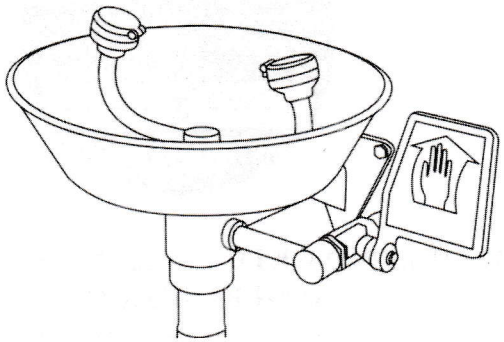
1 Rajah 1 menunjukkan sebuah peralatan keselamatan di dalam sebuah makmal.
Diagram 1 *shows a safety equipment in a laboratory.*



Rajah 1
Diagram 1

Apakah fungsi peralatan keselamatan ini?
What is the function of the safety equipment?

A Untuk mensterilkan mata
To sterilise the eyes

B Untuk mengurangkan kekeringan mata
To reduce dryness of the eyes

C Untuk membersihkan bahagian mata sekiranya berlaku kemalangan bahan kimia
To clean parts of the eyes in case of chemical accidents

D Untuk mengelakkan habuk atau percikan bahan kimia daripada masuk ke dalam mata
To prevent dust or splashes of chemicals from getting into the eyes

2 Apakah kegunaan isotop plumbum-210?
What is the use of lead-210 *isotope*?

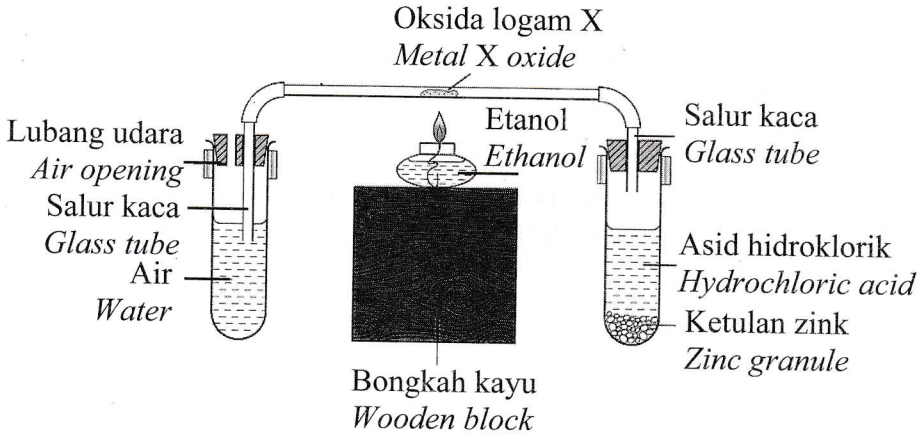
A Radioterapi untuk membunuh sel kanser tanpa melakukan pembedahan
Radiotherapy to kill cancer cells without surgery

B Menetapkan umur lapisan pasir dan tanah sehingga 80 tahun
Determining the age of sand and earth layers up to 80 *years*

C Menganggar umur bahan artifak atau fosil
Estimation of artifacts or fossils' age

D Mengesan kebocoran paip bawah tanah
Detecting leakage of underground pipes

3 Rajah 2 menunjukkan susunan radas untuk menentukan formula empirik oksida logam X.
Diagram 2 shows the set-up of the apparatus used to determine the empirical formula of metal X oxide.



Rajah 2
Diagram 2

Apakah X?
What is X?

A Zink
Zinc

B Kuprum
Copper

C Aluminium
Aluminium

D Magnesium
Magnesium

4 Antara yang berikut, penyataan manakah yang dicadangkan oleh Dmitri Mendeleev dalam Pembangunan Jadual Berkala Unsur?
Which of the following statements did Dmitri Mendeleev propose in the development of the Periodic Table of Elements?

A Memperkenalkan Hukum Oktaf
Introducing the Law of Octaves

B Setiap unsur mempunyai nombor proton
Each element has a proton number

C Beberapa ruang kosong ditinggalkan untuk pengisian unsur yang tidak ditemui lagi
Several empty spaces are left for filling undiscovered elements

D Pengkelasan unsur berdasarkan beberapa kumpulan seperti gas, bukan logam, logam dan logam oksida
Classification of elements based on several groups such as gases, non-metals, metals and metal oxides

5 Ikatan kimia berikut yang manakah terbentuk melalui pemindahan elektron?
Which of the following chemical bond is formed through the transfer of electron?

A Ikatan ion
Ionic bond

B Ikatan datif
Dative bond

C Ikatan logam
Metallic bond

D Ikatan kovalen
Covalent bond

6 Antara yang berikut, penyataan manakah betul tentang larutan alkali lemah?
Which of the following statements is correct about a weak alkaline solution?

