ChemQuest 2022

disusun mengikut bab KSSM

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Bab 2 – 8 Tingakatan 4

Kompilasi Soalan Kertas 2 Percubaan SPM 2021

[SBP | Perlis | Kedah 2 set | Selangor 2 set]
[Melaka | Johor | Kelantan | Terengganu]

Tingkatan 4 Bab 2

[Selangor2021-Set01-01]
1. Rajah 1 menunjukkan simbol atom bagi unsur P, Q dan S.
Diagram I shows the symbol of atoms for element P. Q and S,

$^{23}_{11}P$ $^{35}_{17}Q$ $^{20}_{10}S$

(a) Apakah yang dimaksudkan dengan nombor nukleon?
What is meant by nucleon number?

.....

..... [1M]

(b) Nyatakan nombor proton bagi atom S.
State the proton number of atom S.

..... [1M]

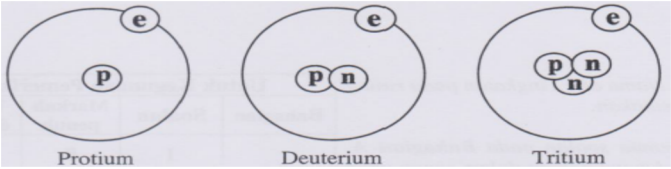
(c) Berapakah bilangan neutron bagi atom P?
What is the number of neutrons for atom P?

..... [1M]

(d) Lukis struktur atom bagi unsur Q.
Draw the atomic structure of element Q.

[2M]

[SBP2021-01]
1. Protium, deuterium dan tritium merupakan isotop bagi unsur hidrogen. Rajah 1 menunjukkan struktur atom bagi ketiga-tiga atom hidrogen tersebut.
Protium, deuterium and tritium are isotopes of the hydrogen element. Diagram 1 shows the atomic structure for these three atoms of hydrogen.



(a) Apakah maksud isotop?
What is the meaning of isotopes?

.....

..... [1M]

(b) Nyatakan nama semua zarah subatom yang terdapat di dalam nukleus.
State the name of all subatomic particles inside the nucleus.

..... [1M]

(c) Namakan zarah subatom yang bercas negatif.
Name subatomic particle that is negatively charged.

..... [1M]

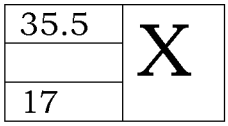
(d) Adakah ketiga-tiga atom hidrogen dalam Rajah 1 mempunyai sifat kimia yang sama? Terangkan jawapan anda.
Do the three hydrogen atoms in Diagram 1 have the same chemical properties? Explain your answer.

.....

.....

..... [2M]

[SBP2021-03]
3. Rajah 3 menunjukkan simbol atom bagi unsur X. Huruf yang digunakan adalah bukan simbol sebenar unsur itu.
Diagram 3 shows the symbol of the atom of element X. The letter used is not the actual symbol of the element.



(a) Apakah yang diwakili oleh nombor 17 dalam Rajah 3?
What is represented by the number 17 in Diagram 3?

..... [1M]

(b) Nyatakan kala bagi unsur X dalam Jadual Berkala Unsur.
State the period of element X in the Periodic Table of Elements.

..... [1M]

(c) X bertindak balas dengan wul besi yang panas untuk membentuk pepejal perang.
X reacts with hot iron wool to form a brown solid.

(i) Tulis persamaan kimia bagi tindak balas yang berlaku.
Write the chemical equation for the reaction occurs.

..... [2M]

(ii) Hitung jisim pepejal perang yang terbentuk apabila 0.3 mol X bertindak balas dengan wul besi yang panas.
[Jisim atom relatif: Fe = 56, X = 35.5]
Calculate the mass of the brown solid formed when 0.3 mol X reacts with hot iron wool.
[Relative atomic mass : Fe = 56, X = 35.5]

[2M]

[Selangor2021-Set01-01]
1. Jadual 1 menunjukkan bilangan proton dan neutron bagi atom unsur W, X dan Y. Huruf yang digunakan bukan simbol sebenar bagi atom-atom itu. Gunakan huruf tersebut untuk menjawab soalan berikut.
Table 1 shows the number of protons and neutrons of atoms of elements W, X and Y. The letters used are not the actual symbols of the atoms. Use the letters to answer the following questions.

