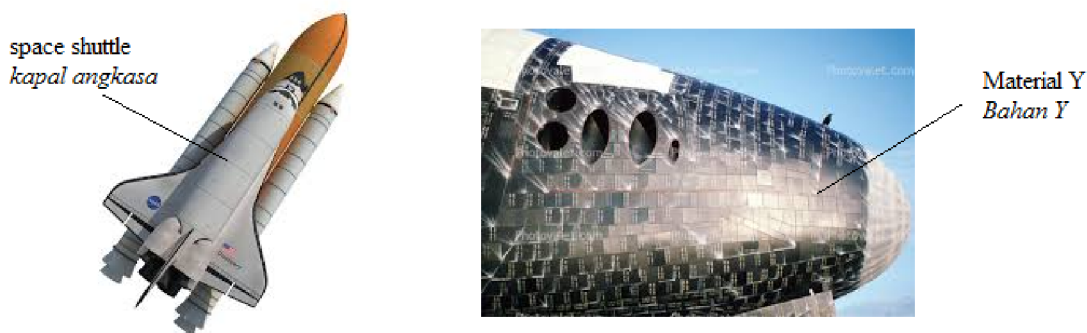


Diagram 16
Rajah 16

Which of the following is correct regarding material Y?
Antara berikut, yang manakah benar berkaitan bahan Y?

| | Material Y <i>Bahan Y</i> | Property <i>Ciri-ciri</i> |
|----------|--|---|
| A | Reinforced Concrete <i>Konkrit yang diperkuat</i> | High tensile strength <i>Daya tensil yang tinggi</i> |
| B | Ceramic <i>Seramik</i> | Withstand high temperature <i>Menahan suhu yang tinggi</i> |
| C | Duralumin alloy <i>Aloi duralumin</i> | Light and strong <i>Ringan dan kuat</i> |
| D | Fibre glass <i>Gentian kaca</i> | Hard, strong and low density <i>Keras, kuat dan berketumpatan rendah</i> |

- 33 Diagram 17 shows the formation of a yellow precipitate when solution J and solution K are mixed.
Rajah 17 menunjukkan pembentukan mendakan kuning apabila larutan J dan larutan K dicampurkan.

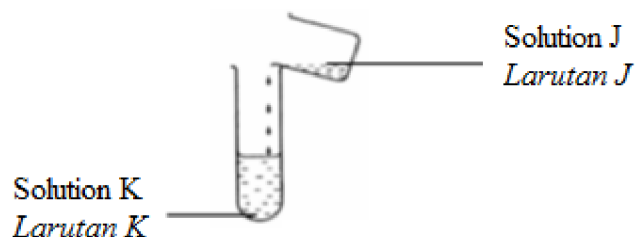


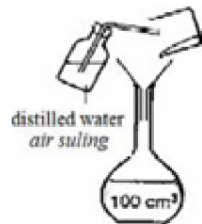
Diagram 17
Rajah 17

Which of the following is the most suitable to be solution J and solution K?
Antara berikut larutan manakah paling sesuai dijadikan larutan J dan larutan K?

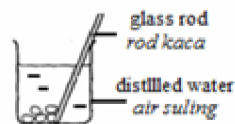
- I Potassium iodide and lead (II) nitrate
Kalium iodida dan plumbum(II) nitrat
- II Potassium chromate(VI) and lead(II) nitrate
Kalium kromat(VI) dan plumbum(II) nitrat
- III Sodium chloride and silver nitrate
Natrium klorida dan argentum nitrat
- IV Sodium sulphate and silver nitrate
Natrium sulfat dan argentum nitrat

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

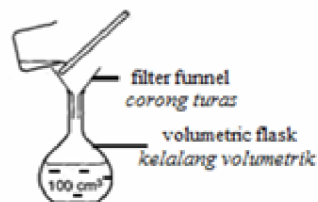
- 34 Diagram 18 shows the steps taken to prepare a standard solution.
Rajah 18 menunjukkan langkah-langkah yang diambil untuk menyediakan satu larutan piawai.



STEP P
LANGKAH P



STEP Q
LANGKAH Q



STEP R
LANGKAH R



STEP S
LANGKAH S

Diagram 18
Rajah 18

What is the arrangement of the steps in correct order to prepare a standard solution?
Apakah susunan langkah-langkah yang betul untuk menyediakan larutan piawai?

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

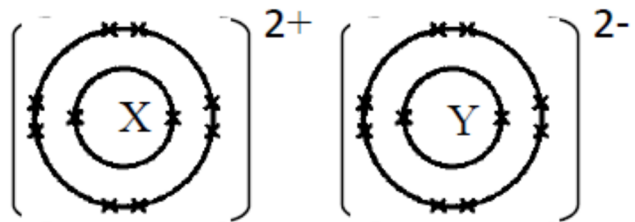
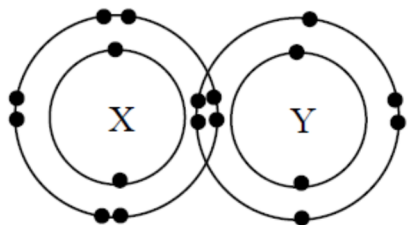
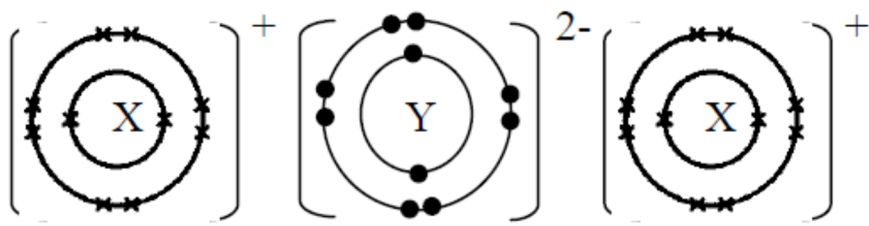
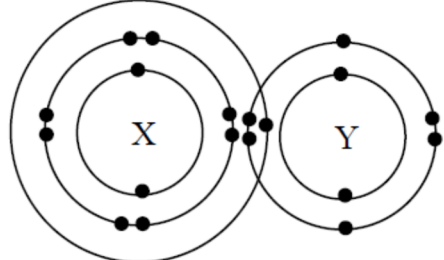
- 35 Table 6 shows the proton number of elements X and Y.
Jadual 6 menunjukkan nombor proton bagi unsur X dan Y.

| Element <i>Unsur</i> | Proton number <i>Nombor proton</i> |
|-------------------------|---------------------------------------|
| X | 11 |
| Y | 8 |

Table 6
Jadual 6


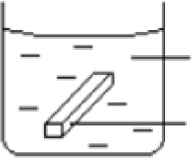
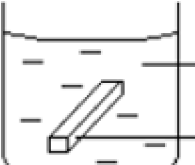

Which of the following shows the electron arrangement of the compound formed when element X reacts with element Y?

Antara berikut yang manakah menunjukkan rajah susunan elektron bagi sebatian yang terbentuk apabila unsur X bertindak balas dengan unsur Y?

- A 
- B 
- C 
- D 

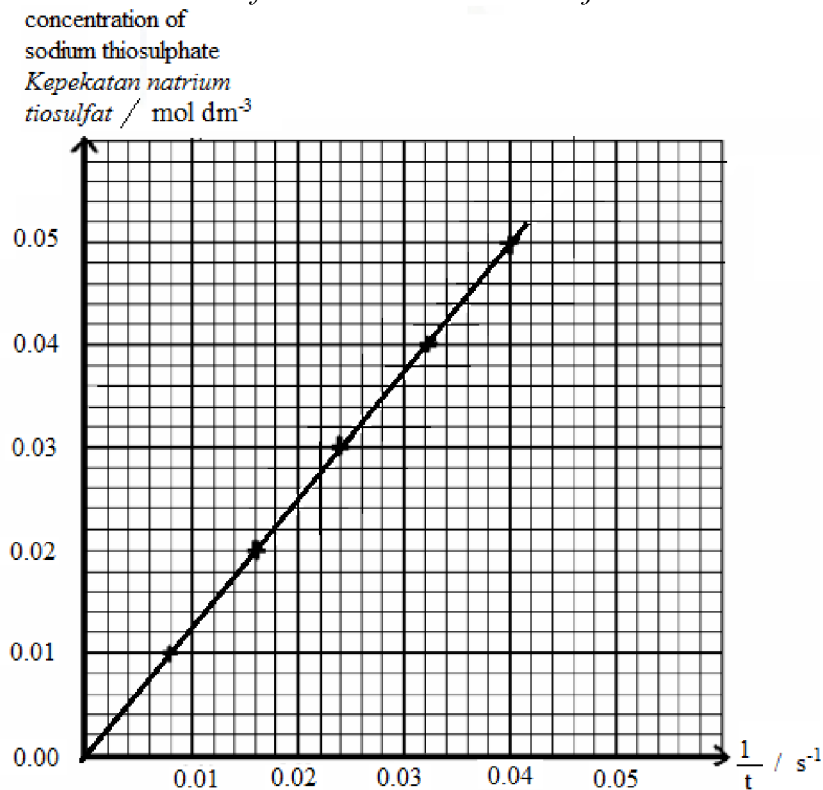
- 36 Displacement of metal from its salt solution occur when the colour of solution show changes. The displacement of metal can be used to construct electrochemical series. Which of the following solutions will show colour changes?

Penyesaran logam daripada larutan garamnya berlaku apabila warna larutan mengalami perubahan. Penyesaran logam boleh digunakan untuk membina siri elektrokimia. Antara larutan berikut yang manakah menunjukkan perubahan warna?

| | |
|--|---|
| <p>A</p>  <p>AgNO₃ solution Larutan AgNO₃</p> <p>Cu strip Jalur Cu</p> | <p>B</p>  <p>ZnCl₂ solution Larutan ZnCl₂</p> <p>Cu strip Jalur Cu</p> |
| <p>C</p>  <p>ZnSO₄ solution Larutan ZnSO₄</p> <p>Fe strip Jalur Fe</p> | <p>D</p>  <p>Zn(NO₃)₂ solution Larutan Zn(NO₃)₂</p> <p>Pb strip Jalur Pb</p> |

- 37 An experiment is carried out to study the effect of concentration on the rate of reaction between sodium thiosulphate and hydrochloric acid.
Satu eksperimen telah dijalankan untuk mengkaji kesan kepekatan terhadap kadar tindak balas di antara natrium tiosulfat dengan asid hidroklorik.

Graph of the concentration of sodium thiosulphate against 1/time is as shown:
Graf kepekatan natrium tiosulfat melawan 1/masa ditunjukkan di bawah:



Based on the graph, what is the value of t if the experiment is repeated using sodium thiosulphate solution 0.06 mol dm^{-3} .

Berdasarkan graf, apakah nilai t jika eksperimen diulangi menggunakan larutan natrium tiosulfat berkepekatan 0.06 mol dm^{-3} .

- A 23.8 s
- B 20.8 s
- C 0.048 s^{-1}
- D 0.042 s^{-1}

- 38 Diagram 19 shows an experiment to determine the empirical formula for an iron oxide.

Rajah 19 menunjukkan satu eksperimen untuk menentukan formula empirik ferum oksida.

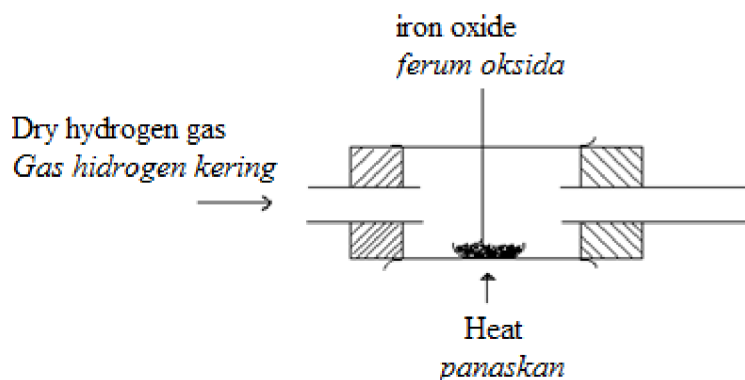


Diagram 19
Rajah 19

The experimental results are as follows:

Keputusan eksperimen adalah seperti berikut:

| | |
|---|------------|
| Mass of an empty combustion tube | = 262.20 g |
| <i>Jisim tiub pembakaran kosong</i> | |
| Mass of combustion tube + iron oxide | = 263.80 g |
| <i>Jisim tiub pembakaran + ferum oksida</i> | |
| Mass of combustion tube + iron that is produced | = 263.32 g |
| <i>Jisim tiub pembakaran + ferum yang terbentuk</i> | |

What is the empirical formula for this iron oxide?

Apakah formula empirik ferum oksida ini?

[Relative atomic mass: Fe=56; O=16]

[Jisim atom relatif: Fe=56; O=16]

- A FeO
- B Fe₂O₃
- C Fe₃O₄
- D Fe₂O₅

- 39 Complete combustion of methane gas, CH_4 produces carbon dioxide, CO_2 and water, H_2O .

What is the mass of water produced when 3.2 g of methane is burnt completely?

Pembakaran lengkap gas metana, CH_4 menghasilkan karbon dioksida, CO_2 dan air, H_2O .

Berapakah jisim air yang terhasil apabila 3.2 g metana terbakar dengan lengkap?

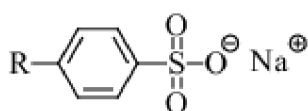
[molar mass of methane = 16 g mol^{-1} ; molar mass of water = 18 g mol^{-1}]

[jisim molar metana = 16 g mol^{-1} ; jisim molar air = 18 g mol^{-1}]

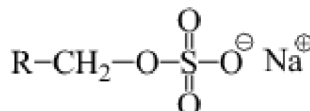
- A** 0.18 g
B 0.20 g
C 3.60 g
D 7.20 g

- 40 Diagram 20 shows cleaning agent A and cleaning agent B.

Rajah 20 menunjukkan agen pembersih A dan agen pembersih B.



Cleaning agent A
Agen pembersih A



Cleaning agent B
Agen pembersihan B

Diagram 20

Rajah 20

Which statement is correct regarding cleaning agent A and B?

Penyataan manakah benar berkaitan agen pembersih A dan B?

| | Cleaning agent A <i>Agen pembersih A</i> | Cleaning agent B <i>Agen pembersih B</i> |
|----------|--|--|
| A | A soap <i>Sejenis sabun</i> | A detergent <i>Sejenis detergent</i> |
| B | Effective in soft water <i>Berkesan dalam air lembut</i> | Effective in hard water <i>Berkesan dalam air liat</i> |
| C | Sodium alkyl sulphate <i>Natrium alkil sulfat</i> | Sodium alkylbenzene sulphonate <i>Natrium alkilbenzena sulfonat</i> |
| D | Made from palm oil <i>Diperbuat daripada minyak sawit</i> | Made from petroleum <i>Diperbuat daripada petroleum</i> |

- 41 Diagram 21 shows a hot pack and a cold pack that can be used to treat sports injuries.