A Mempunyai nilai pH 13
Have a pH *value of* 13

B Mengion separa dalam air
Partially ionise in water

C Kepekatan larutan adalah rendah
Concentration of solution is low

D Larutan tidak bertindak balas dengan asid
Solution does not react with acid

7 Antara yang berikut, unit manakah betul bagi kadar tindak balas?
Which of the following units is correct for the rate of reaction?

A $mol\ dm^{-3}$

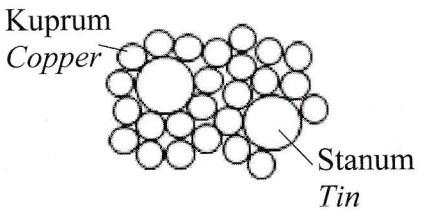
B $g\ min^{-1}$

C $g\ mol^{-1}$

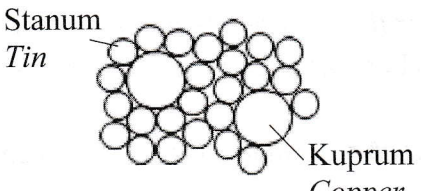
D $kJ\ g^{-1}$

8 Tugu Negara Malaysia telah dibina pada tahun 1966 menggunakan gangsa.
Antara yang berikut, yang manakah menunjukkan susunan atom dalam gangsa?
The National Monument of Malaysia was built in 1966 *using bronze.*
Which of the following shows the arrangement of the atoms in bronze?

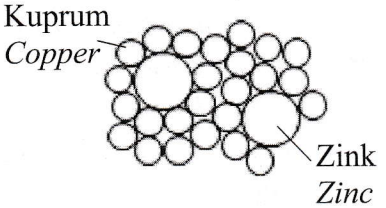
A



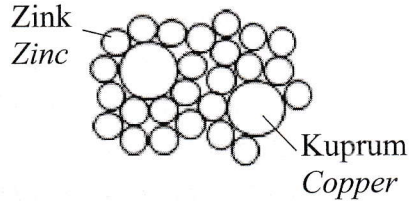
B



C



D



9 Jadual 1 menunjukkan nilai keupayaan elektrod piawai bagi sel setengah dua jenis logam dalam satu tindak balas kimia.
Table 1 shows the standard electrode potential values of half cells for two metals in a chemical reaction.

Keupayaan elektrod piawai sel setengah ***Half-cell standard electrode potential***	**E° (V)**
Mg^{2+}(ak) + 2e$^-$ ⇌ Mg(p) $Mg^{2+}(aq)$ + 2e$^-$ ⇌ Mg(s)	−2.38
Cu^{2+}(ak) + 2e$^-$ ⇌ Cu(p) $Cu^{2+}(aq)$ + 2e$^-$ ⇌ Cu(s)	+0.34

Jadual 1
Table 1

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

A Cu ialah terminal positif
Cu *is positive terminal*

B Nilai E° sel ialah −2.72 V
E° *cell values is* −2.72 V

C Mg^{2+} ialah agen pengoksidaan
Mg^{2+} *is an oxidising agent*

D Persamaan ion keseluruhan ialah Mg^{2+}(ak) + Cu(p) → Cu^{2+}(ak) + Mg(p)
Overall ionic equation is $Mg^{2+}(aq)$ + Cu(s) → $Cu^{2+}(aq)$ + Mg(s)

10 Antara yang berikut, sebatian manakah dipadankan dengan bilangan atom karbonnya yang betul?
Which of the following compounds has its number of carbon atoms correctly matched?

	Sebatian ***Compound***	**Bilangan atom karbon** ***Number of carbon atoms***
A	Etanol *Ethanol*	3
B	Butuna *Butyne*	4
C	Heptena *Heptene*	6
D	Oktana *Octane*	10

11 Antara yang berikut, manakah merupakan contoh bagi tindak balas endotermik?
Which of the following is an example of endothermic reaction?

A Pembakaran kertas
Burning of paper

B Pengaratan besi
Rusting of iron

C Respirasi sel
Cell respiration

D Menggoreng ikan
Frying fish

12 Antara yang berikut yang manakah dapat menukarkan lateks daripada cecair ke pepejal?
Which of the followings can change the latex from liquid to solid?

A NH_3

B $(NH_4)_2SO_4$

C CH_3COOH

D CH_3COOCH_3

13 Rajah 3 menunjukkan formula bagi dua jenis bahan pencuci berbeza, X dan Y.
Diagram 3 shows the formulas for two different types of cleaning agent, X *and* Y.

Bahan pencuci X
Cleaning agent X

Bahan pencuci Y
Cleaning agent Y

Rajah 3
Diagram 3

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

	X	Y
A	Mesra alam *Environmentally friendly*	Menyebabkan pencemaran *Cause pollution*
B	Berkesan dalam air liat sahaja *Effective in hard water only*	Berkesan dalam air liat dan air lembut *Effective in hard water and soft water*
C	Dihasilkan daripada pecahan petroleum *Produced from fraction of petroleum*	Dihasilkan daripada minyak atau lemak *Produced from oil or fat*
D	Bertindak balas dengan ion Mg^{2+} membentuk kekat *Reacts with* Mg^{2+}*ion to form scum*	Tidak bertindak balas dengan ion Mg^{2+} *Does not react with* Mg^{2+} *ion*

14 Antara yang berikut, proses manakah melibatkan pembebasan haba?
Which of the following processes involves the release of heat?

