

MAJLIS KEBANGSAAN PENGETUA-PENGETUA
SEKOLAH MENENGAH
NEGERI KEDAH DARUL AMAN

PEPERIKSAAN PERCUBAAN SPM 2011

CHEMISTRY

Paper 1

One hour and fifteen minutes

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.*

Kertas soalan ini mengandungi 24 halaman bercetak

- 1 Which of the following pairs are matched **correctly** ?
 Antara berikut, yang manakah pasangan yang **betul** ?

	Atom	Ion	Molecule
A	Iron <i>Ferum</i>	Mercury <i>Raksa</i>	Hydrogen <i>Hidrogen</i>
B	Aluminium <i>Aluminium</i>	Sodium <i>Natrium</i>	Chlorine <i>Klorin</i>
C	Sodium <i>Natrium</i>	Lithium oxide <i>Litium oksida</i>	Bromine <i>Bromin</i>
D	Ammonia <i>Ammonia</i>	Sulphur dioxide <i>Sulfur dioksida</i>	Carbon dioxide <i>Karbon dioksida</i>

- 2 Isotopes of an element are different in
 Isotop suatu unsur berbeza dari segi

- A chemical properties
sifat kimia
- B physical properties
sifat fizik
- C the number of protons
bilangan proton
- D the number of electrons
bilangan elektron

- 3 Diagram 1 shows part of the Periodic Table.
 Rajah 1 menunjukkan sebahagian dari Jadual Berkala.

Diagram 1

The elements are arranged according to the increasing order of...
 Unsur-unsur disusun mengikut pertambahan

- A the atomic mass of the element.
jisim atom unsur.
- B number of proton in the nucleus of atom.
bilangan proton dalam nukleus atom.
- C number of neutron in the nucleus of atom.
bilangan neutron dalam nukleus atom.
- D number of valence electron in an atom.
bilangan elektron valens dalam sesuatu atom.

- 4 Which of the following is a covalent compound ?
Manakah antara berikut adalah sebatian kovalen ?
- A $MgCl_2$
 B Al_2O_3
 C CaO
 D SO_2

- 5 Diagram 2 shows the apparatus set-up of the electrolysis of substance X.
Rajah 2 menunjukkan susunan radas bagi elektrolisis bahan X.

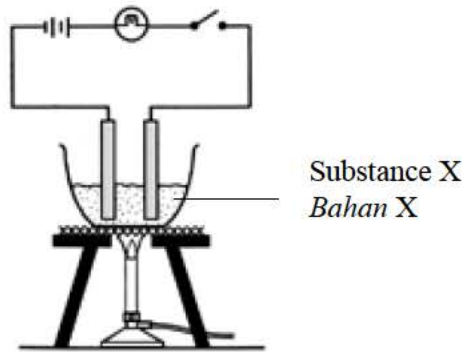


Diagram 2

Substance X is an electrolyte. What is X ?
Bahan X adalah satu elektrolit. Apakah X ?

- A Iron
Besi
- B Glucose
Glukosa
- C Naphtalene
Naftalena
- D Lead(II) bromide
Plumbum (II) bromida
- 6 The pH scale indicates the degree of acidity or alkalinity of a solution
 Which of the following pH values is for strong alkaline solution?
- Skala pH menunjukkan darjah keasidan atau kealkalian sesuatu larutan
 Antara berikut yang manakah nilai pH bagi larutan alkali kuat ?*

- A pH 13
 B pH 10
 C pH 6
 D pH 3

- 7 Diagram 3 shows the formula of a nitrate salt.
Rajah 3 menunjukkan formula bagi suatu garam nitrat.



Diagram 3

Which of the following are the possible ions of X?
Antara berikut yang manakah mungkin ion bagi X?

- I silver ion, Ag^+
ion argentum
- II hydroxide ion, OH^-
ion hidroksida
- III carbonate ion, CO_3^{2-}
ion karbonat
- IV ammonium ion, NH_4^+
ion ammonium
- A I and III only
 B I and IV only
 C II and III only
 D II and IV only
- 8 Diagram 4 shows the steps involved in manufacturing sulphuric acid in the Contact Process.
Rajah 4 menunjukkan langkah-langkah yang terlibat dalam proses penghasilan asid sulfurik melalui Proses Sentuh.

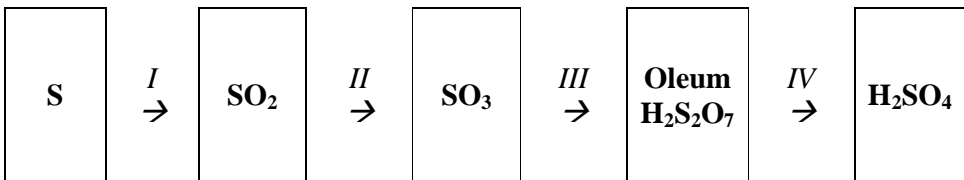


Diagram 4

In step III, sulphur trioxide reacts with
Dalam langkah III, sulfur trioksida bertindak balas dengan

- A water.
air.
- B oxygen.
oksigen.
- C sulphur dioxide.
sulfur dioksida.
- D concentrated sulphuric acid.
asid sulfurik pekat.