Atom Atom	Bilangan proton Number of protons	Bilangan neutron Number of neutrons
W	6	6
X	6	8
Y	8	8

(a) Nyatakan istilah bagi 'jumlah bilangan proton dan neutron' dalam suatu atom.
State the term for 'the total number ofprotons and neutrons' in an atom.

..... [1M]

(b) Tulis perwakilan piawai bagi unsur Y.
Write the standard representation of element Y.

..... [1M]

(c) Nyatakan sepasang isotop dalam Jadual 1. Terangkan jawapan anda.
State a pair of isotopes in Table 1. Explain your answer.

.....

..... [2M]

(d) Tulis susunan elektron bagi atom unsur X.
Write the electron arrangement for the atom of element X.

..... [1M]

[Melaka2021-01]
1. Jadual 1 di bawah menunjukkan tiga unsur dengan nombor proton dan nombor nukleon.
Table 1 below shows three elements with their proton number and nucleon number.

Unsur Element	Nombor proton Proton number	Nombor nukleon Nucleon number
Oksigen Oxygen	8	16
Magnesium Magnesium	12	24
Litium Lithium	3	7

(a) (i) Apakah yang dimaksudkan dengan nombor nukleon?
What is the meaning of nucleon number?

..... [1M]

(ii) Berdasarkan Jadual 1, tuliskan perwakilan piawai bagi setiap unsur tersebut.

Based on Table 1, write the standard representatives for each elements.

Oksigen Oxygen	Magnesium Magnesium	Litium Lithium

[3M]

(iii) Nyatakan satu zarah subatom yang terdapat di dalam nukleus atom litium.
State one subatomic particles present in the nucleus of lithium atom.

..... [1M]

[Kelantan2021-01] B2 Jirim

1. Jadual 1 menunjukkan tiga bahan dan formula kimianya.
Table 1 shows three substances and their chemical formulae.

Bahan Substance	Formula kimia Chemical formula
Helium Helium	He
Naftalena Naphthalene	$C_{10}H_8$
Natrium klorida Sodium chloride	NaCl

Berdasarkan Jadual 1:
Based on Table 1:

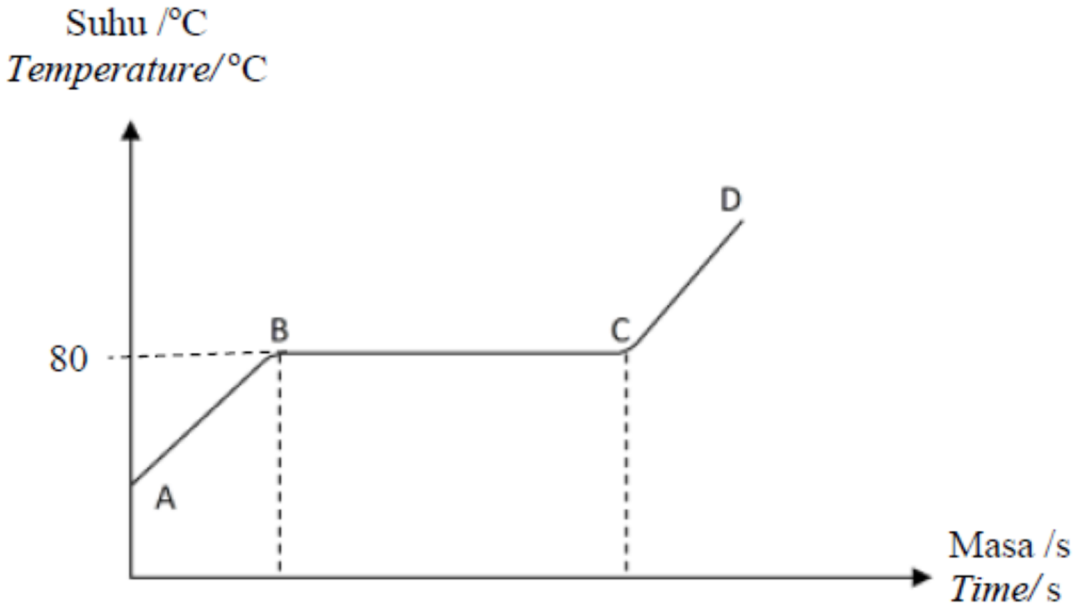
(a) Nyatakan jenis zarah dalam helium.
State the type of particles in helium.