A Peleburan
Melting

B Pengendapan
Deposition

C Pemejalwapan
Sublimation

D Pendidihan
Boiling

15 Antara yang berikut, ion manakah yang akan membentuk sebatian XZ_2?
Which of the following ions will form compound XZ_2?

A X^- dan Z^{2+}
X^- *and* Z^{2+}

B X^{2-} dan Z^+
X^{2-} *and* Z^+

C X^+ dan Z^{2-}
X^+ *and* Z^{2-}

D X^{2+} dan Z^-
X^{2+} *and* Z^-

16 Antara yang berikut, yang manakah mewakili perubahan sifat unsur apabila merentasi Kala 3?
Which of the following represent changes of properties of elements when across Period 3?

I Pertambahan saiz atom
Increase in atomic size

II Pengurangan sifat logam
Decrease in metallic properties

III Pertambahan keelektronegatifan
Increase in electronegativity

IV Pengurangan bilangan elektron valens
Decrease in the number of valence electrons

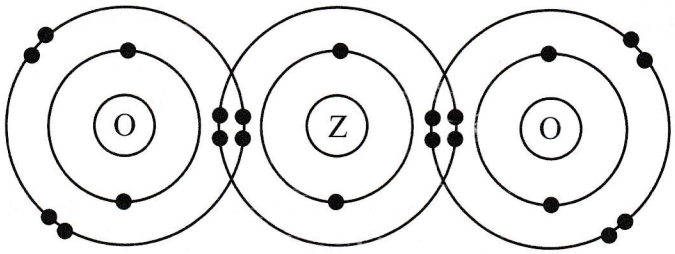
A I dan II
I *and* II

B I dan IV
I *and* IV

C II dan III
II *and* III

D III dan IV
III *and* IV

17 Rajah 4 menunjukkan hasil tindak balas antara unsur Z dengan oksigen.
Diagram 4 shows a product formed between element Z and oxygen.



Rajah 4
Diagram 4

Apakah Z?
What is Z?

A Karbon
Carbon

B Hidrogen
Hydrogen

C Magnesium
Magnesium

D Aluminium
Aluminium

18 Antara yang berikut, yang manakah betul tentang asid sulfurik?
Which of the following is correct about sulphuric acid?

I Nilai pH lebih rendah daripada 7
pH *value is less than* 7

II Mempunyai darjah penceraian yang lebih tinggi
Has higher degree of dissociation

III Menukarkan kertas litmus merah kepada biru
Turn red litmus paper to blue

IV Mempunyai kepekatan ion hidrogen yang lebih rendah
Has lower concentration of hydrogen ions

A I dan II
I *and* II

B I dan IV
I *and* IV

C II dan III
II *and* III

D III dan IV
III *and* IV

19 Persamaan berikut mewakili satu tindak balas kimia.
The following equation represents a chemical reaction.

$$Ca(p) + 2H_2O(ce) \rightarrow Ca(OH)_2(ak) + H_2(g)$$
$$Ca(s) + 2H_2O(l) \rightarrow Ca(OH)_2(aq) + H_2(g)$$

Antara yang berikut, kaedah manakah yang betul untuk menentukan kadar tindak balas?
Which of the following methods is correct to determine the rate of reaction?

A Peningkatan isi padu larutan dengan masa
Increasing of volume of solution with time

B Pertambahan jisim kalsium dengan masa
Increasing of mass of calcium with time

C Penghasilan $Ca(OH)_2$ dengan masa
Production of $Ca(OH)_2$ *with time*

D Perubahan isi padu gas dengan masa
The change of volume of gas with time

20 Antara yang berikut, kaca manakah yang digunakan untuk membuat kanta mikroskop?
Which of the following glass is used to make microscope lens?

A Kaca plumbum
Lead glass

B Kaca soda kapur
Soda lime glass

C Kaca borosilikat
Borosilicate glass

D Kaca silika terlakur
Fused silica glass

21 Jadual 2 menunjukkan keupayaan elektrod piawai bagi sel setengah dua logam.
Table 2 shows the standard electrode potential of half-cells of two metals.

$L^{2+} + 2e^- \rightleftharpoons L$	$E^0 = -1.20$ V
$M^{3+} + 3e^- \rightleftharpoons M$	$E^0 = -2.08$ V

Jadual 2
Table 2

Antara yang berikut, agen penurunan yang manakah paling kuat?
Which of the following is the strongest reducing agent?