It consists of substance X and substance Y which can react to produce instant coldness or hotness.

Rajah 21 menunjukkan satu pek panas dan satu pek sejuk yang boleh digunakan untuk merawat kecederaan sukan.

Ia terdiri daripada bahan X dan bahan Y yang boleh bertindak balas untuk menghasilkan kesejukan atau kepanasan dengan segera.



Diagram 14
Rajah 14

Which pack is the most suitable to reduce swelling muscle of athletes during injury and what is the name of substance X and substance Y?

Pek yang manakah paling sesuai untuk mengurangkan otot yang bengkak pada atlet semasa kecederaan dan apakah nama bahan X dan bahan Y?

| | Suitable pack <i>Pek yang sesuai</i> | Substance X <i>Bahan X</i> | Substance Y <i>Bahan Y</i> |
|----------|---|--|-------------------------------|
| A | Hot pack <i>Pek panas</i> | Ammonium nitrate <i>Ammonium nitrat</i> | Water <i>Air</i> |
| B | Hot pack <i>Pek panas</i> | Anhydrous calcium chloride <i>Kalsium klorida kontang</i> | Water <i>Air</i> |
| C | Cold pack <i>Pek sejuk</i> | Ammonium nitrate <i>Ammonium nitrat</i> | Water <i>Air</i> |
| D | Cold pack <i>Pek sejuk</i> | Anhydrous calcium chloride <i>Kalsium klorida kontang</i> | Water <i>Air</i> |

- 42 Table 7 shows the mineral and metal to be extracted from their ore.
Jadual 7 menunjukkan bijih dan logam yang diekstrak daripada bijihnya.

| Mineral <i>Bijih</i> | Metal extracted <i>Logam yang diekstrak</i> |
|----------------------------|--|
| Bauxite <i>Bauksit</i> | Aluminium <i>Aluminium</i> |
| Hematite <i>Hematit</i> | Iron <i>Ferum</i> |

Table 7
Jadual 7

Which are the correct ways to extract the metal?

Kaedah manakah yang betul untuk mengekstrak logam tersebut?

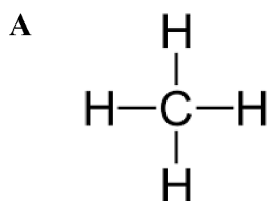
| | To extract aluminium <i>Untuk mengekstrak aluminium</i> | To extract iron <i>Untuk mengekstrak ferum</i> |
|----------|--|--|
| A | Electrolysis <i>Elektrolisis</i> | Electrolysis <i>Elektrolisis</i> |
| B | Reduction using carbon <i>Penurunan oleh karbon</i> | Reduction using carbon <i>Penurunan oleh karbon</i> |
| C | Reduction using carbon <i>Penurunan oleh karbon</i> | Electrolysis <i>Elektrolisis</i> |
| D | Electrolysis <i>Elektrolisis</i> | Reduction using carbon <i>Penurunan oleh karbon</i> |

- 43** Natural gas is composed of 85 % of gas Y. This gas is formed from decomposed materials in coal pits and oil fields. In Malaysia, it is widely used in Natural Gas Vehicles (NGV) such as private cars and taxis.

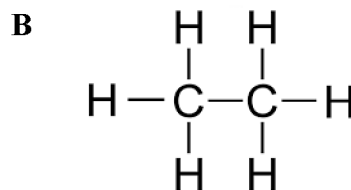
Gas asli terdiri daripada 85% gas Y. Gas ini terbentuk daripada bahan reput dalam lombong arang batu dan lapangan minyak. Di Malaysia, ia digunakan secara meluas dalam Kenderaan Gas Asli (NGV) seperti kereta persendirian dan teksi.

What is the structural formula and name of gas Y?

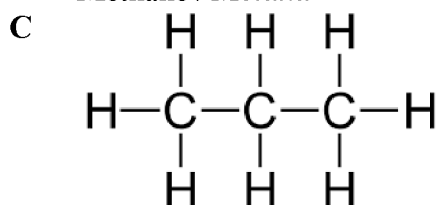
Apakah formula struktur dan nama bagi gas Y?



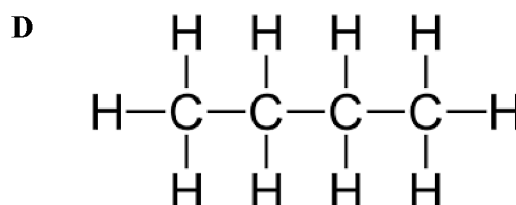
Methane / *Metana*



Ethane / *Etana*



Propane / *Propana*



Butane / *Butana*

- 44 Laundry detergent often contain biological enzymes such as protease and peptidase. Which statement is correct about this biological enzyme?

Bahan pencuci pakaian sering mengandungi enzim biologi seperti protease dan peptidase. Pernyataan yang manakah betul mengenai enzim biologi ini?

| | | |
|----------|---|--|
| A | As catalyst <i>Sebagai mangkin</i> | Speed up cleaning by breaking down protein stains on cloth <i>Mempercepatkan pembersihan dengan memecahkan kotoran berprotein pada kain</i> |
| B | As whitening agent <i>Sebagai agen pemutih</i> | To bleach the white fabrics but does not bleach coloured fabrics <i>Melunturkan pakaian putih tetapi tidak melunturkan pakaian berwarna</i> |
| C | As stabilising agent <i>Sebagai agen ampaian</i> | To lower the production of foam <i>Merendahkan penghasilan buih</i> |
| D | As catalyst <i>Sebagai mangkin</i> | Speed up cleaning by softening the water <i>Mempercepatkan pembersihan dengan melembutkan air</i> |

- 45 Diagram 12 shows two types of mug that we usually used daily.
Rajah 12 menunjukkan dua jenis mug yang kita gunakan setiap hari.



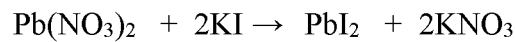
Diagram 12
Rajah 12

- Which of the following are the differences between both mug?
Antara berikut yang manakah perbezaan di antara kedua-dua mug?

| | Glass mug <i>Mug kaca</i> | Ceramic mug <i>Mug seramik</i> |
|-----|--|---|
| I | Transparent <i>Lutsinar</i> | Opaque <i>Legap</i> |
| II | Can be melted <i>Boleh dileburkan</i> | Cannot be melted <i>Tidak boleh dileburkan</i> |
| III | Good heat insulator <i>Penebat haba yang baik</i> | Poor heat insulator <i>Penebat haba yang lemah</i> |
| IV | Easily break <i>Mudah pecah</i> | Not easily break <i>Tidak mudah pecah</i> |

- A** I and II only
I dan II sahaja
- B** I and III only
I 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

- 46** The following chemical equation shows the reaction between potassium iodide solution and lead(II) nitrate solution:
Persamaan kimia berikut menunjukkan tindak balas antara larutan kalium iodida dan larutan plumbum(II) nitrat:



Calculate the maximum mass of precipitate formed when excess potassium iodide solution is added to 50 cm³ of 0.2 mol dm⁻³ lead(II) nitrate solution.

[Relative atomic mass: Pb=207, I=127, K=39, N=14, O=16]

Hitungkan jisim maksimum mendakan yang terbentuk apabila larutan kalium iodida berlebihan ditambahkan kepada 50 cm³ larutan plumbum(II) nitrat 0.2 mol dm⁻³

[*Jisim atom relatif: Pb=207, I=127, K=39, N=14, O=16*]

- A** 1.01 g
- B** 2.02 g
- C** 4.61 g
- D** 9.22 g
- 47** In an accident at a factory, some nitric acid is spilt. Solid substance X, when added in excess, would neutralise the acid without leaving an alkaline solution. What is solid X?
Dalam suatu kemalangan di kilang, asid nitrik telah tertumpah. Pepejal X, apabila ditambah secara berlebihan, akan meneutralkan asid tanpa meninggalkan larutan alkali. Apakah pepejal X?
- A** Ammonia
Ammonia
- B** Calcium carbonate
Kalsium karbonat
- C** Sodium chloride
Natrium klorida
- D** Sodium hydroxide
Natrium hidroksida

- 48 Table 8 shows the results of an experiment on chemical cell using different pairs of metal electrodes immersed in a copper (II) sulphate solution.

Jadual 8 menunjukkan keputusan eksperimen sel kimia menggunakan pasangan elektrod logam berbeza yang direndam di dalam larutan kuprum(II) sulfat.

| Metal Electrodes <i>Elektrod logam</i> | | Voltmeter reading/ V <i>Bacaan voltmeter</i> |
|---|----------------------------|---|
| Positive <i>Positif</i> | Negative <i>Negatif</i> | |
| P | Q | 0.5 |
| P | S | 2.7 |
| Q | R | 1.0 |
| R | S | 1.2 |

Table 8
Jadual 8

What is the arrangement of metals in ascending order according to the tendency of releasing electrons?

Apakah susunan logam dalam tertib menaik mengikut kecenderungan melepaskan elektron?

- A S, R, Q, P
 B P, Q, S, R
 C P, Q, R, S
 D P, R, Q, S
- 49 Carbon monoxide is a poisonous substance. Diagram 13 shows carbon monoxide detector that can be used at home.
Karbon monoksida adalah bahan beracun. Rajah 13 menunjukkan pengesan karbon monoksida yang boleh digunakan di rumah.

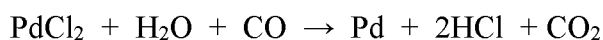


Orange spot containing palladium(II) chloride
Tompok jingga mengandungi palladium(II) klorida

Diagram 13
Rajah 13

The orange spot turns black if there is a high concentration of carbon monoxide in the air. The chemical equation of redox reaction is shown below:

Tompok jingga bertukar hitam jika terdapat karbon monoksida berkepekatan tinggi di udara. Persamaan kimia tindak balas redoks adalah seperti berikut:

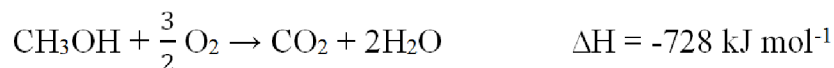


What is the change in oxidation number of palladium and carbon in this reaction?

Apakah perubahan nombor pengoksidaan palladium dan karbon dalam tindak balas ini?

| | Palladium <i>Palladium</i> | Carbon <i>Karbon</i> |
|----------|-------------------------------|--------------------------|
| A | +2 to 0 +2 kepada 0 | +2 to +4 +2 kepada +4 |
| B | +4 to +2 +4 kepada +2 | 0 to +2 0 kepada +2 |
| C | 0 to +2 0 kepada +2 | +4 to +2 +4 kepada +2 |
| D | +2 to +4 +2 kepada +4 | +2 to 0 +2 kepada 0 |

- 50 The thermochemical equation represents the combustion of methanol, CH₃OH.
Persamaan termokimia mewakili pembakaran methanol, CH₃OH.



What is the mass of methanol needed to raise the temperature of 250 cm³ of water by 27.8°C?

[Molar mass of CH₃OH = 32; Specific heat capacity of water = 4.2 J g⁻¹ °C⁻¹;
Density of water = 1 g cm⁻³]

Berapakah jisim metanol yang diperlukan untuk menaikkan suhu 250 cm³ air sebanyak 27.8 °C?

*[Jisim molar CH₃OH = 32; Muatan haba tentu air = 4.2 J g⁻¹ °C⁻¹;
Ketumpatan air = 1 g cm⁻³]*

- A** 2.56 g
B 1.88 g
C 1.28 g
D 0.79 g

END OF QUESTION PAPER

KERTAS SOALAN TAMAT

<https://cikguadura.wordpress.com/>

INFORMATION FOR CANDIDATES
MAKLUMAT UNTUK CALON

1. This question paper consists of **50** questions.

Kertas soalan ini mengandungi 50 soalan.

2. Answer **all** questions.

Jawab semua soalan.

3. Each question is followed by four alternative answers, **A,B,C** and **D**. For each question, choose one answer only. Blacken your answer on the objective answer sheet provided.

Tiap-tiap soalan diikuti oleh empat pilihan jawapan, iaitu A,B,C dan D. Bagi setiap soalan, pilih satu jawapan sahaja. Hitamkan jawapan anda pada kertas jawapan objektif yang disediakan.

4. If you wish to change your answer, erase the blackened mark that you have made. Then blacken the new answer.

Sekiranya anda hendak menukar jawapan, padamkan tanda yang telah dibuat. Kemudian hitamkan jawapan yang baru.

6. The diagrams in the questions provided are not drawn to scale unless stated.

Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.

7. You may use a non-programmable scientific calculator.

Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.

SEKOLAH MENENGAH TEKNIK JOHOR BAHRU**PEPERIKSAAN PERCUBAAN SPM 2016****PERATURAN PEMARKAHAN**<https://cikguadura.wordpress.com/>**KIMIA
KERTAS 1**

| | | | |
|----|---|----|---|
| 1 | A | 26 | C |
| 2 | D | 27 | D |
| 3 | B | 28 | C |
| 4 | B | 29 | C |
| 5 | B | 30 | B |
| 6 | D | 31 | C |
| 7 | A | 32 | B |
| 8 | C | 33 | A |
| 9 | D | 34 | A |
| 10 | A | 35 | C |
| 11 | D | 36 | A |
| 12 | B | 37 | B |
| 13 | B | 38 | B |
| 14 | C | 39 | D |
| 15 | D | 40 | B |
| 16 | D | 41 | C |
| 17 | D | 42 | D |
| 18 | A | 43 | A |
| 19 | C | 44 | A |
| 20 | C | 45 | A |
| 21 | A | 46 | C |
| 22 | D | 47 | B |
| 23 | B | 48 | C |
| 24 | D | 49 | A |
| 25 | D | 50 | C |

Section A
Bahagian
[60 marks]
[60 markah]

Answer **all** the questions in the section
Jawab semua soalan dalam bahagian ini
<https://cikguadura.wordpress.com/>

- 1 Table 1 shows proton number and nucleon number for atom W, X and Y.
Jadual 1 menunjukkan nombor proton dan nombor nukleon bagi atom W, X dan Y.

| <i>Atom</i> | Proton number / Nombor Proton | Nucleon number / Nombor Nukleon |
|-------------|--|--|
| W | 11 | 23 |
| X | 17 | 35 |
| Y | 17 | 37 |

Table / *Jadual* 1

- (a) (i) What is meant by proton number?
Apakah yang dimaksudkan dengan nombor proton ?
-
-
- [1 mark]
- (ii) What is the number of neutron in atom W ?
Apakah bilangan neutron dalam atom W?
-
- [1 mark]
- (b) Which atoms are isotopes? Explain why.
Atom – atom yang manakah adalah isotop? Jelaskan mengapa.
-
-
- [2 marks]
- (c) Write the electron arrangement of atom X .
Tuliskan susunan elektron bagi atom X.
-
- [1 mark]

- (d) Diagram 1 shows diffusion occurs when the gas jar cover is removed
Rajah 1 di bawah menunjukkan resapan berlaku bila penutup balang gas dibuka.