..... [1M]

(b) Apakah keadaan fizik natrium klorida pada keadaan bilik?
What is the physical state of sodium chloride at room conditions?

..... [1M]

(c) Rajah 1 menunjukkan lengkung pemanasan bagi pepejal naftalena.
Diagram 1 shows the heating curve for solid naphthalene.



Berdasarkan graf di atas, takat lebur naftalena ialah 80°C.
Based on the graph above, the melting point of naphthalene is 80°C.

(i) Apakah yang dimaksudkan dengan takat lebur?
What is meant by melting point?

.....

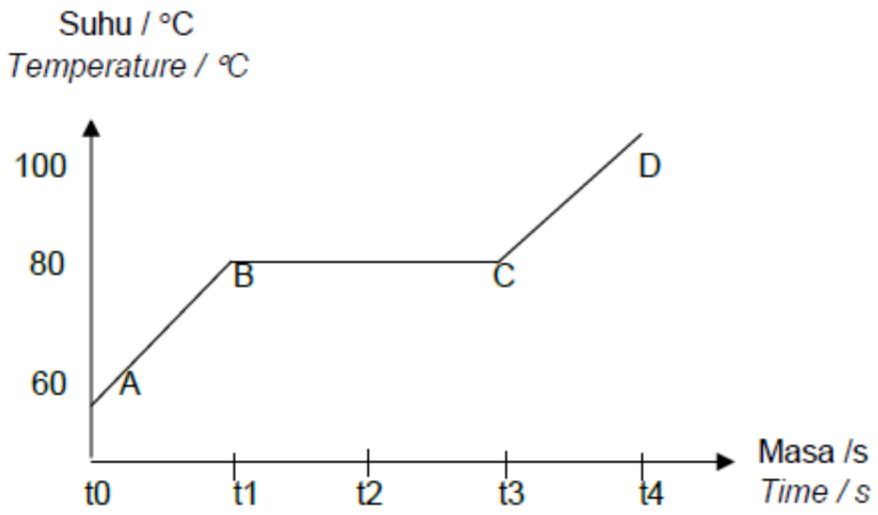
..... [1M]

(ii) Terangkan mengapa suhu tidak berubah dari B ke C.
Explain why the temperature remains constant from B to C.

.....

..... [2M]

[Kedah2021-Set02-01]
1. Rajah 1 menunjukkan graf suhu melawan masa bagi peleburan pepejal naftalena.
Diagram 1 shows a graph of temperature against time for the melting of naphthalene solid.



(a) Nyatakan jenis zarah dalam naftalena.
State the type of particles in naphthalene.

..... [1M]

(b) Terangkan mengapa suhu tidak berubah dari t1 ke t3.
Explain why the temperature remains unchanged from t1 to t3.

.....

..... [2M]

(c) Nyatakan masa apabila semua pepejal naftalena telah bertukar kepada cecair.
State the time when all the naphthalene solids have turned to liquid.

..... [1M]

(d) Nyatakan pemerhatian apabila naftalena dipanaskan secara terus.
State the observation when naphthalene heated directly.

..... [1M]

[Perlis2021-03]
3. Jadual 1 menunjukkan bilangan proton dan bilangan neutron dalam atom R, S dan T.
Table 1 shows the number of protons and the number of neutrons in atom R, S and T.

Atom Atom	Bilangan proton Number of protons	Bilangan neutron Number of neutrons
R	11	12
S	11	13
T	12	12

(a) Nyatakan tiga zarah subatom.
State three subatomic particles of an atom.

..... [1M]

(b) (i) Apakah yang dimaksudkan dengan isotop?
What is meant by isotope?