A L^{2+}

B M^{3+}

C L

D M

22 Sebatian karbon M terhasil apabila etanol bertindak balas dengan larutan kalium manganat(VII) berasid.
Apakah formula am bagi M?
Carbon compound M *formed when ethanol reacts with acidified potassium manganate*(VII) *solution.*
What is the general formula for M?

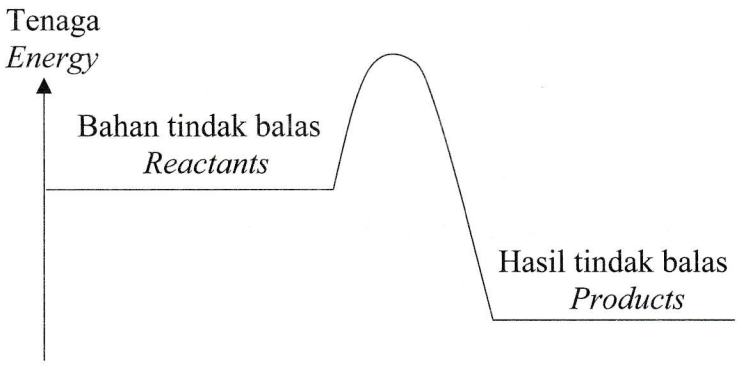
A C_nH_{2n}

B C_nH_{2n+2}

C $C_nH_{2n+1}COOH$

D $C_nH_{2n+1}COOC_mH_{2m+1}$

23 Rajah 5 menunjukkan gambar rajah profil tenaga bagi satu tindak balas.
Diagram 5 shows the energy profile diagram for a reaction.



Rajah 5
Diagram 5

Antara yang berikut, yang manakah bahan tindak balas dan penerangan yang betul bagi tindak balas tersebut?
Which of the following are correct reactants dan description about the reaction?

	Bahan tindak balas ***Reactants***	**Penerangan** ***Description***
A	Ammonium nitrat dan air *Ammonium nitrate and water*	Tenaga haba diserap untuk memecahkan ikatan lebih tinggi daripada tenaga haba dibebaskan semasa pembentukan ikatan *Heat energy absorbed to break the bond is higher than heat energy released during the formation of bond*
B	Plumbum(II) nitrat dan kuprum(II) sulfat *Lead*(II) *nitrate and copper*(II) *sulphate*	Tenaga haba diserap untuk memecahkan ikatan lebih tinggi daripada tenaga haba dibebaskan semasa pembentukan ikatan *Heat energy absorbed to break the bond is higher than heat energy released during the formation of bond*
C	Asid sulfurik dan natrium hidrogen karbonat *Sulphuric acid and sodium hydrogen carbonate*	Tenaga haba diserap untuk memecahkan ikatan lebih rendah daripada tenaga haba dibebaskan semasa pembentukan ikatan *Heat energy absorbed to break the bond is lower than heat energy released during the formation of bond*
D	Asid hidroklorik dan zink *Hydrochloric acid and zinc*	Tenaga haba diserap untuk memecahkan ikatan lebih rendah daripada tenaga haba dibebaskan semasa pembentukan ikatan *Heat energy absorbed to break the bond is lower than heat energy released during the formation of bond*

24 Antara yang berikut, polimer manakah dihasilkan melibatkan sekurang-kurangnya dua jenis monomer yang berbeza?
Which of the following polymers produced that involves at least two different types of monomers?

A Polivinil klorida
Polyvinyl chloride

B Polipropena
Polypropene

C Polietena
Polyethene

D Poliester
Polyester

25 Sos cili mengandungi asid benzoik.
Antara yang berikut, yang manakah menerangkan fungsi asid benzoik?
Chili sauce contains benzoic acid.
Which of the following explains the function of benzoic acid?

A Menghalang pertumbuhan bakteria
Prevent the growth of bacteria

B Menambah rasa masam dalam sos
Enhance sour flavour in sauce

C Memberi tekstur yang licin kepada sos
Give smooth texture to sauce

D Memperlahankan pengoksidaan minyak
Slow down the oxidation of oil

26 Jadual 3 menunjukkan takat didih dan takat lebur bagi bahan-bahan P, Q, R dan S.
Table 3 *shows the boiling point and melting point of substances* P, Q, R *and* S.

Bahan ***Substances***	**Takat didih (°C)** ***Boiling point*** **(°C)**	**Takat lebur (°C)** ***Melting point*** **(°C)**
P	268	197
Q	170	150
R	130	80
S	17	8

Jadual 3
Table 3

Antara yang berikut, bahan manakah melebur apabila diletakkan ke dalam air yang mendidih?
Which substance melts when put into a boiling water?

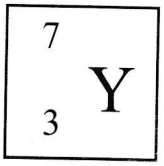
A P

B Q

C R

D S

27 Rajah 6 menunjukkan perwakilan piawai bagi unsur Y.
Diagram 6 shows the standard representation of element Y.



Rajah 6
Diagram 6

Berapakah bilangan elektron valens bagi atom Y?
What is the number of valence electrons in atom Y?