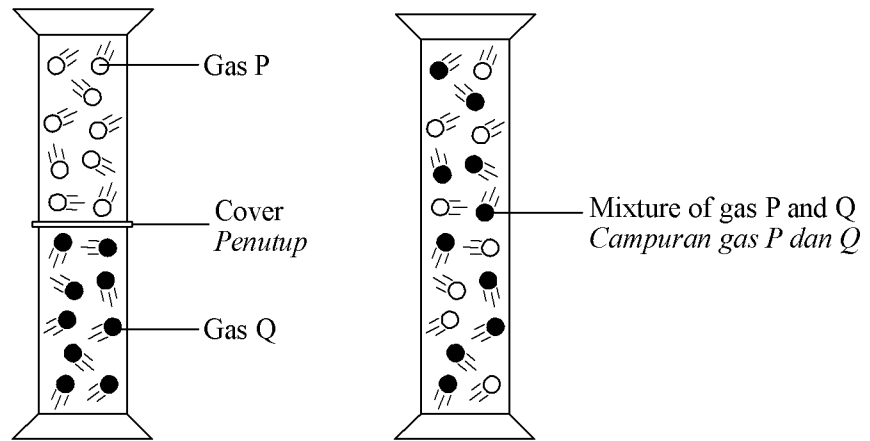


Diagram 1 / Rajah 1

- (i) The colour of Q gas is brown and P gas is colourless. Mixture of P gas and Q gas is produced when the cover is removed. State the observation in this experiment.
Warna gas Q ialah perang dan gas P tak berwarna. Campuran gas P dan Q dihasilkan apabila penutup dibuka. Nyatakan pemerhatian untuk eksperimen ini.

.....

[1 mark]

- (ii) Explain your answer in (b)(i) by using kinetic theory of matter.
Terangkan jawapan anda di (b)(i) dengan menggunakan teori kinetik jirim.

.....

.....

.....

[2 marks]

- (iii) The gas jar which contains solid iodine is immersed in hot water. State the changes of movement of iodine particle.
Balang gas mengandungi pepejal iodin direndamkan dalam air panas. Nyatakan perubahan bagi pergerakan zarah iodin.

.....

[1 mark]

- 2 Diagram 2 shows the position of several elements P, Q, R, S, T, U, V and W.
Rajah 2 menunjukkan kedudukan beberapa unsur-unsur P, Q, R, S, T, U, V and W.

| | | | | | | | | | | | | | | | | | |
|---|---|--|--|--|--|---|--|--|--|---|---|--|---|--|--|--|---|
| | | | | | | | | | | | | | | | | | |
| | P | | | | | | | | | | | | | | | | |
| Q | | | | | | | | | | T | V | | U | | | | |
| R | | | | | | S | | | | | | | | | | | W |
| | | | | | | | | | | | | | | | | | |

Diagram 2 / Rajah 2

Using the symbols P, Q, R, S, T, U, V and W, answer the following questions.

Dengan menggunakan simbol P, Q, R, S, T, U, V dan W, jawab soalan-soalan berikut.

- (a) State the element which you would classify under Group 2
Nyatakan unsur yang boleh dikelaskan di bawah Kumpulan 2

.....
[1 mark]

- (b) Which of the elements has the biggest atomic radius?
Unsur yang manakah mempunyai jejari atom paling besar?

.....
[1 mark]

- (c) (i) Compare the electronegativity of elements Q and U.
Bandingkan keelektronegatifan bagi Q dan U.

.....
[1 mark]

- (ii) Explain your answer in (b)(i).
Terang jawapan anda di (b)(i).

.....
.....
[2 marks]

- (d) Write the formula of ion formed by Q.
Tuliskan formula bagi ion yang terbentuk oleh Q.
-
- [1 mark]
- (e) Compare the reactivity of Q and R.
Bandingkan kereaktifan di antara Q dan R.
-
- [1 mark]
- (f) Why is W chemically unreactive?
Kenapa W tidak reaktif secara kimia?
-
- [1 mark]
- (g) Give one special characteristic of S.
Beri satu ciri istimewa bagi S.
-
- [1 mark]

- 3 (a) Table 3 shows the pH value of four solutions. The solutions are of the same concentration.
Jadual 3 menunjukkan nilai pH bagi empat larutan. Kesemua larutan ini mempunyai kepekatan yang sama.

| Solution <i>Larutan</i> | pH |
|----------------------------|----|
| W | 1 |
| X | 5 |
| Y | 7 |
| Z | 14 |

Table 3 / *Jadual 3*

- (i) Name one example for solution Z.
Namakan satu contoh bagi larutan Z.
-
- [1 mark]

- (ii) Write a chemical equation for the reaction of Z in (a)(i) with sulphuric acid.
Tuliskan satu persamaan kimia untuk tindak balas antara larutan Z di (a)(i) dengan asid sulfurik.

..... [2 mark]

- (iii) State one uses of Z in the industry.
Nyatakan satu kegunaan Z dalam industry.

..... [1 mark]

- (iv) Which solution possibly can be sodium sulphate ?
Yang manakah merupakan larutan natrium sulfat ?

..... [1 mark]

- (b) Diagram 3 shows the symbols of atom for element U, V, W and X.
Rajah 3 menunjukkan simbol- simbol atom bagi unsur U, V, W dan X.



DIAGRAM 3 / RAJAH 3

Element V can react with element W to form a compound.
Unsur V boleh bertindak balas dengan unsur W membentuk satu sebatian.

- (i) Write the chemical formula for the compound.
Tuliskan formula kimia bagi sebatian itu.

..... [1 mark]

- (ii) State **one** physical property for the compound formed.
Nyatakan satu sifat fizikal bagi sebatian yang terbentuk.

..... [1 mark]

- (c) When element U react with element W, a compound is produced.
Apabila unsur U bertindak balas dengan unsur W, satu sebatian terhasil.

- (i) State the type of the compound produced.
Nyatakan jenis sebatian yang terhasil.

..... [1 mark]

- (ii) Draw the electron arrangement for the compound in (c) (i).
Lukiskan susunan elektron bagi sebatian dalam (c) (i).

[2 marks]

- 4 Diagram 4 shows the apparatus set-up for an experiment to determine the heat of displacement.
Rajah 4 menunjukkan susunan radas bagi satu eksperimen untuk menentukan haba penyesaran.

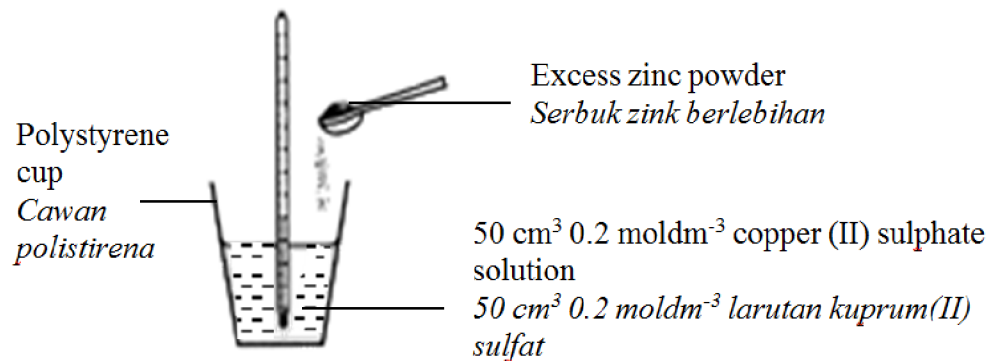


Diagram 4
Rajah 4

Based on the experiment,
Berdasarkan eksperimen,

- (a) State the meaning of heat of displacement.
Nyatakan maksud haba penyesaran.

.....

.....

.....

[1 mark]

- (b) Give **one** reason why polystyrene cup is used in the experiment.

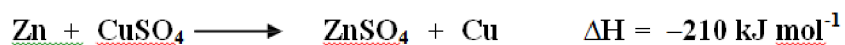
*Berikan **satu** sebab mengapa cawan polistirena digunakan dalam eksperimen ini.*

.....

[1 mark]

- (c) The thermochemical equation below represents the displacement reaction.

Persamaan termokimia di bawah mewakili tindak balas penyesaran itu.



Calculate:

Hitung:

- (i) the number of moles of copper(II) ion.
bilangan mol ion kuprum.

[1 mark]

- (ii) the heat released during the reaction.
haba yang dibebaskan semasa tindak balas.

[2 marks]

- (iii) the change of temperature in the experiment.
 [Specific heat capacity of solution = $4.2 \text{ J g}^{-1} \text{ } ^\circ\text{C}^{-1}$;
 Density of solution = 1 g cm^{-3}]
perubahan suhu dalam eksperimen.
 [Muatan haba tentu larutan = $4.2 \text{ Jg}^{-1}\text{ } ^\circ\text{C}^{-1}$
 Ketumpatan larutan = 1 gcm^{-3}]

[1 mark]

- (d) The experiment is repeated using magnesium powder to replace zinc powder.
The volume and concentration of copper (II) sulphate used is remained the same.
Eksperimen diulang dengan menggunakan serbuk magnesium menggantikan serbuk zink. Isi padu dan larutan kuprum(II) sulfat yang digunakan adalah sama.
- (i) Predict the heat of displacement for the reaction.
Ramalkan haba penyesaran bagi tindak balas itu.
-
- [1 mark]
- (ii) Give a reason for your answer in 4(d)(i).
Beri sebab bagi jawapan di 4(d(i)).
-
- [1 mark]
- (e) Draw the energy level diagram for the reaction.
Lukis gambar rajah aras tenaga bagi tindak balas ini.

[2 marks]

- 5 Three experiment; **I**, **II** and **III** are carried out to investigate the factors affecting the rate of reaction.

Table 5 shows the reactants involved in the experiments.

Tiga eksperimen; I, II dan III dijalankan untuk mengkaji faktor-faktor yang mempengaruhi kadar tindak balas.

Jadual 5 menunjukkan bahan tindak balas yang terlibat dalam eksperimen tersebut.

| Experiment <i>Eksperimen</i> | Reactants <i>Bahan-bahan tindak balas</i> | |
|---------------------------------|---|--|
| I | Excess magnesium <i>Magnesium berlebihan</i> | 25 cm ³ of 0.1 mol dm ⁻³ hydrochloric acid <i>25 cm³ asid hidroklorik 0.1 mol dm⁻³</i> |
| II | Excess magnesium <i>Magnesium berlebihan</i> | 25 cm ³ of 0.1 mol dm ⁻³ sulphuric acid <i>25 cm³ asid sulfurik 0.1 mol dm⁻³</i> |
| III | Excess magnesium <i>Magnesium berlebihan</i> | 25 cm ³ of 0.1 mol dm ⁻³ sulphuric acid + copper(II) sulphate solution <i>25 cm³ asid sulfurik 0.1 mol dm⁻³ + larutan kuprum(II) sulfat</i> |

Table 5 / *Jadual 5*

Diagram 5 shows the results of experiments I, II and III.

Rajah 5 menunjukkan keputusan bagi eksperimen I, II dan III.

Volume of hydrogen gas/ cm³

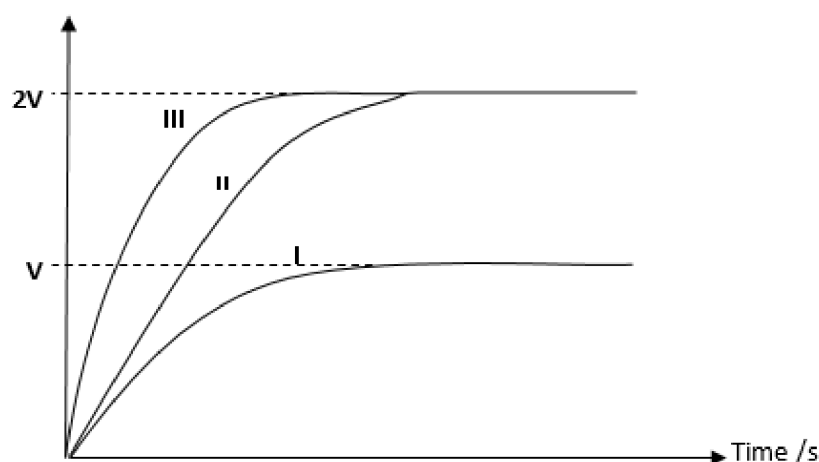


Diagram 5 / *Rajah 5*

- (a) State **one** factor that affect the rate of reaction.
*Nyatakan **satu** faktor yang mempengaruhi kadar tindak balas.*
-
- [1 mark]
- (b) (i) Why the curve **II** is steeper than curve **I**?
*Mengapa lengkungan **II** lebih curam daripada lengkungan **I**?*
-
- [1 mark]
- (ii) Suggest one way to obtain curve **III** from curve **II** other than by adding copper(II) sulphate in Experiment **III** without changing the volume and concentration of sulphuric acid.
*Cadangkan satu cara untuk memperoleh lengkungan **III** dari lengkungan **II** selain daripada menambahkan larutan kuprum(II) sulfat dalam eksperimen **III** tanpa mengubah isipadu dan kepekatan asid sulfurik.*
-
- [1 mark]
- (c) Explain why the total volume of hydrogen gas released in Experiment **II** is doubled that of Experiment **I**.
*Terangkan mengapa jumlah isipadu gas hidrogen yang dibebaskan dalam Eksperimen **II** adalah dua kali ganda Eksperimen **I**.*
-
- [2 marks]
- (d) Based on Experiment **II**,
*Berdasarkan Eksperimen **II**,*
- (i) write the chemical equation for the reaction occurred.
tuliskan persamaan kimia bagi tindak balas yang berlaku.
-
- [1 mark]

- (ii) Calculate the total volume of hydrogen gas released.
[Molar gas volume at room condition is $24 \text{ dm}^3\text{mol}^{-1}$]

hitungkan jumlah isipadu gas hidrogen yang terbebas.

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

[3 marks]

- (e) If the change in mass of magnesium during the reaction is measured, plot the graph of mass of magnesium against time obtained for Experiment I.

Jika perubahan dalam jisim magnesium semasa tindak balas diukur, lakarkan graf jisim magnesium melawan masa yang diperolehi bagi Eksperimen I.

[2 marks]

- 6 Diagram 6 shows the set-up of apparatus of electrolysis of $0.001 \text{ mol dm}^{-3}$ copper(II) chloride solution using carbon electrodes P and Q.