..... [1M]

(ii) Atom-atom yang manakah merupakan isotop?
Which atoms are isotopes?

..... [1M]

(iii) Nyatakan isotop yang digunakan untuk merawat penyakit kanser.
State the isotope that is used to treat cancer diseases.

..... [1M]
(c) (i) Tuliskan susunan elektron bagi atom T.
Write the electron arrangement of atom T.

..... [1M]
(ii) Apakah elektron valens bagi atom R?
What is the valence electron of atom R?

..... [1M]

[Kedah2021-Set02-03]
3. Rajah 3 menunjukkan perwakilan piawai bagi atom Z.
Diagram 3 shows the standard representation of atom Z.

7	Z
3	

(a) Apakah yang diwakili oleh nombor 3?
What is represented by the number 3?

..... [1M]

(b) Tulis formula bagi ion Z
Write the formula of ion Z.

..... [1M]

(c) 0.05 mol Z bertindak balas dengan oksigen untuk membentuk oksida Z.
0.05 moles of Z react with oxygen to form oxide of Z.

(i) Tulis persamaan kimia bagi tindak balas antara Z dengan oksigen.
Write the chemical equation for the reaction between Z and oxygen.

..... [2M]

(ii) Hitung jisim oksida Z yang terbentuk. [Jisim atom relatif: Z=7; O=16]
Calculate the mass of oxide of Z formed. [Relative atomic mass: Z=7;O=16].

[2M]

[Kedah2021-Set01-01]
Rajah 1 menunjukkan keadaan tiga jirim, A, B dan C bagi suatu bahan yang sama.
Diagram 1 shows the state of three matters, A, B and C of a same substance.

		
A	B	C

(a) Apakah jenis zarah yang terdapat dalam B?
What type of particle is found in B?

..... [1M]

(b) Namakan proses yang berlaku apabila keadaan fizik C bertukar kepada A.
Name the process when physical state C changes to A.

..... [1M]

(c) Nyatakan keadaan fizikal bagi C .
State the physical state of C.

..... [1M]

(d) Apabila B berubah kepada C, nyatakan perubahan bagi :
When B changes to C, state the changes of:

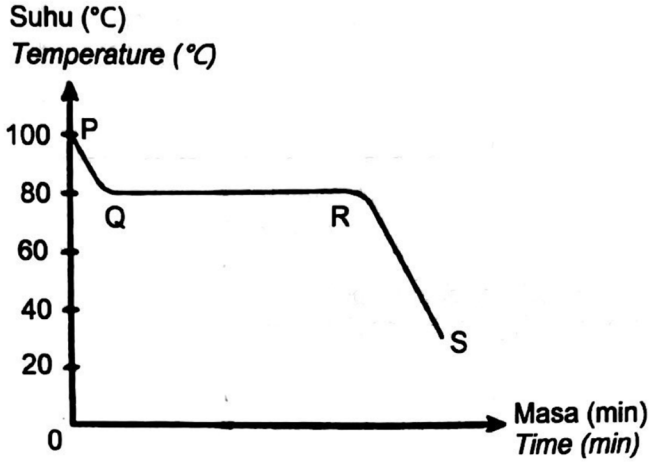
(i) tenaga haba
heat energy

..... [1M]

(ii) daya tarikan antara zarah
the force of attraction between the particles

..... [1M]

[Johor2021-02]
2. Rajah 2 menunjukkan graf suhu melawan masa bagi penyejukkan asetamida, C_2H_5NO dalam suatu eksperimen.
Diagram 2 shows the graph of temperature against time for cooling of acetamide, C_2H_5NO in an experiment.



(a) Apakah yang dimaksudkan dengan takat beku?
What is the meaning of freezing point?

.....

..... [1M]

(b) Nyatakan takat beku bagi asetamida dalam eksperimen ini.
State the freezing point of acetamide in this experiment.

..... [1M]

(c) Nyatakan jenis zarah bagi asetamida.
State the type of particle for acetamide.