- 9 Rate of reaction **does not** depend on
*Kadar tindak balas **tidak** bergantung kepada*
- A volume of reactant
isipadu bahan tindak balas
- B size of reactant
saiz bahan tindak balas
- C temperature of reactant
suhu bahan tindak balas
- D concentration of reactant
kepekatan bahan tindak balas
- 10 Ethanol is used as a solvent in the preparation of cough syrup
Which of the following is the homologous series of ethanol?
Etanol digunakan sebagai pelarut di dalam penyediaan ubat batuk
Antara berikut yang manakah siri homolog bagi etanol?
- A Alkane
Alkana
- B Alkene
Alkena
- C Alcohol
Alkohol
- D Carboxylic acid
Asid karbosilik
- 11 Diagram 5 shows the apparatus set-up for a displacement reaction.
Rajah 5 menunjukkan susunan radas bagi satu tindak balas penyesaran.

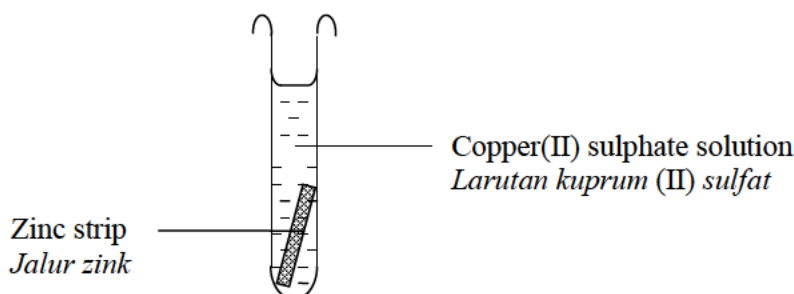


Diagram 5

Based on Diagram 5, what is the role of copper(II) sulphate solution?
Berdasarkan Rajah 5, apakah peranan larutan kuprum(II) sulfat?

- A Hydrating agent
Agen penghidratan
- B Dehydrating agent
Agen pendehidratan
- C Oxidising agent
Agen pengoksidaan
- D Reducing agent
Agen penurunan

- 12 Exothermic reaction is a chemical reaction that gives out heat
Which of the following is an exothermic reaction ?

Tindak balas exotermik adalah satu tindak balas kimia yang membebaskan haba

Antara berikut, yang manakah tindak balas eksotermik ?

- A Photosynthesis
Fotosintesis
 - B Melting of ice
Peleburan ais
 - C Dissolving ammonium chloride in water
Melarutkan ammonium klorida dalam air
 - D Neutralisation reaction between acid and alkali
Tindak balas peneutralan antara asid dan alkali
- 13 Diagram 6 shows two examples of medicine Y
Rajah 6 menunjukkan dua contoh ubat Y

Penicillin <i>Penisilin</i>
Streptomycin <i>Streptomisin</i>

Diagram 6

What is the type of medicine Y?
Apakah jenis ubat Y ?

- A Analgesic
Analgesik
- B Antibiotic
Antibiotik
- C Hormon
Hormon
- D Psychotherapeutic medicine
Ubat psikoterapeutik

- 14 Table 1 shows the melting point and boiling point of substance X.
Jadual 1 menunjukkan takat lebur dan takat didih bagi bahan X

	Temperature/°C Suhu/ °C
Melting point <i>Takat lebur</i>	78
Boiling point <i>Takat didih</i>	245

Table 1

What is the physical state of substance X at 100 °C ?

Apakah keadaan fizik bahan X pada suhu 100 °C ?

- A Solid
Pepejal
- B Liquid
cecair
- C Solid and liquid
Pepejal dan cecair
- D Liquid and gas
Cecair dan gas
- 15 Table 2 shows the proton number of elements X, Y and Z.
Jadual 2 menunjukkan nombor proton bagi unsur X, Y dan Z.

Element <i>Unsur</i>	Proton number <i>Nombor proton</i>
X	8
Y	13
Z	20

Table 2

What is the charge of the ion of element X, Y and Z?

Apakah cas bagi ion unsur X, Y dan Z ?

	Ion X	Ion Y	Ion Z
A	2+	3+	2-
B	2-	3+	2-
C	2-	3-	2+
D	2-	3+	2+

- 16 Diagram 7 below shows the formulae of two compounds of M.
Rajah 7 dibawah menunjukkan formula-formula bagi dua sebatian M.