Rajah 6 menunjukkan susunan radas bagi elektrolisis ke atas larutan kuprum(II) klorida $0.001 \text{ mol dm}^{-3}$ dengan menggunakan elektrod-elektrod karbon P dan Q.

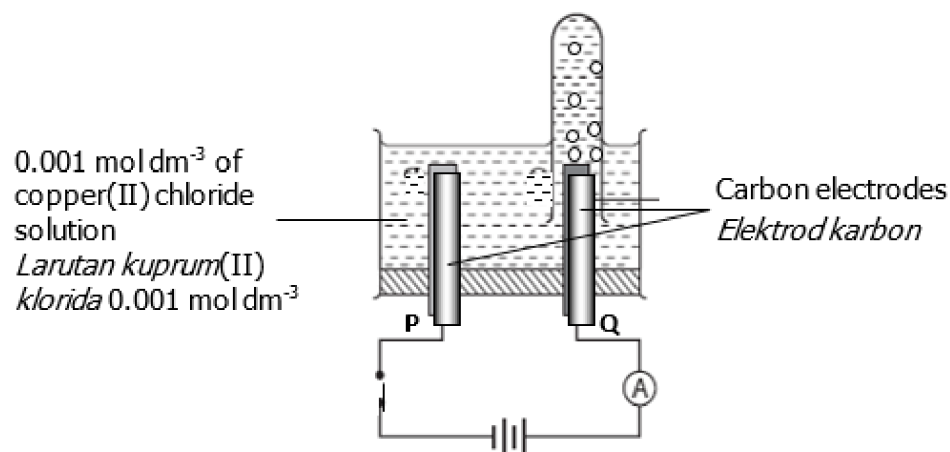


Diagram 6

Rajah 6

- (a) Write the formula of **all** the ions present in copper(II) chloride solution.
*Tuliskan formula bagi **semua** ion yang hadir dalam larutan kuprum(II) klorida.*

.....
[1 mark]

- (b) (i) State the observation obtained at carbon electrode P.
Nyatakan pemerhatian yang diperolehi di elektrod karbon P.

.....
[1 mark]

- (ii) Write the half equation for the reaction that takes place at electrode P.
Tuliskan setengah persamaan bagi tindak balas yang berlaku di elektrod karbon P.

.....
[1 mark]

- (c) State the name of the gas released at electrode Q. Describe a test to identify the gas.
Nyatakan nama bagi gas yang terbebas di elektrod Q. Huraikan satu ujian untuk mengenal pasti gas tersebut.

.....
.....
.....

[3 marks]

- (d) After 30 minutes, state the change in colour of copper (II) chloride solution.
Explain your answer.
*Selepas 30 minit, nyatakan perubahan warna larutan kuprum(II) klorida.
Terangkan jawapan anda.*

.....
.....

[2 mark]

- (e) If the experiment is repeated using 2.0 mol dm^{-3} of copper(II) chloride solution, different product is formed at the anode. Explain the difference.
Jika eksperimen diulangi menggunakan larutan kuprum(II) klorida 2.0 mol dm^{-3} , hasil yang terbentuk di anod adalah berbeza. Terangkan perbezaan tersebut.

.....
.....
.....

[3 marks]

Section B

[20 marks] / [20 markah]

Answer any **one** question from this section.

Jawab mana-mana satu soalan daripada bahagian ini.
<https://cikguadura.wordpress.com/>

- 7 Table 7.1 shows the information of two compounds; P and Q.
Rajah 7.1 menunjukkan maklumat tentang dua sebatian; P dan Q.

| Compound <i>Sebatian</i> | General formula <i>Formula am</i> | Molar mass <i>Jisim molar (g mol⁻¹)</i> | Reaction with bromine water without the presence of ultra violet light <i>Tindak balas dengan air bromin tanpa kehadiran sinar ultra ungu</i> |
|-----------------------------|---|--|---|
| P | C_nH_{2n} | 84 | Brown colour is decolourised <i>Warna perang dinyahwarnakan</i> |
| Q | C_nH_{2n+2} | 86 | Brown colour remains <i>Warna perang tidak berubah</i> |

Table / *Jadual* 7.1

[Given that, relative atomic mass of H = 1 ; C = 12]

[Diberi bahawa, jisim atom relatif bagi H = 1 ; C = 12]

- (a) Based on Table 7.1;

Berdasarkan Jadual 7.1;

- (i) Identify the homologous series for compound P and compound Q.
-
- Kenal pasti siri homolog bagi sebatian P dan sebatian Q.*

[2 marks]

- (ii) Determine the molecular formula and state the name of the compound Q.
-
- Tentukan formula molekul dan nyatakan nama bagi sebatian Q.*

[3 marks]

- (b) (i) Explain the differences in observation between P and Q when they react with bromine water.

Terangkan perbezaan dalam pemerhatian antara P dan Q apabila sebatian-sebatian ini bertindak balas dengan air bromin.

[4 marks]

- (ii) Write the chemical equation for the reaction between compound P with bromine water.
Draw the structural formula and state the name of the product formed in this reaction.

Tuliskan persamaan kimia bagi tindak balas antara sebatian P dengan air bromin.

Lukiskan formula struktur dan namakan hasil yang terbentuk dalam tindak balas ini.

[3 marks]

- (c) Compare the sootiness of flame when compound P and Q are burnt in excess oxygen. Explain why.

Bandingkan kejelagaan nyalaan apabila sebatian P dan Q terbakar dalam oksigen berlebihan. Terangkan mengapa.

[4 marks]

- (d) Diagram 7.2 shows a series of changes occurred to compound P.

Rajah 7.2 menunjukkan perubahan yang berlaku kepada sebatian P.

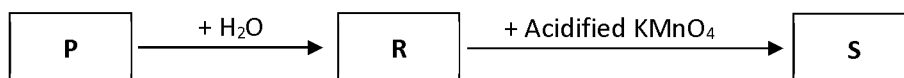


Diagram / Rajah 7.2

Based on the Diagram 7.2, compare the compound R and S in terms of:

Berdasarkan Rajah 7.2, bandingkan sebatian R dan S dari segi:

- general formula
formula am
- functional group
kumpulan berfungsi

[4 marks]

- 8 (a) Sulphur dioxide, SO_2 , is one of the by-products of the Contact process. It can cause environmental pollution like acid rain. Sulphur dioxide gas dissolves in rain water to produce sulphurous acid.

Sulfur dioksida, SO_2 , ialah satu daripada hasil sampingan proses Sentuh. Ia dapat menyebabkan pencemaran alam sekitar seperti membentuk hujan asid. Gas sulfur dioksida larut dalam air hujan untuk menghasilkan asid sulfurus

- (i) Write the chemical equation for the reaction between sulphur dioxide gas and rain water.

Tulis persamaan kimia bagi tindak balas antara sulfur dioksida dengan air hujan.

- (ii) State three effects of acid rain to the environment.

Nyatakan tiga kesan hujan asid terhadap alam sekitar.

[4 marks]

- (b) Diagram 8 shows an industry preparation of sulphuric acid by the Contact process. *Rajah 8 menunjukkan penyediaan asid sulfurik melalui proses Sentuh.*

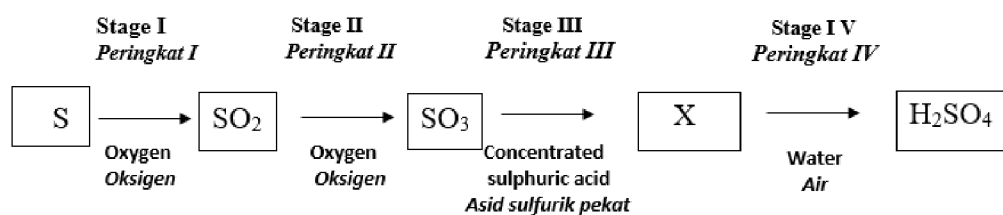
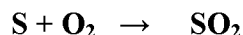


Diagram 8/ *Rajah 8*

- (i) Name the compound X.
Namakan sebatian X.
- (ii) Write the chemical equation of the reaction at stage II.
Tulis persamaan kimia bagi tindak balas di peringkat II.
- (iii) The chemical equation below shows the reaction between sulphur and oxygen gas at stage I.
Persamaan kimia di bawa menunjukkan tindak balas antara sulfur dan gas oksigen di peringkat I.



Given that the relative atomic mass of S = 32, O = 16 and the molar volume of any gas is $24 \text{ dm}^3 \text{ mol}^{-1}$ at room temperature and pressure. Calculate the maximum volume of sulphur dioxide gas produced if 48 g of sulphur is burnt completely in oxygen gas.

Diberikan jisim atom relatif $S = 32$, $O = 16$ dan isi padu molar sebarang gas ialah $24 \text{ dm}^3 \text{ mol}^{-1}$ pada suhu dan tekanan bilik. Hitungkan isi padu maksimum gas sulfur dioksida yang terhasil jika 48g sulfur terbakar dengan lengkap dalam gas oksigen.

[6 marks]

- (b) Table 8.1 shows the pH values of hydrochloric acid and ethanoic acid of the same concentration.

Jadual 8.1 menunjukkan nilai pH bagi asid hidroklorik dan asid etanoik dengan kepekatan yang sama.

| Acid <i>Asid</i> | Concentration (mol dm ⁻³) <i>Kepekatan (mol dm⁻³)</i> | pH value <i>Nilai pH</i> |
|--|--|-----------------------------|
| hydrochloric acid <i>asid hidroklorik</i> | 0.1 | 1 |
| ethanoic acid <i>asid etanoik</i> | 0.1 | 5 |

Table 8.1 / *Jadual 8.1*

Explain why the pH value of the two acids are different.

Terangkan mengapa nilai pH bagi kedua-dua asid itu berbeza.

[4 marks]

- (c) Table 8.2 shows the results of titration between 1.0 mol dm⁻³ sulphuric acid and 25.0 cm³ of potassium hydroxide solution.

Jadual 8.2 menunjukkan keputusan pentitratan antara asid sulfurik 1.0 mol dm⁻³ dengan 25.0 cm³ larutan kalium hidroksida.

| Titration <i>Titratan</i> | I | II | III |
|--|------|-------|-------|
| Final reading of burette (cm ³) <i>Bacaan akhir buret (cm³)</i> | 9.90 | 19.90 | 30.00 |
| Initial reading of burette (cm ³) <i>Bacaan awal buret (cm³)</i> | 0.00 | 9.90 | 19.90 |

Table 8.2 / *Jadual 8.2*

- (i) Write the chemical equation for the reaction between potassium hydroxide and sulphuric acid.
Tulis persamaan kimia bagi tindak balas antara kalium hidroksida dengan asid sulfurik.

[2 marks]

- (ii) Based on table 8.2, determine the average volume of sulphuric acid used and hence calculate the molarity of potassium hydroxide solution.
Berdasarkan Jadual 8.2, tentukan isipadu purata asid sulfurik yang digunakan dan seterusnya hitung kemolaran larutan kalium hidroksida.

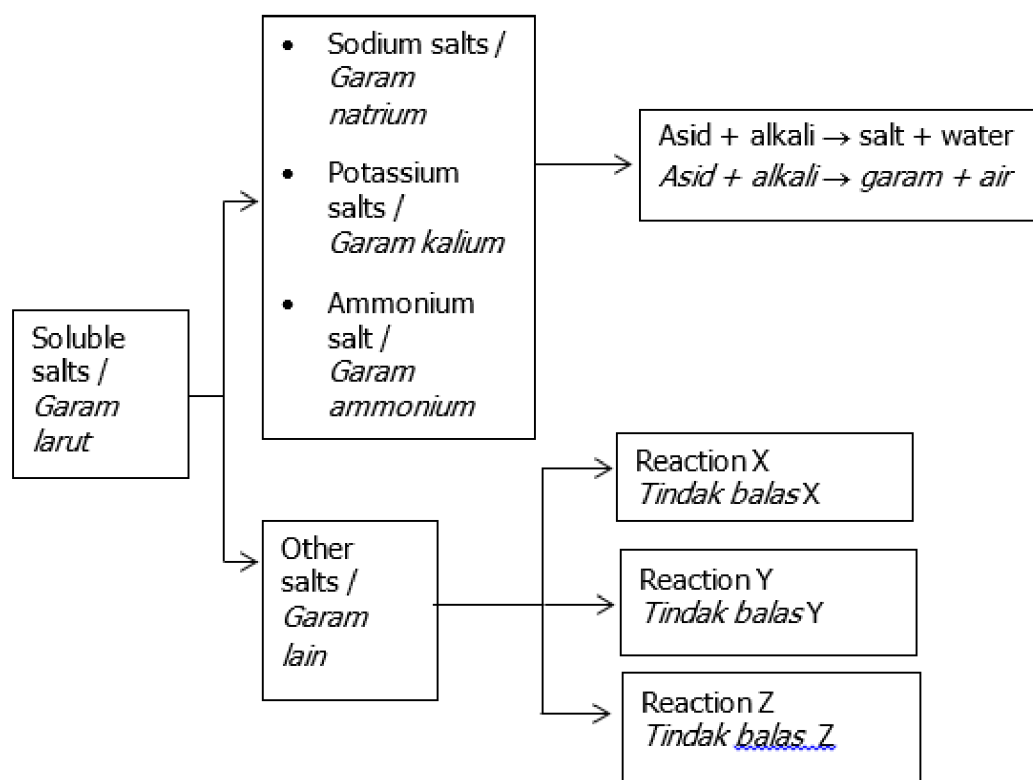
[4 marks]

Section C

[20 marks] / [20 markah]

<https://cikguadura.wordpress.com/>Answer any **one** question from this section.*Jawab mana-mana satu soalan daripada bahagian ini.*

- 9 (a) Diagram 9 shows the reactions involved in the preparation of soluble salts.
Gambarajah 9 menunjukkan tindak balas melibatkan penyediaan garam larut.



DIAGRAM/ RAJAH 9

- (i) Sodium, potassium and ammonium salts can be prepared using reaction between acid and alkali. Other soluble salts can be prepared by using another reactions such as reaction X, Y and Z. State the reaction X, Y and Z.

Garam natrium, kalium dan ammonium dapat disediakan melalui tindak balas antara asid dan alkali. Garam larut lain boleh disediakan dengan menggunakan tindak balas lain seperti tindak balas X, Y dan Z. Nyatakan tindak balas X, Y dan Z.

[3 marks]

- (ii) By choosing **one** of the reactions in (a) (i), suggest example of reactants used and products formed.

Write the chemical equation for the reaction based on your suggestion.

Dengan memilih satu daripada tindak balas dalam (a) (i), cadangkan contoh bahan- bahan tindak balas yang digunakan dan hasil-hasil tindak balas yang terbentuk.

Tuliskan persamaan kimia bagi tindak balas berdasarkan cadangan anda itu.