A 1
B 3
C 5
D 7

28 Antara yang berikut, pernyataan manakah yang betul bagi 1 mol bahan?
Which of the following statements is correct about 1 mol *of substance*?

A 1 mol glukosa mempunyai 6.02×10^{23} atom
1 mol *of glucose contains* 6.02×10^{23} *atoms*
B 1 mol gas argon mempunyai 6.02×10^{23} molekul
1 mol *of argon gas contains* 6.02×10^{23} *molecules*
C 1 mol kuprum(II) oksida mempunyai 6.02×10^{23} ion
1 mol *of copper*(II) *oxide contains* 6.02×10^{23} *ions*
D 1 mol magnesium sulfat mempunyai 6.02×10^{23} unit formula
1 mol *of magnesium sulphate mempunyai* 6.02×10^{23} *formula units*

29 Antara yang berikut, kumpulan berfungsi manakah mewakili bukan hidrokarbon?
Which of the following functional groups represent a non-hydrocarbon?

I Ikatan tunggal antara atom karbon
Single bond between carbon atoms
II Ikatan ganda tiga antara atom karbon
Triple bond between carbon atoms
III Karboksil
Carboxyl
IV Karboksilat
Carboylate

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

30 Ion Z^- mempunyai susunan elektron 2.8.
Berikut yang manakah betul tentang unsur Z?
Z^- ion has an electron arrangement of 2.8.
Which of the following is correct about element Z?

A Mempunyai keelektronegatifan yang tinggi
Has high electronegativity

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

C Lengai terhadap tindak balas kimia
Inert towards chemical reaction

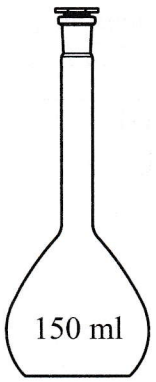
D Membentuk larutan beralkali apabila melarut dalam air
Forms alkaline solution when dissolved in water

31 Unsur Q dan unsur R mempunyai nombor proton 12 dan 9 masing-masing.
Apakah jisim formula relatif bagi sebatian yang terbentuk antara Q dan R?
[Jisim atom relatif: Q = 24, R = 19]

Element Q *and* R *have proton numbers of* 12 *and* 9 *respectively.*
What is the relative formula mass of a compound formed between Q *and* R?
[*Relative atomic mass*: Q = 24, R = 19]

A 43 **C** 67
B 62 **D** 86

32 Rajah 7 menunjukkan satu radas untuk menyediakan larutan piawai natrium klorida 0.2 mol dm^{-3}.
Diagram 7 *shows an apparatus to prepare a standard solution of* 0.2 mol dm^{-3} *sodium chloride.*

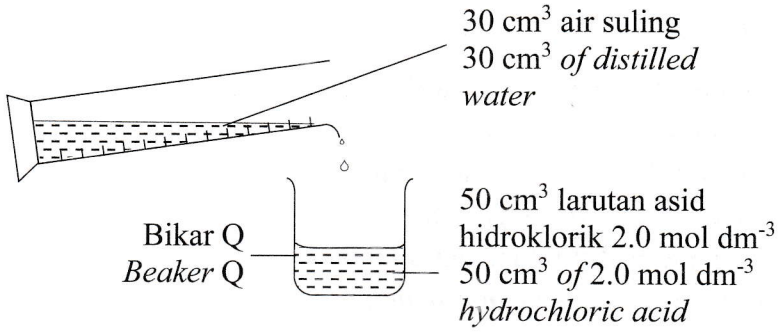


Rajah 7
Diagram 7

Berapakah isi padu larutan natrium klorida 2.0 mol dm^{-3} yang diperlukan untuk menyediakan larutan piawai itu?
What is the volume of 2.0 mol dm^{-3} *sodium chloride solution needed to prepare the standard solution*?

A 10 cm^3 **C** 30 cm^3
B 15 cm^3 **D** 60 cm^3

33 Rajah 8 menunjukkan susunan radas untuk menyediakan larutan asid hidroklorik.
Diagram 8 shows the apparatus set-up to prepare hydrochloric acid solution.



Rajah 8
Diagram 8

Serbuk zink berlebihan dimasukkan ke dalam 40 cm^3 asid hidroklorik yang disediakan di bikar Q.
Apakah jisim maksimum garam yang terbentuk pada akhir eksperimen?
[Jisim atom relatif: Cl = 35.5, Zn = 65]

Excess zinc powder is added into 40 cm^3 *of hydrochloric acid solution prepared in beaker* Q.
What is the maximum mass of salt formed at the end of the experiment?
[*Relative atomic mass*: Cl = 35.5, Zn = 65]

A 3.4 g
B 5.4 g
C 6.8 g
D 10.9 g

34 Jadual 4 menunjukkan jumlah isi padu gas yang terkumpul pada sela masa tertentu bagi tindak balas antara kalsium karbonat dengan asid hidroklorik.
Table 4 shows the total volume of gas collected at a certain time interval for a reaction between calcium carbonate and hydrochloric acid.