Diagram 7

Which of the following is **true** about element M?
*Antara berikut yang manakah **benar** tentang M ?*

- A M is a very reactive metal.
M adalah unsur yang sangat reaktif.
- B M only react with chlorine.
M hanya bertindakbalas dengan klorin.
- C M has several oxidation number.
M mempunyai beberapa nombor pengoksidaan.
- D M appear in colour in certain compound only.
M menunjukkan warna dalam sebatian tertentu sahaja.
- 17 Table 3 shows the proton number of several elements.
Jadual 3 dibawah menunjukkan nombor proton bagi beberapa unsur.

Element <i>Unsur</i>	S	T	U	V
Proton number <i>Nombor proton</i>	11	12	14	17

Table 3

Which of the following pairs of elements react to form an ionic compound?
Antara pasangan unsur-unsur berikut yang manakah bertindakbalas membentuk sebatian ionik ?

- I S and V
 II T and V
 III S and U
 IV U and V
- A I and II
 B I and III
 C II and III
 D III and IV

- 18 Diagram 8 shows the apparatus set-up for the electrolysis of copper(II) sulphate solution using **carbon electrodes**.

Rajah 8 menunjukkan susunan radas bagi elektrolisis larutan kuprum(II) sulfat dengan menggunakan **elektrod karbon**.

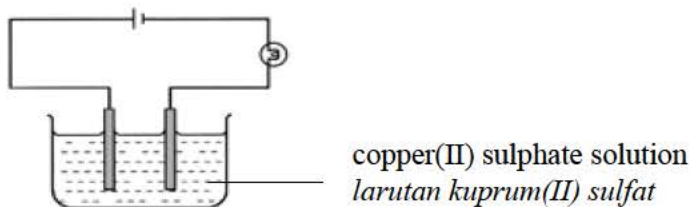


Diagram 8

The blue colour of the copper(II) sulphate solution turns light blue.

Which of the following explains this observation?

Warna biru larutan kuprum(II) sulfat bertukar kepada biru muda.

Antara berikut yang manakah menerangkan pemerhatian ini ?

- A SO_4^{2-} ion is discharged at the anode
Ion SO_4^{2-} dinyahcas di anod
- B H^+ ion is discharged at the cathode
Ion H^+ dinyahcas di katod
- C Cu^{2+} ion is discharged at the cathode
Ion Cu^{2+} dinyahcas di katod
- D OH^- ion is discharged at the anode
Ion OH^- dinyahcas di anod
- 19 Which of the following oxide forms an acidic solution when dissolved in water?
Antara berikut oksida yang manakah akan membentuk larutan berasid apabila dilarutkan dalam air ?

- A SO_2
B ZnO
C Na_2O
D MgO

- 20 Diagram 9 shows a chemical equation to prepare an insoluble salt.
Rajah 9 menunjukkan persamaan kimia bagi penyediaan garam tak terlarutkan .

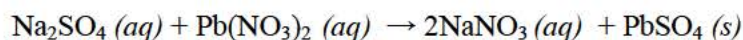


Diagram 9

Which of the following is the **correct** ionic equation for the chemical equation?

Antara berikut, yang manakah persamaan ion yang **betul** bagi persamaan kimia tersebut?

- A $\text{Na}^+ + \text{NO}_3^- \rightarrow \text{NaNO}_3$
B $\text{Na}^+ + \text{SO}_4^{2-} \rightarrow \text{Na}_2\text{SO}_4$
C $\text{Pb}^{2+} + 2\text{NO}_3^- \rightarrow \text{Pb}(\text{NO}_3)_2$
D $\text{Pb}^{2+} + \text{SO}_4^{2-} \rightarrow \text{PbSO}_4$

- 21 Diagram 10 shows the orderly arrangement of atoms in a metal.
Rajah 10 menunjukkan susunan atom-atom yang teratur dalam suatu logam.

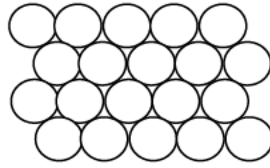


Diagram 10

The metal is ductile because
Logam itu mulur kerana

- A the forces of attraction between the metal atoms are very weak.
daya tarikan antara atom logam sangat lemah.
- B the forces of attraction between the metal atoms are very strong.
daya tarikan antara atom logam sangat kuat.
- C the layers of metal atoms cannot slide over one another when a force is applied.
lapisan atom logam tidak boleh menggelongsor antara satu sama lain apabila dikenakan daya
- D the layers of metal atoms can slide over one another when a force is applied.
lapisan atom logam boleh menggelongsor antara satu sama lain apabila dikenakan daya.
- 22 Diagram 11 shows an action carried out at 450 °C in a compressor that contains mixture of hydrogen gas and nitrogen gas.
Rajah 11 menunjukkan tindakan pada suhu 450 °C terhadap sebuah pemampat yang mengandungi gas hidrogen dan gas nitrogen.