[3 marks]

(b)

Magnesium sulphate is a soluble salt.
Magnesium sulfat adalah garam

Answer the following questions based on the above statement.

Jawab soalan- soalan berikut berdasarkan pernyataan di atas.

- (i) Describe a laboratory experiment to prepare a dry magnesium sulphate salt. In your description, include the chemical equation involved.

Huraikan satu eksperimen makmal untuk menyediakan garam magnesium sulfat yang kering. Dalam huraian anda sertakan persamaan kimia bagi tindak balas yang terlibat.

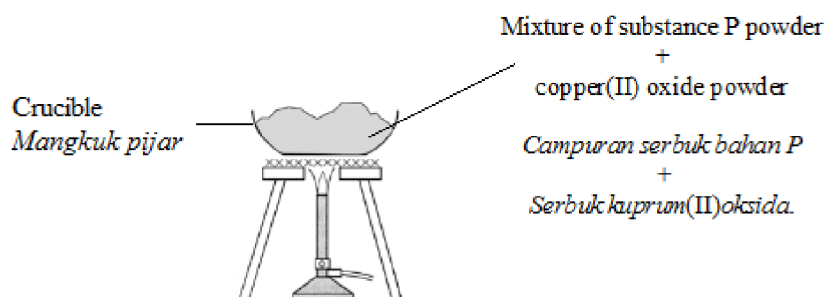
[10 marks]

- (ii) Describe a simple chemical test of how you could differentiate between magnesium sulphate and magnesium nitrate.

Huraikan satu ujian kimia ringkas bagaimana anda membezakan antara larutan magnesium sulfat dan magnesium nitrat.

[4 marks]

- 10 (a) Diagram 10 shows the apparatus set-up to investigate the redox reaction between substance P and copper(II) oxide powder
Rajah 10 menunjukkan susunan radas untuk mengkaji tindak balas redoks antara bahan P dan serbuk kuprum(II) oksida.



Rajah 10 / Diagram 10

Suggest substance P.

Based on your answer, explain why the reaction in diagram 10 is a redox reaction in terms of the change in oxidation number.

Cadangkan bahan P.

Berdasarkan jawapan anda, terangkan mengapa tindak balas dalam Rajah 10 merupakan tindak balas redoks dari segi perubahan nombor pengoksidaan.

[4 marks]

- (b) Table 10 shows the result of two experiments to study the effects of metal X dan Y on the rusting of iron.

Jadual 10 menunjukkan keputusan bagi dua eksperimen untuk mengkaji kesan logam X dan Y terhadap pengurangan besi.

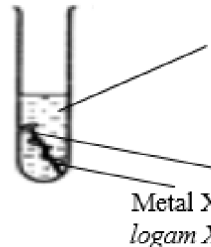
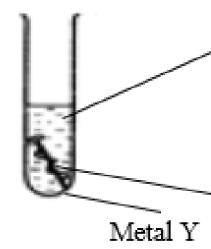
| | Experiment / <i>Ekperimen</i> | Observation <i>Pemerhatian</i> |
|----|---|---|
| I |  <p>Hot agar solution containing potassium hexacyanoferrate(III) and phenolphthalein <i>Agar panas mengandungi kalium heksasianoferat(III) dan fenolftalein</i></p> <p>Iron nail / <i>paku besi</i></p> <p>Metal X <i>logam X</i></p> | <p>Blue spots formed</p> <p><i>Tompok biru terbentuk</i></p> |
| II |  <p>Hot agar solution containing potassium hexacyanoferrate(III) and phenolphthalein <i>Agar panas mengandungi kalium heksasianoferat(III) dan fenolftalein</i></p> <p>Iron nail <i>paku besi</i></p> <p>Metal Y <i>logam Y</i></p> | <p>Pink spot formed.</p> <p><i>Tompok merah jambu terbentuk</i></p> |

Table 10 / Jadual 10

Explain the observation in experiment I and experiment II.
Terangkan pemerhatian dalam eksperimen I dan eksperimen II.

[6 marks]

- (c) The transfer of electrons takes place in many redox reactions. With the help of a labeled diagram, describe an experiment that you can carry out to study the redox reaction through the transfer of electrons at a distance. Predict the observation and write the equation for the oxidation and reduction.

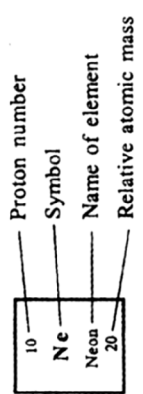
Pemindahan elektron terlibat banyak dalam tindak balas redoks. Dengan bantuan gambar rajah berlabel, huraikan satu eksperimen yang dapat dijalankan untuk mengkaji tindak balas redoks melalui pemindahan electron pada satu jarak. Ramalkan pemerhatian dan tuliskan persamaan bagi pengoksidaan dan penurunan.

[10 marks]

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END OF QUESTION PAPER
KERTAS SOALAN TAMAT

PERIODIC TABLE OF THE ELEMENTS

| 1 H Hydrogen 1 | | 2 He Helium 4 | |
|---|--|--|--|
| 3 Li Lithium 7 | | 4 Be Beryllium 9 | |
| 5 B Boron 11 | | 6 C Carbon 12 | |
| 7 N Nitrogen 14 | | 8 O Oxygen 16 | |
| 9 F Fluorine 19 | | 10 Ne Neon 20 | |
| 11 Na Sodium 23 | | 12 Mg Magnesium 24 | |
| 13 Al Aluminium 27 | | 14 Si Silicon 28 | |
| 15 P Phosphorus 31 | | 16 S Sulfur 32 | |
| 17 Cl Chlorine 35 | | 18 Ar Argon 40 | |
| 19 K Potassium 39 | | 20 Ca Calcium 40 | |
| 21 Sc Scandium 45 | | 22 Ti Titanium 48 | |
| 23 V Vanadium 51 | | 24 Cr Chromium 52 | |
| 25 Mn Manganese 55 | | 26 Fe Iron 56 | |
| 27 Co Cobalt 59 | | 28 Ni Nickel 59 | |
| 29 Cu Copper 64 | | 30 Zn Zinc 65 | |
| 31 Ga Gallium 70 | | 32 Ge Germanium 73 | |
| 33 As Arsenic 75 | | 34 Se Selenium 79 | |
| 35 Br Bromine 80 | | 36 Kr Krypton 84 | |
| 37 Rb Rubidium 86 | | 38 Sr Strontium 88 | |
| 39 Y Yttrium 89 | | 40 Zr Zirconium 91 | |
| 41 Nb Niobium 93 | | 42 Mo Molybdenum 96 | |
| 43 Tc Technetium 98 | | 44 Ru Ruthenium 101 | |
| 45 Rh Rhodium 103 | | 46 Pd Palladium 106 | |
| 47 Ag Silver 108 | | 48 Cd Cadmium 112 | |
| 49 In Indium 115 | | 50 Sn Tin 119 | |
| 51 Sb Antimony 122 | | 52 Te Tellurium 128 | |
| 53 I Iodine 127 | | 54 Xe Xenon 131 | |
| 55 Cs Cesium 133 | | 56 Ba Barium 137 | |
| 57 La Lanthanum 139 | | 58 Ce Cerium 140 | |
| 59 Pr Praseodymium 141 | | 60 Nd Neodymium 144 | |
| 61 Pm Promethium 147 | | 62 Sm Samarium 150 | |
| 63 Eu Europium 152 | | 64 Gd Gadolinium 157 | |
| 65 Tb Terbium 159 | | 66 Dy Dysprosium 163 | |
| 67 Ho Holmium 165 | | 68 Er Erbium 167 | |
| 69 Tm Thulium 169 | | 70 Yb Ytterbium 173 | |
| 71 Lu Lutetium 175 | | 72 Hf Hafnium 179 | |
| 73 Ta Tantalum 181 | | 74 W Tungsten 184 | |
| 75 Re Rhenium 186 | | 76 Os Osmium 190 | |
| 77 Ir Iridium 192 | | 78 Pt Platinum 195 | |
| 79 Au Gold 197 | | 80 Hg Mercury 201 | |
| 81 Tl Thallium 204 | | 82 Pb Lead 207 | |
| 83 Bi Bismuth 209 | | 84 Po Polonium 210 | |
| 85 At Astatine 210 | | 86 Rn Radon 222 | |
| 87 Fr Francium 223 | | 88 Ra Radium 226 | |
| 89 Ac Actinium 227 | | 90 Th Thorium 232 | |
| 91 Pa Protactinium 231 | | 92 U Uranium 238 | |
| 93 Np Neptunium 237 | | 94 Pu Plutonium 244 | |
| 95 Am Americium 243 | | 96 Cm Curium 247 | |
| 97 Bk Berkelium 247 | | 98 Cf Californium 249 | |
| 99 Es Einsteinium 254 | | 100 Fm Fermium 253 | |
| 101 Md Mendelevium 256 | | 102 No Nobelium 254 | |
| 103 Lr Lawrencium 257 | | 104 Rf Rutherfordium 261 | |
| 105 Db Dubnium 262 | | 106 Sg Seaborgium 263 | |
| 107 Uuh Ununhexium 263 | | 108 Uuo Ununoctium 265 | |
| 109 Uue Ununennium 266 | | 110 Uuq Ununquadium 257 | |
| 111 Uuh Ununhexium 263 | | 112 Uub Ununbium 262 | |
| 113 Uut Ununtrium 264 | | 114 Uuq Ununquadium 257 | |
| 115 Uup Ununpentium 260 | | 116 Uuq Ununquadium 257 | |
| 117 Uuh Ununhexium 263 | | 118 Uuo Ununoctium 265 | |
| 119 Uue Ununennium 266 | | 120 Uuq Ununquadium 257 | |



Reference: Chang, Raymond (1991). Chemistry. McGraw-Hill, Inc.

INFORMATION FOR CANDIDATES
MAKLUMAT UNTUK CALON

1. This question paper consists of three sections: **Section A**, **Section B** and **Section C**.
*Kertas soalan ini mengandungi tiga bahagian: **Bahagian A**, **Bahagian B** dan **Bahagian C**.*
2. Answer **all** questions in **Section A**. Write your answers for **Section A** in the spaces provided in this question paper.

*Jawab **semua** soalan dalam **Bahagian A**. Jawapan anda bagi **Bahagian A** hendaklah ditulis pada ruang yang disediakan dalam kertas soalan ini.*
3. Answer **one** question from **Section B** and one question from **Section C**. Write your answers for **Section B** and **Section C** on the foolscap paper. You may use equations, diagrams, tables, graphs and other suitable methods to explain your answers.

*Jawab **satu** soalan daripada **Bahagian B** dan satu soalan daripada **Bahagian C**. Jawapan anda bagi **Bahagian B** dan **Bahagian C** hendaklah ditulis dalam kertas kajang. Anda boleh menggunakan persamaan, rajah, jadual, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda.*
4. The diagrams in the questions are not drawn to scale unless stated.
Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.
5. Marks allocated for each question or sub-part of a question are shown in brackets.
Markah yang diperuntukkan bagi setiap soalan atau ceraihan soalan ditunjukkan dalam kurungan.
6. Show your working. It may help you to get marks.
Tunjukkan kerja mengira. Ini membantu anda mendapatkan markah.
7. If you wish to change your answer, cross out the answer that you have done. Then write down the new answer.

Jika anda hendak menukar jawapan, batalkan jawapan yang telah dibuat. Kemudian tulis jawapan yang baru.
8. The Periodic Table of Elements is provided on page 23.
Jadual Berkala Unsur disediakan di halaman 23.
9. You may use a scientific calculator.
Anda dibenarkan menggunakan kalkulator saintifik.
10. You are advised to spend 90 minutes to answer questions in **Section A**, 30 minutes for **Section B** and 30 minutes for **Section C**.

*Anda dinasihati supaya mengambil masa 90 minit untuk menjawab soalan dalam **Bahagian A**, 30 minit untuk **Bahagian B** dan 30 minit untuk **Bahagian C**.*

SULIT

4541/2

4541/2

Kimia

Kertas 2

Peraturan Pemarkahan

Ogos

2016

**PERCUBAAN
SIJIL PELAJARAN MALAYSIA 2016**

<https://cikguadura.wordpress.com/>

**KIMIA
Kertas 2
PERATURAN PEMARKAHAN**

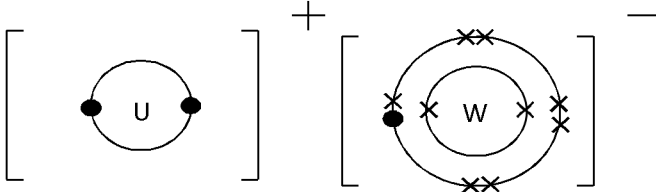
Peraturan pemarkahan ini mengandungi 9 halaman bercetak

SECTION A

<https://cikguadura.wordpress.com/>

| No | | | Mark scheme | | Marks |
|----|-----|-------|---|---|----------|
| 1 | (a) | (i) | The number of protons in an atom | 1 | |
| | | (ii) | 12 | 1 | |
| | (b) | | X and Y Because same proton number/the number of proton but difference number of neutron/nucleon number | 1 | |
| | (c) | | 2.8.7 | 1 | |
| | (d) | (i) | Brown / perang | 1 | |
| | | (ii) | -iodine particle are tiny and discrete | 1 | |
| | | | - iodine particles move from low concentration to high concentration | 1 | |
| | | (iii) | Becomes faster / semakin laju | 1 | |
| | | | Total | | 9 |