Masa (s) ***Time* (s)**	**Isi padu gas (cm^3)** ***Volume of gas* (cm^3)**
0	0.00
30	4.20
60	7.70
90	10.90
120	13.70
150	15.20
180	16.00
210	16.00

Jadual 4
Table 4

Berapakah kadar tindak balas purata dalam minit kedua?
What is the average rate of reaction in the second minutes?

A 0.128 $cm^3\ s^{-1}$
B 0.114 $cm^3\ s^{-1}$
C 0.100 $cm^3\ s^{-1}$
D 0.088 $cm^3\ s^{-1}$

35 Jadual 5 menunjukkan sel setengah bagi dua logam yang digunakan untuk membina satu sel kimia.
Table 5 shows half cells of two metals that are used to build a chemical cell.

Tindak balas sel setengah ***Half-cell reaction***	**E^0 / V (298 K)**
$Zn^{2+}(ak) + 2e^- \rightleftharpoons Zn(p)$ $Zn^{2+}(aq) + 2e^- \rightleftharpoons Zn(s)$	-0.76
$Sn^{2+}(ak) + 2e^- \rightleftharpoons Sn(p)$ $Sn^{2+}(aq) + 2e^- \rightleftharpoons Sn(s)$	-0.14

Jadual 5
Table 5

Antara yang berikut, notasi sel manakah mewakili tindak balas redoks yang berlaku dalam sel kimia tersebut?
Which of the following cell notations represents the redox reaction taken place in the chemical cell?

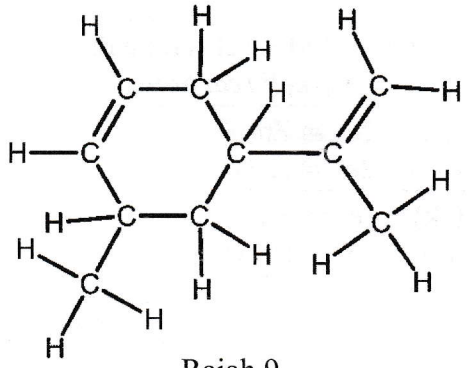
A $Zn^{2+}(ak, 1.0\ mol\ dm^{-3}) \mid Zn(p) \parallel Sn(p) \mid Sn^{2+}(ak, 1.0\ mol\ dm^{-3})$
$Zn^{2+}(aq, 1.0\ mol\ dm^{-3}) \mid Zn(s) \parallel Sn(s) \mid Sn^{2+}(aq, 1.0\ mol\ dm^{-3})$

B $Zn(p) \mid Zn^{2+}(ak, 1.0\ mol\ dm^{-3}) \parallel Sn^{2+}(ak, 1.0\ mol\ dm^{-3}) \mid Sn(p)$
$Zn(s) \mid Zn^{2+}(aq, 1.0\ mol\ dm^{-3}) \parallel Sn^{2+}(aq, 1.0\ mol\ dm^{-3}) \mid Sn(s)$

C $Sn^{2+}(ak, 1.0\ mol\ dm^{-3}) \mid Sn(p) \parallel Zn(p) \mid Zn^{2+}(ak, 1.0\ mol\ dm^{-3})$
$Sn^{2+}(aq, 1.0\ mol\ dm^{-3}) \mid Sn(s) \parallel Zn(s) \mid Zn^{2+}(aq, 1.0\ mol\ dm^{-3})$

D $Sn(p) \mid Sn^{2+}(ak, 1.0\ mol\ dm^{-3}) \parallel Zn^{2+}(ak, 1.0\ mol\ dm^{-3}) \mid Zn(p)$
$Sn(s) \mid Sn^{2+}(aq, 1.0\ mol\ dm^{-3}) \parallel Zn^{2+}(aq, 1.0\ mol\ dm^{-3}) \mid Zn(s)$

36 Rajah 9 menunjukkan struktur molekul limonena yang diekstrak daripada oren.
Diagram 9 shows the molecular structure of limonene which is extracted from oranges.



Rajah 9
Diagram 9

Berapakah jisim hasil tindak balas apabila molekul bromin bertindak balas sepenuhnya dengan 1 mol limonena semasa tindak balas penambahan ini?
[Jisim atom relatif: H = 1, C = 12, Br = 80]
What is the mass of the product when bromine molecules react completely with 1 mol *of limonene during the addition reaction*?
[*Relative atomic mass*: H = 1, C = 12, Br = 80]

A 136 g
B 216 g
C 296 g
D 456 g

37 Persamaan kimia berikut menunjukkan penguraian zinc nitrat.
The following chemical equation shows the decomposition of zinc nitrate.