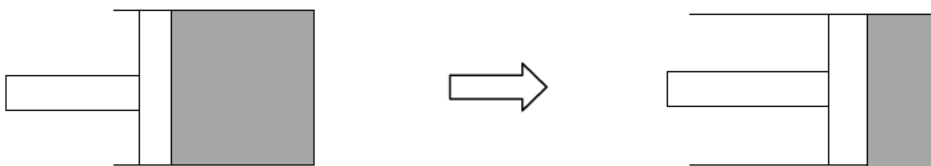
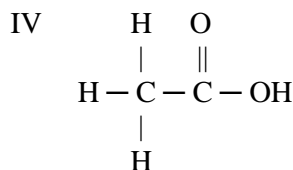
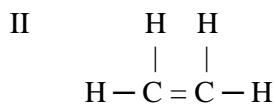
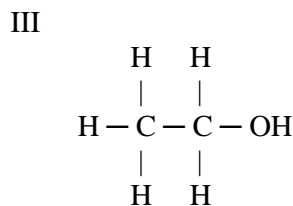
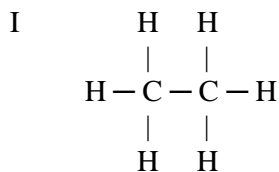


Diagram 11

What happen to the frequency of effective collision of the molecules?
Apakah yang berlaku kepada frekuensi pelanggaran berkesan molekul-molekul tersebut ?

- A Decreases
Berkurang
- B Increases
Bertambah
- C Remain unchanged
Tidak berubah
- D Decreases then increases
Berkurang kemudian bertambah

- 23 Which of the compounds are hydrocarbon?
Antara sebatian berikut yang manakah hidrokarbon?



- A I and II
 B I and III
 C II and IV
 D III and IV
- 24 Iron (III) ions can be reduced to iron(II) ions by substance X
 Which of the following is substance X ?

*Ion ferum(III) boleh diturunkan kepada ion ferum(II) oleh bahan X
 Antara berikut yang manakah bahan X ?*

- A Zinc
Zink
- B Chlorine water
Air klorin
- C Acidified potassium manganate(VII) solution
Larutan kalium manganat (VII) berasid
- D Acidified potassium dichromate (VI) solution
Larutan kalium dikromat (VI) berasid

- 25 Diagram 12 is an energy level diagram.
Rajah 12 adalah gambar rajah aras tenaga.

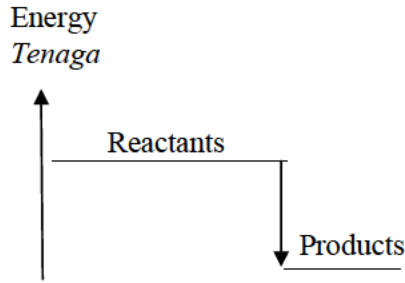
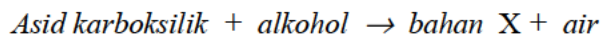
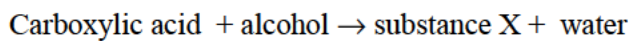


Diagram 12

Which statement is **true** about this energy level diagram ?
*Pernyataan manakah yang **benar** mengenai gambar rajah aras tenaga ini ?*

- A Heat is absorbed
Haba diserap
- B Heat is needed to start the reaction
Haba diperlukan untuk memulakan tindak balas.
- C The surrounding temperature increases
Suhu persekitaran meningkat
- D The products contain more energy than the reactants
Hasil tindak balas mengandungi lebih tenaga daripada bahan tindak balas
- 26 The information below shows the reaction between carboxylic acid and alcohol.
Maklumat berikut menunjukkan tindak balas antara asid karboksilik dan alkohol



What is the function of substance X in food processing ?
Apakah fungsi bahan X dalam pemprosesan makanan ?

- A Colouring
Pewarna
- B Flavouring
Perisa
- C Antioxidant
Antioksidan
- D Preservative
Pengawet

- 27 Diagram 13 shows the symbol of element R
Rajah 13 menunjukkan simbol bagi unsur R

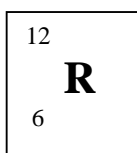


Diagram 13

Which of the following is true about R
Manakah antara berikut benar tentang R

- A R atom has four valence electrons
Atom R mempunyai empat elektron valens
- B R atom form a positively charged ion.
Atom R membentuk ion positif
- C R atom has six protons and twelve neutrons.
Atom R mempunyai enam proton dan dua belas neutron
- D Element R is located in Group 2 and Period 3 of the Periodic Table of Elements.
Unsur R terletak dalam Kumpulan 2 dan Kala 3 dalam Jadual Berkala Unsur
- 28 1.04 g of metal M react with 0.48 g of oxygen to form M oxide.
 Determine the empirical formula of M oxide.
1.04 g logam M bertindak balas dengan 0.48 g oksigen untuk membentuk oksida M.
Tentukan formula empirik oksida M.