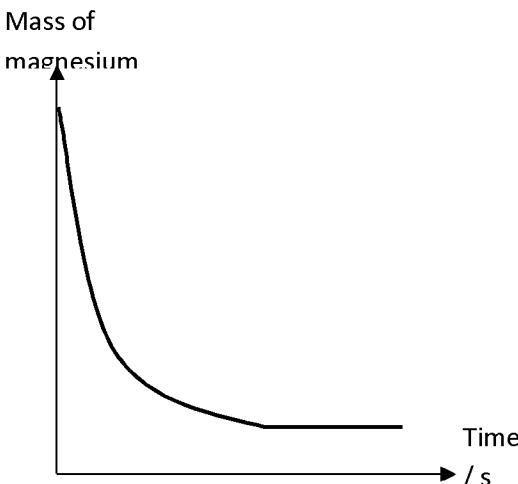
| No | | | Mark scheme | | Marks |
|----|-----|------|--|---|----------|
| 2. | (a) | | P | 1 | |
| | (b) | | R | 1 | |
| | (c) | (i) | U lebih elektronegatif | 1 | |
| | | (ii) | Bilangan proton atom U lebih banyak//Cas positif nucleus atom U lebih tinggi. Daya tarikan antara nucleus dan electron valens atom U lebih kuat//Atom U lebih senang menarik elektron | 1 | |
| | (d) | | Q ⁺ | 1 | |
| | (e) | | R is more reactive than Q. | 1 | |
| | | | Its valence shell achieve octet electron arrangement (completely filled) | 1 | |
| | (f) | | 1. form coloured ions 2. has more than one oxidation number 3. as catalyst 4. form complex ions [any one] | 1 | |
| | | | Total | | 9 |

| No | | | Mark scheme | | Marks |
|----|-----|-------|---|--------|-----------|
| 3 | (a) | (i) | Sodium hydroxide/ potassium hydroxide r: formula | 1 | |
| | | (ii) | $2\text{NaOH} + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + 2\text{H}_2\text{O}$ $/ 2\text{KOH} + \text{H}_2\text{SO}_4 \rightarrow \text{K}_2\text{SO}_4 + 2\text{H}_2\text{O}$ - Chemical formulae of reactants and products correct - Equation is balanced | 1 1 | |
| | | (iii) | Soap | 1 | |
| | | (iv) | Y | 1 | |
| | (b) | (i) | VW ₄ | 1 | |
| | | (ii) | has low melting / boiling point // cannot conduct electricity in any state // soluble in organic solvent | 1 | |
| | (c) | (i) | Ionic compound | 1 | |
| | | (ii) |  [Number of electron each shells are correct] [Number of charge symbol are correct] | 1 1 | |
| | | | Total | | 10 |

| No | | | Mark scheme | | Marks |
|----|-----|-------|---|---|-------|
| 4 | (a) | | Heat change / released when one mole of copper is displaced from copper (II) sulphate solution by zinc | 1 | |
| | (b) | | Polystyrene is a heat insulator // to reduce heat loss to surroundings r: to prevent | 1 | |
| | (c) | (i) | No of moles of Copper(II) ion = $\frac{0.2 \times 50}{1000}$ // 0.01 mol | 1 | |
| | | (ii) | 1. 1 mol of Cu is displaced releases 210 kJ heat | 1 | |
| | | | 2. 0.01 mol of Cu releases = 0.01×210 kJ // 2.1 kJ / 2100 J | 1 | |
| | | (iii) | $2100 \text{ J} = 50 \times 4.2 \times \Theta$ // $\Theta = 10^\circ\text{C}$ | 1 | |
| | (d) | (i) | More than -210 kJ mol^{-1} / Higher / Increases | 1 | |

| | | | | |
|--|------|---|--------|-----------|
| | (ii) | Magnesium is more electropositive than zinc // magnesium is higher than zinc in electrochemical series // distance between Mg – Cu is further than Zn-Cu in electrochemical series | 1 | |
| | (e) | <p>1. Label energy and diagram has 2 different energy levels for exothermic reaction</p> <p>2. Balanced chemical / ionic equation, ΔH is written</p> <p>Energy</p> <p style="text-align: center;">$\Delta H = -210 \text{ kJ mol}^{-1}$</p> | 1 1 | |
| | | Total | | 10 |

| No | | Mark scheme | | Marks |
|----|---------|---|---------------------|-------|
| 5 | (a) | Size of reactant // Concentration // Temperature // Catalyst | 1 | |
| | (b) (i) | Rate of reaction for Exp II is higher than Exp I // Concentration of H^+ ions in experiments II is higher. | 1 | |
| | (ii) | Increase the temperature of solution (acid) | 1 | |
| | (c) | Hydrochloric acid is a monoprotic acid; sulphuric acid is a diprotic acid. The number of moles of H^+ ions in Experiment II is double. | 1 1 | |
| | (d) (i) | $\text{Mg} + \text{H}_2\text{SO}_4 \rightarrow \text{MgSO}_4 + \text{H}_2$ | 1 | |
| | (ii) | <p>No. of moles of $\text{H}_2\text{SO}_4 = \frac{25 \times 0.1}{1000} // 0.0025$</p> <p>$\text{H}_2\text{SO}_4 : \text{H}_2$</p> <p>1 mol : 1 mol</p> <p>0.0025 mol : 0.0025 mol</p> | 1 1 1 | |

| | | | | | |
|--|--|--|---|-----|-----------|
| | | | Volume of gas = $0.0025 \times 24 \text{ dm}^3 // 0.06 \text{ dm}^3 // 60 \text{ cm}^3$ | | |
| | | |  | 1+1 | |
| | | | Total | | 11 |

| No | | Mark scheme | | Marks |
|----|-----|---|-------------|-----------|
| 6 | (a) | Cu^{2+} , Cl^- , H^+ , OH^- | 1 | |
| | (b) | (i) Brown solid is deposited. | 1 | |
| | | (ii) $\text{Cu}^{2+} + 2\text{e}^- \rightarrow \text{Cu}$ | 1 | |
| | (c) | Oxygen. Insert a glowing wooden splinter into the test tube. The glowing wooden splinter relights. | 1 1 1 | |
| | (d) | Warna biru semakin pudar The concentration/number of Cu^{2+} ion decreased. | 1 1 | |
| | (e) | Chlorine gas formed at the anode. Cl^- ion discharge at the anode. Concentration of Cl^- ion/copper(II) chloride is high. | 1 1 1 | |
| | | Total | | 11 |

SECTION B

<https://cikguadura.wordpress.com/>

| No | | Mark scheme | | Marks | | | | | | | |
|---|--------------------------------------|-------------|---|---|---|------------|------------|--------------------------------------|--------------------------------------|-----------------------|---|
| 7 | (a) | (i) | Homologous series of compound P is Alkene . Homologous series of compound Q is Alkane . | 1 1 | 2 | | | | | | |
| | | (ii) | Molar mass of $C_nH_{2n+2} = 86$ $n(12) + (2n + 2)(1) = 86$ $14n = 86 - 2$ $14n = 84$ $n = 6$ Molecular formula of Q is C₆H₁₄ The name of compound Q is Hexane | 1 1 1 | 3 | | | | | | |
| | (b) | (i) | P is an unsaturated hydrocarbon // contains double bond between carbon atoms (C=C) P undergoes reaction . Q is a saturated hydrocarbon // contains single bond between carbon atoms (C-C) No reaction . | 1 1 1 1 | 4 | | | | | | |
| | | (ii) | $C_6H_{12} + Br_2 \rightarrow C_6H_{12}Br_2$ [<i>Any correct structural formula</i>] [<i>Correct name</i>] <u>Sample Answer:</u> <pre> H H H H H H H - C - C - C - C - C - C - H Br Br H H H H </pre> 1,2-dibromohexane | 1 1 1 | 3 | | | | | | |
| | (c) | | Sootiness of compound P is higher than compound Q. <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">Percentage of carbon by mass per molecule</th> </tr> <tr> <th>Compound P</th> <th>Compound Q</th> </tr> </thead> <tbody> <tr> <td>$\frac{72}{84} \times 100 = 85.71\%$</td> <td>$\frac{72}{86} \times 100 = 83.72\%$</td> </tr> </tbody> </table> Percentage of carbon by mass per molecule in P is higher than Q. | Percentage of carbon by mass per molecule | | Compound P | Compound Q | $\frac{72}{84} \times 100 = 85.71\%$ | $\frac{72}{86} \times 100 = 83.72\%$ | 1 1+1 1 | 4 |
| Percentage of carbon by mass per molecule | | | | | | | | | | | |
| Compound P | Compound Q | | | | | | | | | | |
| $\frac{72}{84} \times 100 = 85.71\%$ | $\frac{72}{86} \times 100 = 83.72\%$ | | | | | | | | | | |

| | | | | | | |
|------------------|-----------------|-------------------|-----------------|-------------------|-----------|---|
| | (d) | | | | | |
| | | Compound | R | S | 1+1 | 4 |
| | | General formula | $C_nH_{2n+1}OH$ | $C_nH_{2n+1}COOH$ | | |
| Functional group | hydroxyl // -OH | carboxyl // -COOH | 1+1 | | | |
| | | Total | | | 20 | |

| No | | | Mark scheme | | Marks |
|----|-----|-------|--|------------------|-------|
| 8 | (a) | (i) | $SO_2 + H_2O \rightarrow H_2SO_3$ | 1 | |
| | | (ii) | <ul style="list-style-type: none"> • Corrodes buildings • Corrodes metal structures • pH of the soil decreases • Lakes and rivers become acidic <p>[Able to state any three items correctly]</p> | 1 1 1 | 4 |
| | (b) | (i) | Oleum | 1 | |
| | | (ii) | $2SO_2 + O_2 \rightarrow 2SO_3$ | 1 1 | |
| | | (iii) | <ul style="list-style-type: none"> • Moles of sulphur = $48 / 32 = 1.5$ • Moles of SO_2 = moles of sulphur = 1.5 • Volume of SO_2 = $1.5 \times 24 \text{ dm}^3 = 36 \text{ dm}^3$ | 1 1 1 | 6 |
| | (c) | | <p>Hydrochloric acid is a strong acid. It dissociates completely in water to produce a high concentration of hydrogen ions. Hence, its pH is low.</p> <p>Ethanoic acid is a weak acid. It ionizes partially in water to produce a low concentration of hydrogen ions. Hence, its pH is high.</p> <p>Asid hidroklorik ialah satu asid kuat. Asid itu terurai sepenuhnya dalam air untuk menghasilkan kepekatan ion hidrogen yang tinggi. Oleh itu, nilai pH rendah.</p> <p>Asid etanoik ialah satu asid lemah. Asid itu terurai separa dalam air dan kepekatan ion hidrogen adalah rendah. Oleh itu, nilai pH tinggi.</p> | 1 1 1 1 | 4 |
| | (d) | (i) | $2KOH + H_2SO_4 \rightarrow K_2SO_4 + 2H_2O$ | 1 1 | |
| | | (ii) | <p>(i) Average volume of sulphuric acid <i>Isi padu purata asid stdfurik</i> $= \frac{9.90 + 10.00 + 10.10 \text{ cm}^3}{3}$ $= 10.00 \text{ cm}^3$</p> | 1 | |

| | | | | | |
|--|--|--|--|-------------|-----------|
| | | | $\frac{M_a V_a}{M_b V_b} = \frac{a}{b}$ $\frac{(1.0)(10)}{M_b (25)} = \frac{1}{2}$ $M_b = 0.8 \text{ mol dm}^{-3}$ | 1 1 1 | 6 |
| | | | Total | | 20 |

SECTION C

| No | | | Mark scheme | | Marks |
|----|-----|------|---|-------------|-------|
| 9 | (a) | (i) | 1. acid and metal oxide 2. acid and reactive metal 3. acid and metal carbonate | 1 1 1 | 3 |
| | | (ii) | <i>Sample answer</i> [Name any acid] and [Name any metal / metal oxide / metal carbonate] [Name equivalent salt and water // water + CO ₂ // water + H ₂] [Balanced equation] | 1 1 1 | 3 |
| | (b) | (i) | <i>[chemical substances - 1 mark]</i> <i>[apparatus - 1 mark]</i> <i>[procedure - 7 marks]</i> <i>[chemical equation - 1 mark]</i> <i>Sample answer :</i> 1. <i>[chemical substances]</i> magnesium powder /magnesium oxide(Hydroxide, carbonate) and sulphuric acid 2. <i>[apparatus]</i> Beaker, filter funnel, filter paper, glass rod | 1 1 | |

| | | | | | |
|--|--|--|---|--|-----------|
| | | | 4. If no changes occur → magnesium nitrate solution | | |
| | | | Total | | 20 |

| No | | Mark scheme | | Marks |
|----|-----|---|---|-------|
| 10 | (a) | 1. Mg/Al/Fe/Pb/Zn 2. Magnesium undergoes oxidation as oxidation number of magnesium increases from 0 to +2 and 3. Copper (II) oxide undergoes reduction as oxidation number of copper in copper(II) oxide decreases from +2 to 0 4. Oxidation and reduction occur at the same time. | 1 1 1 1 | ...4 |
| | (b) | Experiment I 1. Fe ²⁺ ion present 2. Metal X lower than iron in the Electrochemical Series // Metal X is less electropositive than iron 3. Iron atoms releases electrons to form iron(II) ions Experiment II 1. OH ⁻ ion present 2. Metal Y higher than iron in the Electrochemical Series // Metal Y is more electropositive than iron 3. Atom Y releases electrons to form Y ^{m+} ions 4. Water and oxygen gain electron to form OH ⁻ ion // $2\text{H}_2\text{O} + \text{O}_2 + 4\text{e}^- \rightarrow 4\text{OH}^-$ | 1 1 1 1 1 1 1 | Max 6 |
| | (c) | [Material : Any suitable oxidizing agent (example : acidified potassium manganate(VII) solution, acidified potassium dichromate(VI) solution, chlorine water, bromine water), any suitable reducing agent (example : potassium iodide solution, iron(II) sulphate solution) and any suitable electrolyte] [Apparatus : U-tube , carbon electrodes , connecting wires and galvanometer] Diagram Functional Labelled | 1 1 1 1 | |

| | | | | |
|--|--|---|--|-----------------|
| | | <p>Procedure</p> <p>1 Sulphuric acid is added into a U-tube until 1/3 full</p> <p>2 Bromine water is added into one end of the U-tube</p> <p>3 potassium iodide solution is added into the other end of the U-tube carefully</p> <p>4 Two carbon electrodes connected by connecting wires to a galvanometer are dipped into the two solution at the two ends of the U-tube.</p> <p>Observation</p> <p>The colour of bromine water change from brown to colourless//</p> <p>The colour of potassium iodide solution change from colourless to yellow/brown//</p> <p>The needle of the galvanometer is deflected</p> <p>Oxidation reaction : $\text{Br}_2 + 2\text{e}^- \rightarrow 2\text{Br}^-$</p> <p>Reduction reaction: $2\text{I}^- \rightarrow \text{I}_2 + 2\text{e}^-$</p> | <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> | <p>max...10</p> |
| | | Total | | 20 |

<https://cikguadura.wordpress.com/>

4541/3
Kimia
Kertas 3
September
2016
1 ½



jam

SEKOLAH MANENGAH TEKNIK
JOHOR BAHRU

PEPERIKSAAN PERCUBAAN
SIJIL PELAJARAN MALAYSIA 2016

<https://cikguadura.wordpress.com/>

KIMIA

Kertas 3

Satu jam 30 minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Kertas soalan ini adalah dalam dwibahasa.*
2. *Soalan dalam Bahasa Inggeris mendahului soalan yang sepadan dalam Bahasa Melayu.*
3. *Calon dikehendaki membaca maklumat di halaman kedua kertas soalan ini.*

Kertas soalan ini mengandungi **11** halaman bercetak.