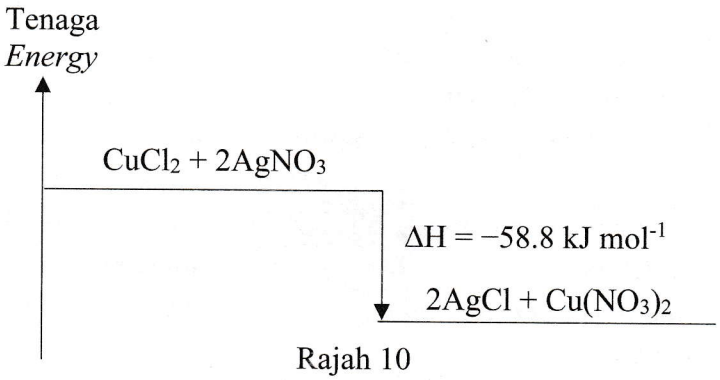
$$2\ Zn(NO_3)_2 \rightarrow 2\ ZnO + 4\ NO_2 + O_2$$

Berapakah jumlah isi padu gas yang terhasil jika 1.89 g garam zinc nitrat terurai dengan lengkap
[Jisim atom relatif: Zn = 65, N = 14, O = 16; satu mol sebarang gas menempati 24 dm^3 pada keadaan bilik]

What is the total volume of gas produced when 1.89 g *zinc nitrate salt decomposes completely*?
[*Relative atomic mass*: Zn = 65, N = 14, O = 16; *one mole of any gas occupies* 24 dm^3 *at room condition*]

A 120 cm^3
B 480 cm^3
C 600 cm^3
D 1200 cm^3

38 Rajah 10 menunjukkan gambar rajah aras tenaga bagi tindak balas antara larutan kuprum(II) klorida dan larutan argentum nitrat.
Diagram 10 *shows the energy level diagram for the reaction between copper*(II) *chloride solution with silver nitrate solution.*



Rajah 10
Diagram 10

Dalam satu eksperimen, 50 cm^3 larutan argentum nitrat 1.0 mol dm^{-3} ditambah ke dalam sebuah bikar yang mengandungi 25 cm^3 larutan kuprum(II) klorida 1.0 mol dm^{-3}.
Apakah perubahan suhu bagi tindak balas tersebut?
[Muatan haba tentu larutan = 4.2 J g^{-1} °C^{-1}]

In an experiment, 50 cm^3 *of* 1.0 mol dm^{-3} *silver nitrate is added into a beaker containing* 25 cm^3 *of* 1.0 mol dm^{-3} *copper*(II) *chloride solution.*
What is the temperature change in the reaction?
[*Specific heat capacity of solution* = 4.2 J g^{-1} °C^{-1}]

A 2.3 °C
B 4.7 °C
C 9.3 °C
D 14.0 °C

39 Jadual 6 menunjukkan pemerhatian bagi tiga ujian ke atas larutan garam G.
Table 6 shows the observations in three tests on solution G.

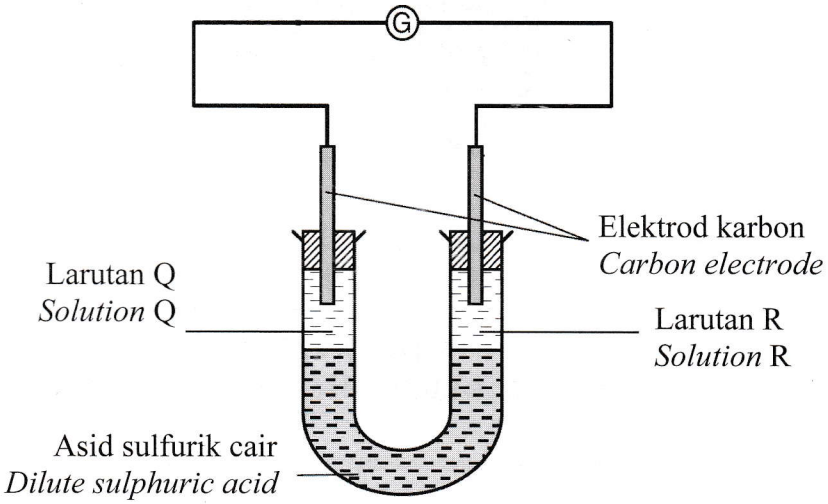
Set	Ujian *Test*	Pemerhatian *Observation*
I	Tambah larutan natrium hidroksida sehingga berlebihan *Add sodium hydroxide solution until in excess*	Mendakan putih larut dalam larutan natrium hidroksida berlebihan *White precipitate dissolves in excess sodium hydroxide solution*
II	Tambah larutan ammonia sehingga berlebihan *Add ammonia solution until in excess*	Mendakan putih larut dalam larutan ammonia berlebihan *White precipitate dissolves in excess ammonia solution*
III	Tambah asid nitrik cair dan larutan argentum nitrat *Add dilute nitric acid and silver nitrate solution*	Mendakan putih terbentuk *White precipitate formed*

Jadual 6
Table 6

Apakah G?
What is G?