[Relative atomic mass: O = 16, M = 52]

- A MO
- B MO₂
- C M₂O₃
- D M₃O₂
- 29 Proton number of element Z is 20. Element T has the same chemical property as element Z. Which of the following is the electron arrangement for atom T ?
Nombor proton unsur Z ialah 20. Unsur T mempunyai sifat kimia yang sama dengan unsur Z. Manakah antara berikut adalah susunan elektron bagi atom T ?
- A 2.
- B 2.8
- C 2.8.2
- D 2.8.8

- 30 Diagram 14 shows the structure of water molecule.
Rajah 14 menunjukkan struktur molekul air.

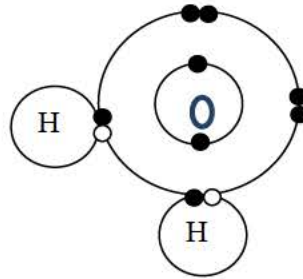


Diagram 14

Which of the following are **incorrect** about the molecule?
Manakah antara berikut adalah **salah** tentang molekul tersebut ?

- I Each hydrogen atom donates one valence electron.
Tiap atom hidrogen menderma satu elektron.valens
 - II Oxygen atom share two electrons with two hydrogen atoms.
Oksigen atom berkongsi dua elektron dengan dua atom hidrogen
 - III One single covalent bond is formed in the molecule.
Satu ikatan kovalen tunggal terbentuk dalam molekul.
 - IV Hydrogen atoms and oxygen atom achieved a stable octet electron arrangement.
Atom-atom hidrogen dan oksigen mencapai susunan elektron oktet yang stabil.
- A I, II and IV.
B I, III and IV.
C II, III and IV.
D I, II, III and IV.

- 31 Diagram 15 shows a simple chemical cell
Rajah 15 menunjukkan satu sel kimia ringkas.

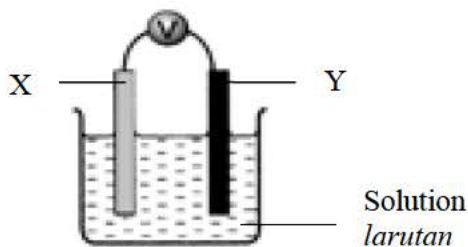


Diagram 15

Which combination of electrodes and solution used can cause deflection of the voltmeter pointer ?
Antara pasangan elektrod dan larutan yang berikut, yang manakah boleh menyebabkan jarum voltmeter terpesong ?

	Electrode X	Electrode Y	Solution
A	Copper	Iron	Tetrachloromethane
B	Zinc	Copper	Dilute sulphuric acid
C	Copper	Copper	Copper(II) sulphate
D	Carbon	Zinc	Methylbenzene

- 32 An acid is a compound that ionises in water to produce hydrogen ions, H^+ or hydroxonium ions, H_3O^+ .
Sulphuric acid is a diprotic acid because sulphuric acid molecule

Asid ialah sebatian yang menghasilkan ion hidrogen, H^+ atau ion hidroksonium, H_3O^+ apabila melarut dalam air.

Asid sulfurik ialah asid diprotik kerana molekul asid sulfurik

- A ionise partially in water.
mengion separa dalam air.
- B ionise completely in water.
mengion lengkap dalam air.
- C produce one hydrogen ion when dissolved in water.
menghasilkan satu ion hidrogen apabila dilarutkan dalam air.
- D produce two hydrogen ion when dissolved in water.
menghasilkan dua ion hidrogen apabila dilarutkan dalam air.
- 33 Diagram 16 shows the steps involved to prepare a soluble salt.
Rajah 16 menunjukkan langkah-langkah untuk menyediakan suatu garam larut.

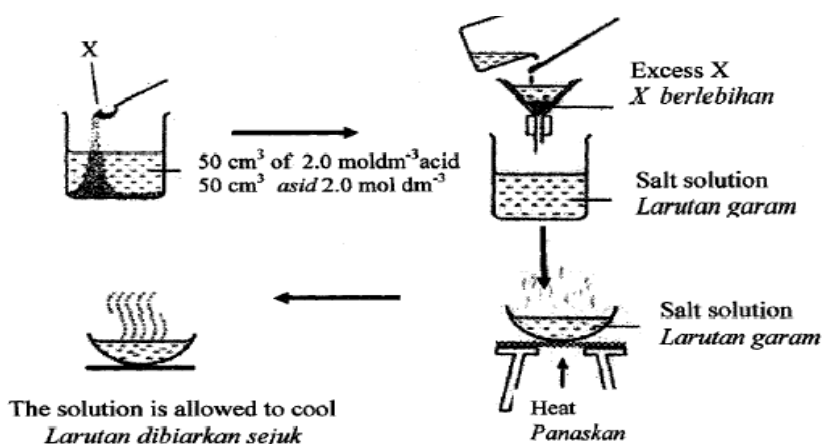


Diagram 16

Which of the following could be X ?