INFORMATION FOR CANDIDATES

MAKLUMAT KEPADA CALON

1. This question paper consists of **three** questions. **Question 1, 2 and 3.**
Kertas soalan ini mengandungi tiga soalan: Soalan 1, 2 dan 3.
2. Answer all questions. Write your s answer for **Question 1** and **2** in the spaces provided in this question paper.
Jawab semua soalan. Tuliskan jawapan bagi Soalan 1 dan 2 pada ruang yang disediakan dalam kertas soalan.
3. Write your answers for question 3 on the addition answer sheets provided by invigilators. You may use equations, diagrams, tables, graph and other methods to explain your answer.
Tulis jawapan anda bagi Soalan 3 di dalam helaian tambahan yang dibekalkan oleh pengawas peperiksaan. Anda boleh menggunakan persamaan, gambar rajah, jadual, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda.
4. The diagram in the questions is not drawn to scale unless stated.
Rajah yang mengiringi soalan tidak dilukiskan mengikut skala kecuali dinyatakan.
5. The marks allocated for each question or sub-part of a question is shown in brackets.
Markah yang diperuntukkan bagi setiap jawapan atau ceraiian soalan ditunjukkan dalam kurungan.
6. Show your working, it may help you to get marks.
Tunjukkan kerja mengira. Ini membantu anda mendapatkan markah,
7. If you wish to change your answer, cross out the answer that you have done. Then write down the new answer.
Sekiranya anda hendak menukar jawapan, batalkan jawapan yang telah dibuat, kemudian tulis jawapan yang baru.
8. You may use a non-programmable scientific calculator.
Anda dibenarkan menggunakan kalkulator saintifik yang tidak diprogramkan.
9. Tie the addition answer sheets together with this question paper and hand in at the end of the examination.
Ikat semua kertas jawapan anda bersama-sama soalan ini di akhir peperiksaan.

Marks awarded:

| Mark | Description |
|------|------------------------------------|
| 3 | Excellent : The best response |
| 2 | Satisfactory : An average response |
| 1 | Weak : An inaccurate response |
| 0 | No response or wrong response |

Answer all questions

Jawab semua soalan

- An experiment to determine the effect of position of metals in reactivity series to the heat of displacement is conducted in lab as in diagram below. The experiments are conducted as below.

Experiment 1 : Reaction of zinc powder with copper (II) sulphate solution

Experiment 2 : Reaction of magnesium powder with copper (II) sulphate solution

Experiment 3 : Reaction of iron powder with copper (II) sulphate solution

Satu eksperimen untuk menentukan kesan kedudukan logam dalam siri kereaktifan kepada haba penyesaran dijalankan di dalam makmal seperti rajah dibawah. Eksperimen yang dijalankan adalah seperti berikut.

Eksperimen 1 : Tindak balas serbuk zink dengan larutan kuprum (II) sulfat

Eksperimen 2 : Tindak balas serbuk magnesium dengan larutan kuprum (II) sulfat

Eksperimen 3 : Tindak balas serbuk ferum dengan larutan kuprum (II) sulfat

Experiment / Eksperimen: 1

5 gram of zinc powder is added to 50 cm³ of 0.6 mol dm⁻³ of copper (II) sulphate solution and the thermometer is used to stir the mixture. The temperature of mixture is recorded as table below

Dalam tindak balas 1, 5 gram serbuk zink ditambahkan kepada 50 cm³ larutan kuprum (II) sulfat 0.6 mol dm⁻³ dan jangkasuhu digunakan untuk mengacau campuran. Suhu campuran dicatatkan seperti jadual di bawah.

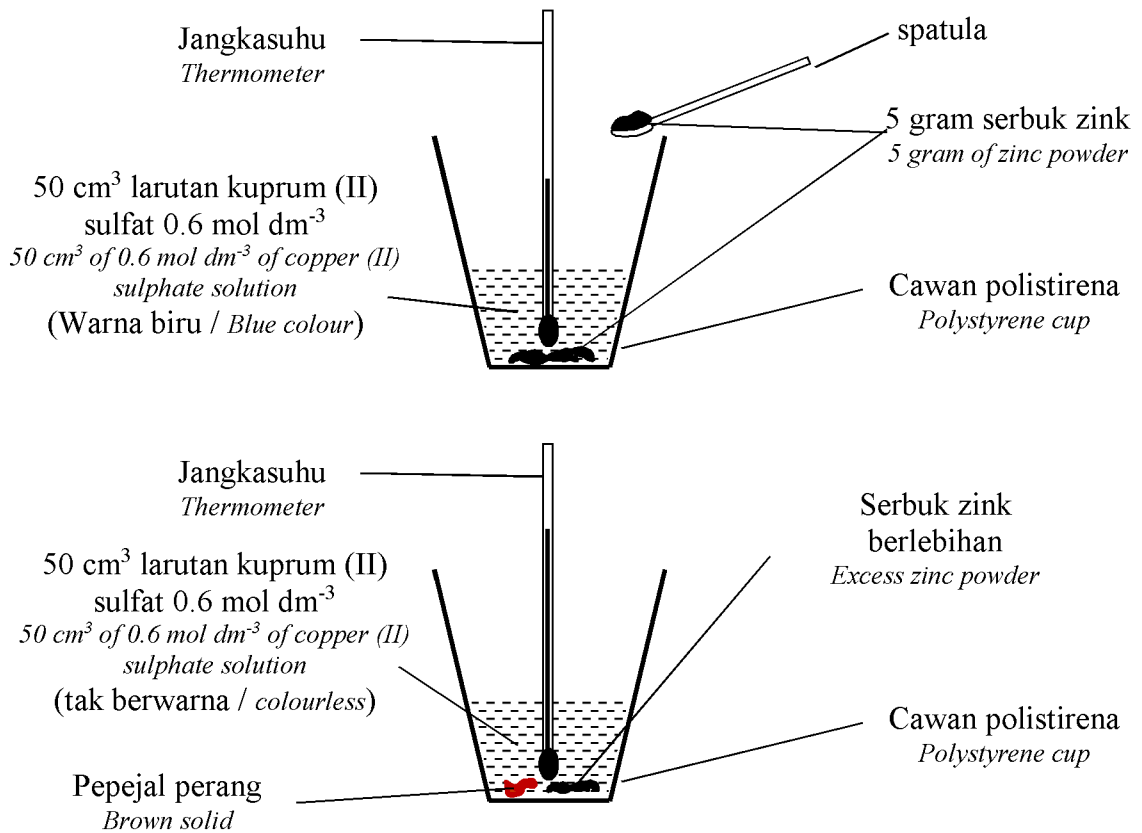
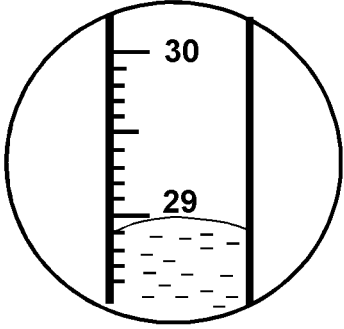
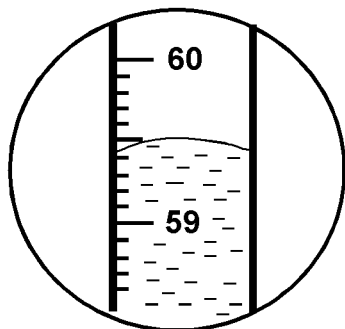
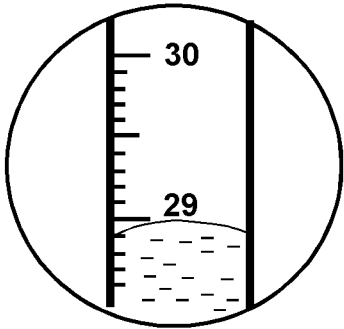
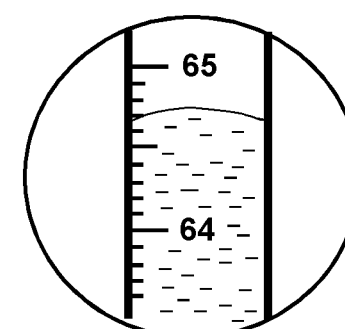


Diagram 1
Table 1

Experiment 1 : Zinc with copper (II) sulphate solution
Eksperimen 1 : Zink dengan larutan kuprum (II) sulfat

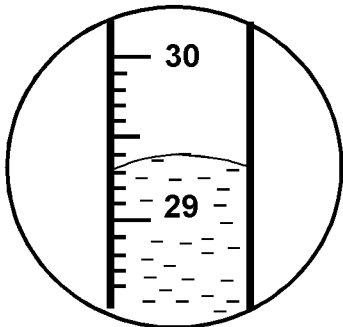
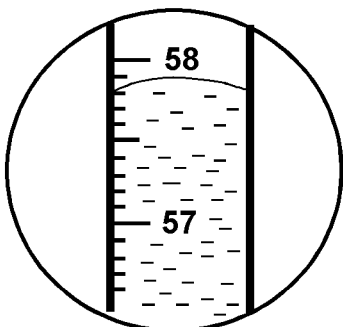
| Early reading of thermometer <i>Bacaan awal jangkasuhu</i> | Final reading of thermometer <i>Bacaan akhir jangkasuhu</i> |
|---|---|
| <div style="text-align: center;">  </div> <p>Early temperature / <i>Suhu awal</i> :</p> <p>.....</p> | <div style="text-align: center;">  </div> <p>Final temperature / <i>Suhu akhir</i> :</p> <p>.....</p> |

Experiment 2 : Magnesium with copper (II) sulphate solution
Eksperimen 2 : Magnesium dengan larutan kuprum (II) sulfat

| Early reading of thermometer <i>Bacaan awal jangkasuhu</i> | Final reading of thermometer <i>Bacaan akhir jangkasuhu</i> |
|---|---|
| <div style="text-align: center;">  </div> <p>Early temperature / <i>Suhu awal</i> :</p> <p>.....</p> | <div style="text-align: center;">  </div> <p>Final temperature / <i>Suhu akhir</i> :</p> <p>.....</p> |

Experiment 3 : Iron with copper (II) sulphate solution

Eksperimen 3 : Ferum dengan larutan kuprum (II) sulfat

| Early reading of thermometer <i>Bacaan awal jangkasuhu</i> | Final reading of thermometer <i>Bacaan akhir jangkasuhu</i> |
|---|---|
| <div style="text-align: center;">  </div> <p>Early temperature / <i>Suhu awal</i> :</p> <p>.....</p> | <div style="text-align: center;">  </div> <p>Final temperature / <i>Suhu akhir</i> :</p> <p>.....</p> |

- (a) Record the thermometer readings in the spaces provided in Table 1
Rekodkan bacaan jangkasuhu di dalam ruangan yang disediakan dalam Jadual 1

[3 marks]
 [KK0503 - MENGUKUR MENGGUNAKAN NOMBOR]

- (b) State the observations in this experiment as Diagram 1
Nyatakan pemerhatian didalam eksperimen ini seperti Rajah 1

.....

.....

.....

[3 marks]
 [KK 0501 - MEMERHATI]

- (c) State the relationship between the position of metals in reactivity series with the increases of temperature.
Nyatakan hubungan diantara kedudukan logam dalam siri kereaktifan dengan kenaikan suhu.

.....

.....

.....

[3 marks]
 [KK 0507 - MENGGUNAKAN PERHUBUNGAN RUANG DAN MASA]

- (d) Calculate the heat of displacement in experiment 1.

Kira haba penyesaran di dalam eksperimen 1

[Specific heat capacity / *Haba spesifik kapasiti* = $4.2 \text{ J g}^{-1} \text{ }^{\circ}\text{C}^{-1}$; The mass of 1 cm^3 of solution is 1 gram ; *1 cm³ larutan beratnya 1 gram*]

[3 marks]

[KK 0506 – BERKOMUNIKASI]

- (e) The Heat of displacement are given as table below.

Haba Penyesaran di berikan seperti di bawah.

| Metals Logam | Heat of Displacement / kJ mol^{-1} <i>Haba Penyesaran / kJ mol^{-1}</i> |
|----------------------|---|
| Zinc <i>Zink</i> | 210 |
| Magnesium | 336 |
| Iron <i>Ferum</i> | 121.8 |

Predict the Heat of Displacement when aluminium reacts with copper (II) sulphate solution.

Ramalkan Haba Penyesaran apabila aluminium bertindak balas dengan larutan kuprum (II) sulfat.

.....

[3 marks]

[KK 0505 – MERAMAL]

- (f) Explain how to determine that this reaction is an exothermic reaction.
Terangkan bagaimana untuk menentukan bahawa eksperimen ini adalah tindak balas eksotermik,

.....

.....

.....

[3 marks]
[KK 0508 - MENTAHSIR DATA]

- (g) State the operational definition for the heat of displacement in this experiment
Nyatakan operasi secara definisi untuk haba penyesaran di dalam eksperimen ini

.....

.....

.....

.....

[3 marks]
[KK 0509 - MENDEFINASI SECARA OPERASI]

- 2. An experiment to determine the effect of soap and detergent in hard water is conducted in lab. Hard water is poured into a basin and soap is added. The cloth is scrub thoroughly

and the effect of the cleaning agent are recorded. The experiment is repeated by using detergent. The result of the experiment is shown as diagram 2 below.

Suatu eksperimen untuk menentukan kesan sabun dan detergen dalam air liat dijalankan di dalam makmal. Air liat dituangkan ke dalam basin dan sabun dicampurkan. Kain dibasuh secara menyeluruh dan kesan agen pencuci dicatatkan. Eksperimen diulangi dengan menggunakan detergen. Keputusan eksperimen di tunjukkan seperti rajah 2 di bawah

Experiment I : Washing using soap

Eksperimen I : Membasuh menggunakan sabun



sebelum



selepas

Experiment II : Washing using detergent

Eksperimen II : Membasuh menggunakan detergen



sebelum



selepas

Diagram 2 / Rajah 2

(a) State the following variables

Nyatakan pemboleh ubah yang berikut

- (i) Manipulated variable :
Pemboleh ubah yang dimanipulasikan
- (ii) Responding variable :
Pemboleh ubah yang bergerak balas
- (iii) Fixed variable :
Pemboleh ubah yang dimalarkan

[3 marks]
[KK 0510 - MENGAWAL PEMBOLEHUBAH]

(b) State the hypothesis for this experiment.
Nyatakan hipotesis untuk eksperimen ini.

.....
.....
.....

[3 marks]
[KK 0511 - MEMBUAT HYPOTHESIS]

(c) State the inference that can be made from the observations
Nyatakan inferens yang boleh dibuat dari pemerhatian itu.

.....
.....
.....
.....

[3 marks]
[KK 0504 - MEMBUAT INFERENS]

(d) Classify the list of solution below into hard water and soft water
Kelaskan senarai larutan di bawah kepada air liat dan air lembut

River water, Seawater, Rain water, Drinking water, Lime water
Air sungai, Air laut, Air hujan, Air minuman, Air kapur

[3 marks]
[KK 0502 – MENGELAS]

- 3 Ionic compound dissolve in water but most covalent compound does not dissolve in water. Sodium chloride is an example of ionic compound and glucose solution is covalent compound that dissolve in water.