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

40 Rajah 11 menunjukkan susunan radas untuk mengkaji pemindahan elektron pada suatu jarak.
Diagram 11 *shows the apparatus set-up to study the transfer of electron at a distance.*



Rajah 11
Diagram 11

Selepas 30 minit, pemerhatian direkodkan seperti berikut:
After 30 *minutes, observations were recorded as below*:

- Larutan R bertukar daripada warna perang kepada tidak berwarna
  Solution R *turns from brown to colourless*
- Jarum galvanometer terpesong
  Needle of galvanometer deflects

Apakah Q dan R?
What are Q *and* R?

	Q	R
A	Larutan kalium iodida *Potassium iodide solution*	Air klorin *Chlorine water*
B	Larutan kalium iodida *Potassium iodide solution*	Air bromin *Bromine water*
C	Larutan kalium bromida *Potassium bromide solution*	Air bromin *Bromine water*
D	Larutan kalium bromida *Potassium bromide solution*	Air iodin *Iodine water*

KERTAS PEPERIKSAAN TAMAT

ARAHAN:
Anda dikehendaki menyemak senarai radas dan bahan, membaca soalan dan merancang eksperimen dalam tempoh **lima minit** yang pertama.
Tandakan (✓) pada ruang yang disediakan untuk menyemak radas dan bahan yang dibekalkan.

INSTRUCTION
You are required to check the list of apparatus and materials, read the questions and plan the experiment within the first **five minutes**.
Tick (✓) *in the space provided to check the apparatus and materials are supplied.*

SENARAI SEMAK CALON
CANDIDATE CHECK LIST

Bil	Radas dan Bahan *Apparatus and Materials*	Kuantiti *Quantity*	Ada (✓) / Tiada (✗) *Yes* (✓) / *No* (✗)
1.	Bikar 100 cm^3 100 cm^3 *beaker*	2	( )
2.	Silinder penyukat 50 cm^3 50 cm^3 *measuring cylinder*	1	( )
3.	Galvanometer *Galvanometer*	1	( )
4.	Sel kering *Dry cell*	2	( )
5.	Pemegang sel kering *Dry cell holder*	1	( )
6.	Bungkusan plastik berisi serbuk yang berlabel '5 g sebatian X' *Plastic packet containing powder labelled* '5 g *of compound* X'	1	( )
7.	Bungkusan plastik berisi serbuk yang berlabel '5 g sebatian Y' *Plastic packet containing powder labelled* '5 g *of compound* Y'	1	( )
8.	Air suling *Distilled water*	1 botol 1 *bottle*	( )

Bil	Radas dan Bahan *Apparatus and Materials*	Kuantiti *Quantity*	Ada (✓) / Tiada (✗) *Yes* (✓) / *No* (✗)
9.	Wayar penyambung dengan klip buaya *Connecting wire with crocodile clip*	3	( )
10.	Rod kaca *Glass rod*	2	( )
11.	Rod karbon *Carbon rod*	4	( )
12.	Tuala *Towel*	1	( )

Anda diberikan dua sampel pepejal berwarna putih. Anda dikehendaki menjalankan satu eksperimen untuk mengkaji kekonduksian elektrik bagi dua jenis sebatian.
Jalankan eksperimen ini dengan menggunakan radas dan bahan yang dibekalkan.

You are given two samples of white solid. You are required to carry out an experiment to investigate the electrical conductivity of two types of compounds.
Carry out the experiment by using the apparatus and materials provided.

(*a*) Rancang satu prosedur bagi eksperimen ini.
Tuliskan langkah-langkah eksperimen dalam ruangan yang disediakan.

Plan a procedure for this experiment.
Write the steps of the experiment in the spaces provided.

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[4 *markah* / 4 *marks*]

(*b*) Lengkapkan jadual untuk merekod keputusan eksperimen anda.
Complete a table to record the result of the experiment.

Jenis Sebatian ***Type of compound***	**Pemerhatian pada galvanometer** ***Observation on galvanometer***	**Inferens** ***Inference***
X		
Y		

[4 *markah* / 4 *marks*]

(*c*) Berdasarkan keputusan eksperimen anda dalam (*b*),
Based on the results of your experiment in (*b*),

Kenal pasti jenis sebatian X dan sebatian Y.
Identify the type of compound X *and* Y.

Sebatian X
Compound X: .....

Sebatian Y
Compound Y: .....

[2 *markah* / 2 *marks*]

(*d*) Ramalkan pemerhatian pada galvanometer jika salah satu sebatian di (*b*) digantikan dengan naftalena. Terangkan jawapan anda.
Predict the observation on galvanometer when one of the compounds in (b) is replaced by naphthalene. Explain your answer.

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[3 *markah* / 3 *marks*]

(*e*) Nyatakan definisi secara operasi bagi sebatian ion.
State the operational definition for ionic compound.

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[2 *markah* / 2 *marks*]

KERTAS PEPERIKSAAN TAMAT