Antara berikut yang manakah mungkin X ?

- A Copper
- B Copper(II) oxide
- C Sodium oxide
- D Potassium oxide.

- 34 Ceramic is suitable to make an engine block because it
Seramik sesuai untuk membina blok enjin disebabkan ia
- A is chemically inert
adalah lengai secara kimia
- B is an electrical conductor
adalah konduktor elektrik
- C can withstand high temperature
boleh tahan suhu yang tinggi
- D has a low specific heat capacity
mempunyai muatan haba tentu yang rendah

- 35 Hydrogen peroxide decompose to produce water and oxygen gas as follows:
Hidrogen peroksida terurai kepada air dan gas oksigen seperti berikut :

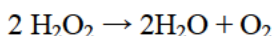


Diagram 17 shows the graph of volume of oxygen gas against time .Curve X was obtained when 0.2 g of manganese (IV) oxide is added to 0.40 mol dm^{-3} hydrogen peroxide at 30°C .

Which of the following will produce curve Y?

*Rajah 17 menunjukkan graf isipadu gas oksigen melawan masa .Lengkuk X diperolehi apabila 0.2 g mangan (IV) oksida ditambah kepada hidrogen peroksida 0.40 mol dm^{-3} pada 30°C .
 Antara yang berikut,yang manakah akan menghasilkan lengkung Y ?*

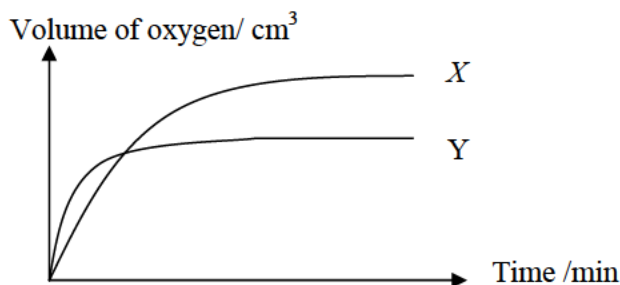
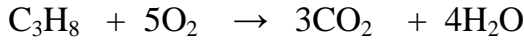


Diagram 17

	Volume of H_2O_2 / cm^3 <i>Isipadu H_2O_2 /cm^3</i>	Concentration of H_2O_2 / mol dm^{-3} <i>Kepekatan H_2O_2 /mol dm^{-3}</i>	Temperature / $^\circ\text{C}$ <i>Suhu /$^\circ\text{C}$</i>	Mass of MnO_2 /g <i>Jisim MnO_2/g</i>
A	10	0.60	30	0.2
B	15	0.20	30	0.2
C	20	0.60	40	0.2
D	30	0.30	40	0.2

- 36 The chemical equation for the combustion of propane is shown below.
Persamaan kimia untuk pembakaran propana adalah seperti di bawah.



Which of the following statement is **true** when 100 cm³ of propane is burnt at room condition ?

*Antara pernyataan berikut, yang manakah **benar** apabila 100 cm³ propana dibakar pada keadaan bilik ?*

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

- I The reaction is an incomplete combustion
Tindak balas tersebut adalah pembakaran tidak lengkap
 - II The reaction is a complete combustion
Tindak balas tersebut adalah pembakaran lengkap
 - III 300 cm³ of water is produced
300 cm³ air terbentuk
 - IV 300 cm³ of carbon dioxide gas is produced
300 cm³ gas karbon dioksida terbentuk
- A I and III
 - B I and IV
 - C II and III
 - D II and IV

- 37 What is the oxidation number of nitrogen in NO₂ ?
Apakah nombor pengoksidaan bagi nitrogen dalam NO₂ ?

- A +2
- B +3
- C +4
- D +6

- 38 Diagram 18 shows a cold pack used to relieve pain due to injury.
Rajah 18 menunjukkan pek sejuk yang digunakan untuk melegakan kesakitan akibat kecederaan.

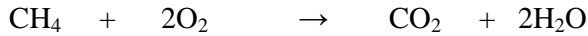


Diagram 18

When substance P and water are mixed, heat is absorbed.
 Which of the following substance is most suitable to be P?
Apabila bahan P dan air dicampur, haba diserap.
Antara berikut, yang manakah paling sesuai sebagai P?

- A Sodium chloride
Natrium klorida
- B Hydrochloric acid
Asid hidroklorik
- C Ammonium nitrate
Ammonium nitrat
- D Potassium hydroxide
Kalium hidroksida
- 39 A student discovered that a green apple that was cut into smaller pieces turned brown after 15 minutes.
 Which of the following substances should be added to prevent the browning of apple?
Seorang pelajar mendapati potongan kecil epal hijau bertukar keperangan setelah dibiarkan selama 15 minit.
Antara berikut, bahan yang manakah boleh ditambah untuk mencegah keperangan epal tersebut?
- A Alcohol
Alkohol
- B Sugar
Gula
- C Lecithin
Lesitin
- D Ascorbic acid
Asid askorbik

- 40 The following equation represents the combustion of methane.
Persamaan berikut mewakili pembakaran metana.