Sebatian ion melarut di dalam air tetapi kebanyakan sebatian kovalen tidak larut di dalam air. Natrium klorida, NaCl ialah satu contoh sebatian ion dan larutan glukosa pula adalah satu contoh sebatian kovalen yang melarut di dalam air.

Diagram 3 shows a conversation between two students about the conductivity of an ionic compound and carbon compound in water.

Rajah 3 menunjukkan perbualan di antara dua orang pelajar mengenai kekonduksian sebatian ion dan sebatian kovalen di dalam air.

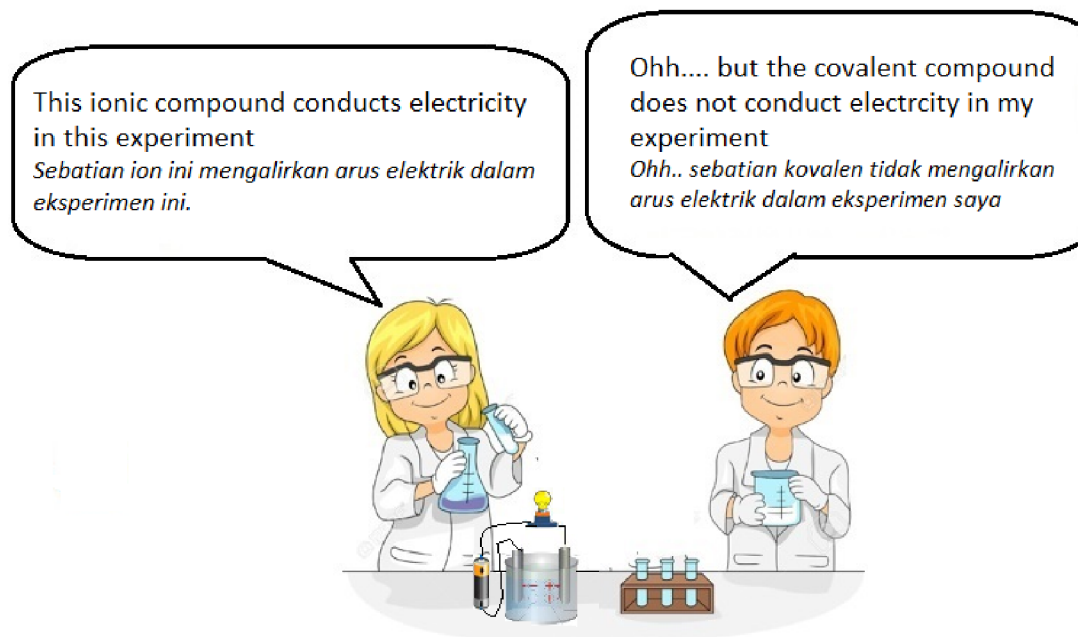


Diagram 3 / Rajah 3

Referring to the above conversation, plan a laboratory experiment to determine the conductivity of an ionic and covalent compound in water.

Merujuk kepada perbualan di atas, rancang satu eksperimen makmal untuk menentukan kekonduksian satu sebatian ion dan sebatian kovalen di dalam air

Your planning should include the following aspects:

Perancangan anda hendaklah mengandungi aspek-aspek berikut:

- Problem statement
Penyataan masalah
- All the variables.
Semua pembolehubah.
- Statement of the hypothesis
Pernyataan hipotesis

- (d) Lists of materials and apparatus
Senarai bahan dan radas
- (e) Procedure for the experiment
Prosedur eksperimen
- (f) Tabulation of data
Penjadualan data

[17 marks]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT
<https://cikguadura.wordpress.com/>

MARKING SCHEME SMTJB 2016
 SKEMA JAWAPAN KERTAS 3 TRIAL 2016
<https://cikguadura.wordpress.com/>

| 1 (a) | Suggested answer / <i>Jawapan yang di cadangkan</i> | Marks |
|-------|--|-------|
| | All answers are correct with unit Eksperimen 1. Early temperature / <i>Suhu awal</i> : 29.00 °C Final temperature / <i>Suhu akhir</i> : 59.50 °C Eksperimen 2 Early temperature / <i>Suhu awal</i> : 29.00 °C Final temperature / <i>Suhu akhir</i> : 64.75 °C Eksperimen 3 Early temperature / <i>Suhu awal</i> : 29.40 °C Final temperature / <i>Suhu akhir</i> : 57.90 °C | 3 |
| | One mistake in the reading of apparatus or unit | 2 |
| | Two mistake in the reading of apparatus or unit | 1 |
| | More than two mistakes in reading of apparatus or unit | 0 |

| 1 (b) | Suggested answer / <i>Jawapan yang di cadangkan</i> | Marks |
|-------|---|-------|
| | Jawapan yang betul 1. Suhu campuran naik 2. Pepejal perang dihasilkan 3. Sedikit serbuk zink melarut [jwpm ini diterima sebab dilukis dlm rajah] 4. Larutan biru menjadi tak berwarna [mana-mana satu jawapan] | 3 |
| | Kesalahan kecil pada jawapan calon 1. Bekas menjadi panas 2. Pepejal perang di perhatikan 3. Larutan tak berwarna terhasil | 2 |
| | Calon memberikan idea pemerhatian 1. pepejal perang 2. Larutan bertukar warna 3. Mendakan terhasil | 1 |
| | Respon yang salah | 0 |

| 1 (c) | Suggested answer / <i>Jawapan yang di cadangkan</i> | Marks |
|-------|--|-------|
| | Jawapan yang betul Semakin jauh kedudukan logam dengan kuprum dalam siri kereaktifan, semakin tinggi kenaikan suhu | 3 |
| | Kesalahan kecil pada jawapan calon Semakin jauh kedudukan logam dengan kuprum dalam siri elektrokimia, semakin tinggi kenaikan suhu | 2 |
| | Calon memberikan idea yang betul Semakin tinggi kedudukan logam dalam siri kereaktifan, semakin tinggi kenaikan suhu | 1 |
| | Respon yang salah | 0 |

| 1 (d) | Suggested answer / <i>Jawapan yang di cadangkan</i> | Marks |
|-------|--|-------|
| | Jawapan yang betul $Q = mc\theta$ $= 50 \times 4.2 \times 30.5$ $= 6405 \text{ J / Joule}$ | 3 |
| | Kesalahan kecil pada jawapan calon 1. Tiada unit / unit salah 2. $Q = mc\theta$ $= 50 \times 4.2 \times 30.5$ $= 6.405 \text{ kJ}$ | 2 |
| | Calon memberikan idea yang betul $Q = 55 \times 4.2 \times 30.5$ $= 7045.5 / 7046 \text{ J}$ | 1 |
| | Respon yang salah | 0 |

| 1 (e) | Suggested answer / <i>Jawapan yang di cadangkan</i> | Marks |
|-------|--|-------|
| | Jawapan yang betul $[(336-210) \div 2] + 210 = 273 \text{ kJ mol}^{-1}$ | 3 |
| | Kesalahan kecil pada jawapan calon $210 < \Delta H < 336 \text{ kJ mol}^{-1}$ | 2 |
| | Calon memberikan idea yang betul More than 210 kJ mol^{-1} | 1 |
| | Respon yang salah | 0 |

| 1 (f) | Suggested answer / <i>Jawapan yang di cadangkan</i> | Marks |
|-------|---|-------|
| | Jawapan yang betul Bacaan thermometer meningkat | 3 |
| | Kesalahan kecil pada jawapan calon Suhu naik | 2 |
| | Calon memberikan idea yang betul Haba terbebas ke persekitaran | 1 |
| | Respon yang salah ΔH bernilai negative | 0 |

| 1 (g) | Suggested answer / <i>Jawapan yang di cadangkan</i> | Marks |
|-------|---|-------|
| | Jawapan yang betul Suhu meningkat hasil dari pembebasan haba apabila 1 mol kuprum disesarkan dari larutan kuprum (II) sulfat oleh logam lain // Apabila logam ditambahkan ke dalam larutan kuprum (II) sulfat, suhu yang naik terhasil apabila 1 mol kuprum disesarkan. | 3 |

| | | |
|--|---|---|
| | Kesalahan kecil pada jawapan calon Haba yang dibebaskan apabila 1 mol kuprum disesarkan dari larutan kuprum (II) sulfat | 2 |
| | Calon memberikan idea yang betul Suhu meningkat hasil dari pembebasan haba apabila kuprum disesarkan dari larutan kuprum (II) sulfat oleh logam lain | 1 |
| | Respon yang salah | 0 |

| 2 (a) | Suggested answer / <i>Jawapan yang di cadangkan</i> | Marks |
|-------|---|-------|
| | Jawapan yang betul (i) Manipulasi : Jenis agen pencuci (ii) Bergerak balas : Kesan pencucian (iii) Dimalarkan : Jenis air liat | 3 |
| | Satu kesilapan | 2 |
| | Dua kesilapan | 1 |
| | Respon yang salah | 0 |

| 2 (b) | Suggested answer / <i>Jawapan yang di cadangkan</i> | Marks |
|-------|---|-------|
| | Jawapan yang betul Apabila sabun digunakan gris tidak hilang dari kain manakala apabila detergen digunakan gris dari kain tertanggal / dibersihkan // Detergen lebih berkesan dari sabun dalam mencuci kekotoran dari kain bergris | 3 |
| | Kesalahan kecil pada jawapan calon Detergen lebih berkesan dari sabun dalam mencuci kekotoran dari kain bergris | 2 |
| | Calon memberikan idea yang betul Detrgen lebih berkesan dari sabun | 1 |
| | Respon yang salah | 0 |

| 2 (c) | Suggested answer / <i>Jawapan yang di cadangkan</i> | Marks |
|-------|--|-------|
| | Jawapan yang betul Detergen lebih berkesan dari sabun dalam air liat | 3 |
| | Kesalahan kecil pada jawapan calon Detergen lebih berkesan dari sabun | 2 |
| | Calon memberikan idea yang betul Detergen boleh mencuci gris dalam air liat | 1 |
| | Respon yang salah | 0 |

| 2 (d) | Suggested answer / <i>Jawapan yang di cadangkan</i> | Marks | | | | |
|-----------------------|---|----------|------------|-----------------------|--|---|
| | Jawapan yang betul <table style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <tr> <td style="border-right: 1px solid black; padding: 5px;">Air liat</td> <td style="padding: 5px;">Air lembut</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 5px;">Air laut Air kapur</td> <td style="padding: 5px;">Air sungai Air hujan Air minuman</td> </tr> </table> | Air liat | Air lembut | Air laut Air kapur | Air sungai Air hujan Air minuman | 3 |
| Air liat | Air lembut | | | | | |
| Air laut Air kapur | Air sungai Air hujan Air minuman | | | | | |
| | Satu kesalahan kecil pada jawapan calon | 2 | | | | |
| | Dua kesalahan kecil pada jawapan calon | 1 | | | | |
| | Respon yang salah | 0 | | | | |

| 3 (a) | PROBLEM STATEMENT | Marks |
|-------|---|-------|
| | Jawapan yang betul Di antara sebatian ion atau sebatian kovalen, yang manakah mengalirkan arus elektrik di dalam air? | 3 |
| | Kesalahan kecil pada jawapan calon Di antara sebatian ion atau sebatian kovalen, yang manakah mengalirkan arus elektrik? | 2 |
| | Calon memberikan idea yang betul Sebatian yang manakah mengalirkan arus elektrik? | 1 |
| | Respon yang salah | 0 |

| 3 (b) | PEMBOLEHUBAH | Marks |
|-------|--|-------|
| | Jawapan yang betul (i) Manipulasi : Jenis sebatian (ii) Bergerak balas : kekonduksian elektrik (iii) Dimalarkan : Jenis pelarut | 3 |
| | Satu kesilapan | 2 |
| | Dua kesilapan | 1 |
| | Respon yang salah | 0 |

| 3 (c) | HIPOTESIS | Marks |
|-------|---|-------|
| | Jawapan yang betul [Sebatian ion] mengalirkan arus elektrik manakala [sebatian kovalen] tidak mengalirkan arus elektrik | 3 |
| | Kesalahan kecil pada jawapan calon [Sebatian ion] mengalirkan arus elektrik // Sebatian ion mengalirkan arus elektrik manakala sebatian kovalen tidak mengalirkan arus elektrik [Pernyataan am] | 2 |

| | | |
|--|--|---|
| | Calon memberikan idea yang betul [Sebatian ion] mengalirkan arus elektrik | 1 |
| | Respon yang salah | 0 |

| 3 (d) | SENARAI ALAT RADAS DAN BAHAN | Marks |
|-------|---|-------|
| | Jawapan yang betul Bateri, wayar penyambung, mentol / galvanometer/mentol/ammeter , elektrod karbon, bikar, larutan [glukosa], larutan [natrium klorida]. | 3 |
| | Kesalahan kecil pada jawapan calon Satu dari senarai alat radas atau bahan tertinggal | 2 |
| | Calon memberikan idea yang betul Dua dari senarai alat radas atau bahan tertinggal | 1 |
| | Respon yang salah | 0 |

| 3 (e) | PROSEDUR EKSPERIMEN | Marks |
|-------|--|-------|
| | Jawapan yang betul 1. Tuang larutan glukosa ke dalam sebuah bikar 2. Celupkan elektrod karbon ke dalam larutan 3. Sambungkan elektrod karbon kepada bateri dan galvanometer / mentol / ammeter 4. Catatkan pemerhatian 5. Ulangi eksperimen dengan menggunakan larutan natrium klorida | 3 |
| | Kesalahan kecil pada jawapan calon Satu prosedur salah atau tertinggal | 2 |
| | Calon memberikan idea yang betul Dua prosedur salah atau tertinggal | 1 |
| | Respon yang salah | 0 |

| 3 (f) | PENJADUALAN DATA | Marks | | | | | | |
|-------------------------|--|-------|---------------|-------------|-----------------|--|-------------------------|--|
| | Jawapan yang betul | 2 | | | | | | |
| | <table border="1"> <thead> <tr> <th>Jenis larutan</th> <th>Pemerhatian</th> </tr> </thead> <tbody> <tr> <td>Larutan glukosa</td> <td></td> </tr> <tr> <td>Larutan natrium klorida</td> <td></td> </tr> </tbody> </table> | | Jenis larutan | Pemerhatian | Larutan glukosa | | Larutan natrium klorida | |
| Jenis larutan | Pemerhatian | | | | | | | |
| Larutan glukosa | | | | | | | | |
| Larutan natrium klorida | | | | | | | | |
| | Kesalahan kecil pada jawapan calon jadual tak lengkap, label tak lengkap | 1 | | | | | | |
| | Respon yang salah | 0 | | | | | | |

<https://cikguadura.wordpress.com/>