Calculate the volume of carbon dioxide formed at standard temperature and pressure if 3.2 g of methane is used.

Kira isipadu karbon dioksida yang terhasil pada suhu dan tekanan piawai jika 3.2 g metana digunakan.

(Relative atomic mass: H=1, C=12, O=16)

Molar volume of gas at standard temperature and pressure $22.4 \text{ dm}^3 \text{ mol}^{-1}$

- A 4.48 dm^3
 B 2.24 dm^3
 C 1.63 dm^3
 D 1.12 dm^3
- 41 Caffeine is found in coffee beans. Its molecular formula is $\text{C}_4\text{H}_5\text{N}_2\text{O}$. If one coffee bean contains 0.02 mole of caffeine, determine the mass of the compound in 10 coffee beans.
*Kafein dijumpai di dalam biji kopi. Formula molekulnya ialah $\text{C}_4\text{H}_5\text{N}_2\text{O}$.
 Jika sebutir biji kopi mengandungi 0.02 mol kafein, tentukan jisim sebatian itu dalam 10 butir biji kopi.*

(Relative atomic mass : H=1, C=12, N=14, O=16)

- A 0.97 g
 B 1.94 g
 C 9.70 g
 D 19.4 g
- 42 Table 4 shows the position of four elements in the Periodic Table.
Jadual 4 dibawah menunjukkan kedudukan empat unsur dalam Jadual Berkala.

A				C			
	B					D	

Table 4

Which of the elements that can react to form a compound with a low melting point and boiling point?

Manakah antara unsur-unsur tersebut dapat bertindak balas membentuk suatu sebatian dengan takat lebur dan takat didih yang rendah ?

- A C and D
 B B and C
 C A and D
 D A and C

- 43 Figure 19 shows a standard representation of two elements X and Y.
Rajah 19 dibawah menunjukkan perwakilan piawai bagi dua unsur X dan Y.

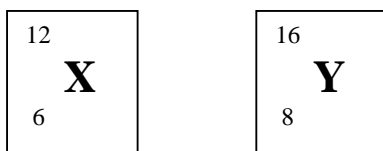


Diagram 19

Element X and Y react to form a covalent compound.

What is the chemical formula of the compound?

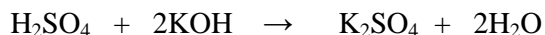
Unsur X dan Y bertindakbalas membentuk suatu sebatian kovalen.

Apakah formula kimia bagi sebatian tersebut?

- A XY_2
 B X_2Y
 C X_2Y_3
 D X_3Y_2
- 44 A concentrated aqueous sodium chloride solution is electrolysed using carbon electrodes. Which half equations represent the reactions at the anode and the cathode?
Satu larutan akueus natrium klorida pekat dielektrolisiskan dengan menggunakan elektrod karbon. Persamaan setengah manakah mewakili tindak balas yang berlaku di anod dan di katod?

	Anode	Cathode
A	$2Cl^- \rightarrow Cl_2 + 2e$	$Na^+ + e \rightarrow Na$
B	$2Cl^- \rightarrow Cl_2 + 2e$	$2H^+ + 2e \rightarrow H_2$
C	$4OH^- \rightarrow O_2 + 2H_2O + 4e$	$2H^+ + 2e \rightarrow H_2$
D	$4OH^- \rightarrow O_2 + 2H_2O + 4e$	$Na^+ + e \rightarrow Na$

- 45 The chemical equation below shows the reaction between sulphuric acid and potassium hydroxide solution.
Persamaan kimia di bawah menunjukkan tindak balas di antara asid sulfurik dan larutan kalium hidroksida.

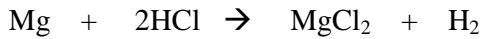


Calculate the volume of potassium hydroxide solution 2.0 mol dm^{-3} needed to neutralise 50 cm^3 of sulphuric acid 0.5 mol dm^{-3} ?

Kirakan isipadu larutan kalium hidroksida 2.0 mol dm^{-3} yang diperlukan untuk meneutralkan 50 cm^3 asid sulfurik 0.5 mol dm^{-3} ?

- A 6.25 cm^3
 B 12.5 cm^3
 C 25.0 cm^3
 D 50.0 cm^3

- 46 Magnesium react with hydrochloric acid as follows:
Magnesium bertindak balas dengan asid hidroklorik seperti berikut :



Calculate the mass of the salt formed when excess magnesium powder is added to 50 cm³ of 2.0 mol dm⁻³ hydrochloric acid.

Hitungkan jisim garam yang terbentuk apabila serbuk magnesium berlebihan ditambahkan kepada 50 cm³ asid hidroklorik 2.0 mol dm⁻³

[Relative atomic mass : Mg = 24 ; Cl = 35.5]

- A 2.98 g
 B 4.75 g
 C 5.95 g
 D 9.50 g
- 47 Table 5 shows fertilisers and their respective relative molecular mass.
Jadual 5 menunjukkan beberapa baja dan jisim molekul relatif masing-masing.

Fertiliser	Relative molecular mass
Ammonium sulphate, (NH ₄) ₂ SO ₄	132
Ammonium nitrate, NH ₄ NO ₃	80
Potassium nitrate, KNO ₃	101
Urea, CO(NH ₂) ₂	60

Table 5

Which of the following fertilisers contains the highest percentage of nitrogen by mass?

Yang manakah antara baja berikut mengandungi peratus nitrogen mengikut jisim yang paling tinggi ?

[Relative atomic mass of N = 14]

- A Urea
 B Ammonium nitrate
 C Potassium nitrate
 D Ammonium sulphate

- 48 Table 6 shows the result obtained from the reaction between hydrochloric acid and calcium carbonate.

Jadual 6 menunjukkan keputusan yang diperolehi daripada tindak balas antara asid hidroklorik dan kalsium karbonat.

Time/minute <i>Masa/minit</i>	0	0.5	1.0	1.5	2.0	2.5	3.0
Volume of CO ₂ gas / cm ³ <i>Isipadu gas CO₂ / cm³</i>	0	170	260	305	340	350	350

Table 6

Calculate the average rate of reaction in the second minute.

Kira kadar tindak balas purata dalam minit kedua.

- A 40.0 cm³ min⁻¹
 B 80.0 cm³ min⁻¹
 C 170.0 cm³ min⁻¹
 D 340.0 cm³ min⁻¹
- 49 The following chemical equation shows the dehydration of propanol to produce propene gas.
Persamaan kimia berikut menunjukkan pendehidratan propanol kepada gas propena .



If 15.0 g of propanol is dehydrated, calculate the volume of propene gas produced at room temperature .

Jika 15.0 g propanol telah didehidratkan, hitung isipadu gas propena yang terhasil pada suhu bilik.

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

Molar volume of gas at room temperature=24 dm³ mol⁻¹]

[*Isipadu molar gas pada suhu bilik = 24 dm³ mol⁻¹]*

- A 18.00 dm³
 B 17.14 dm³
 C 8.57 dm³
 D 6.00 dm³

- 50 Diagram 20 shows a apparatus set-up to investigate a redox reaction by transferring electrons at a distance.
Rajah 20 menunjukkan susunan radas untuk mengkaji tindak balas redoks dengan memindahkan elektron pada suatu jarak.

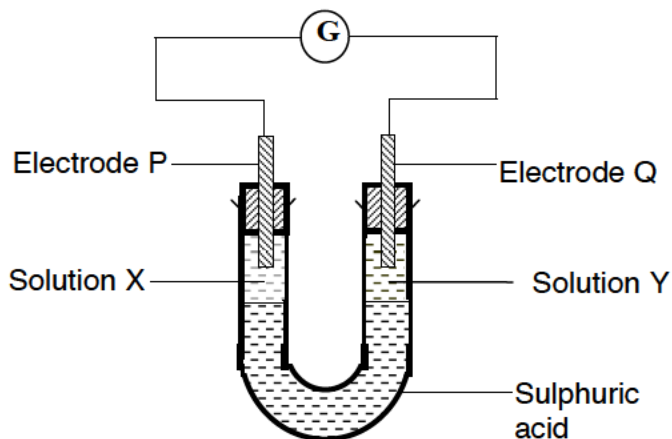


Diagram 20

In this reaction, electrons flow from electrode P to electrode Q.
 Which of the following are the **correct** solutions for X and Y?

*Dalam tindak balas ini, elektron mengalir daripada elektrod P ke elektrod Q.
 Yang mana antara berikut adalah larutan yang betul untuk X dan Y ?*

	Solution X <i>Larutan X</i>	Solution Y <i>Larutan Y</i>
A	Bromine water <i>Air bromin</i>	Iron(II) sulphate solution <i>Larutan ferum(II) sulfat</i>
B	Bromine water <i>Air bromin</i>	Potassium iodide solution <i>Larutan kalium iodida</i>
C	Acidified potassium dichromate(VI) solution <i>Larutan kalium dikromat(VI) berasid</i>	Potassium iodide solution <i>Larutan kalium iodida</i>
D	Potassium iodide solution <i>Larutan kalium iodida</i>	Acidified potassium dichromate(VI) solution <i>Larutan kalium dikromat (VI) berasid</i>

QUESTIONS END HERE