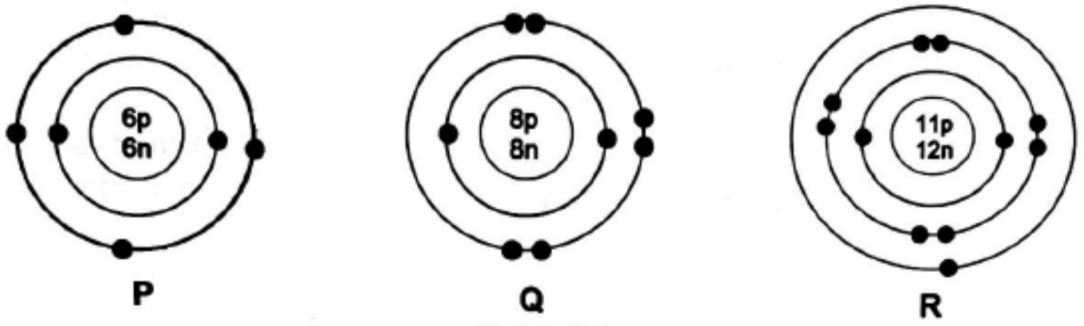
..... [1M]

(d) Terangkan mengapa suhu tidak berubah dari titik Q ke titik R.
Explain why there is no change in temperature from point Q to point R.

.....

..... [2M]

Esei
[Johor2021-09]
9. Rajah 9.1 menunjukkan struktur atom bagi unsur P, Q dan R.
Diagram 9.1 shows the atomic structure of element P, Q and R.



(a) Nyatakan maksud nombor nukleon dan nombor proton.
State the meaning of nucleon number and proton number

[2M]

(b) Tuliskan susunan elektron bagi atom P dan Q.
Write the electron arrangement of P atom and Q.

[2M]

(c) Berdasarkan Rajah 9.1,
Based on Diagram 9.1,

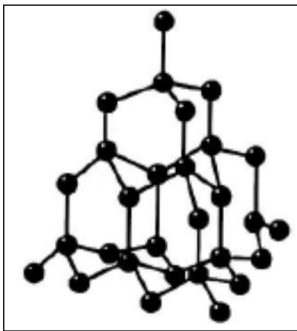
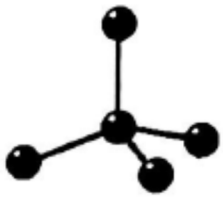
(i) Tuliskan persamaan kimia yang seimbang di antara unsur Q dan R.
Write the balanced chemical equation between element Q and R.

[2M]

(ii) Hitungkan jisim sebatian terbentuk jika 2.3g R bertindak balas dengan Q secara berlebihan.
Calculate the mass of compound formed if 2.3g R react with Q in excess.

[4M]

(d) Rajah 9.2 menunjukkan struktur molekul bagi sebatian kovalen A dan
Diagram 9.2 shows the molecular structure for covalent compound A and B.

	
Sebatian kovalen A Covalent compound A	Sebatian kovalen B Covalent compound B

Nyatakan jenis sebatian kovalen A dan B. Cadangkan contoh bagi kedua-duanya. Bandingkan kedua-dua sebatian dari segi struktur, ikatan kimia serta takat lebur dan takat didih.
State what is type of covalent compound A and B. Suggest an example for both compounds.
Compare both compounds based on structure, chemical bond and melting point and boiling point.

[10M]

Tingkatan 4 Bab 3

[Melaka2021-02]

2. (a) Dalam suatu pertandingan Minggu Sains Sekolah, anda diminta untuk mengenal pasti sebatian X di dalam suatu sampel minuman kultur berperisa pisang.
In a school Science week competition, you are asked to identify compound X in a sample of banana flavoured culture drinks.

Maklumat berikut diberi untuk membantu anda.
The following information is provided to help you.

Minggu Sains Sekolah 2020
School Science Week 2020

Nisbah mol atom paling ringkas Simplest mole ratio of atom		
C	H	O
7	14	2

Berdasarkan Rajah 2.1,
Based on Diagram 2.1,

(i) Apakah yang dimaksudkan dengan formula empirik?
What is the meaning of empirical formula?

.....

..... [1M]

(ii) Nyatakan formula empirik sebatian X.
State the empirical formula of compound X.

..... [1M]

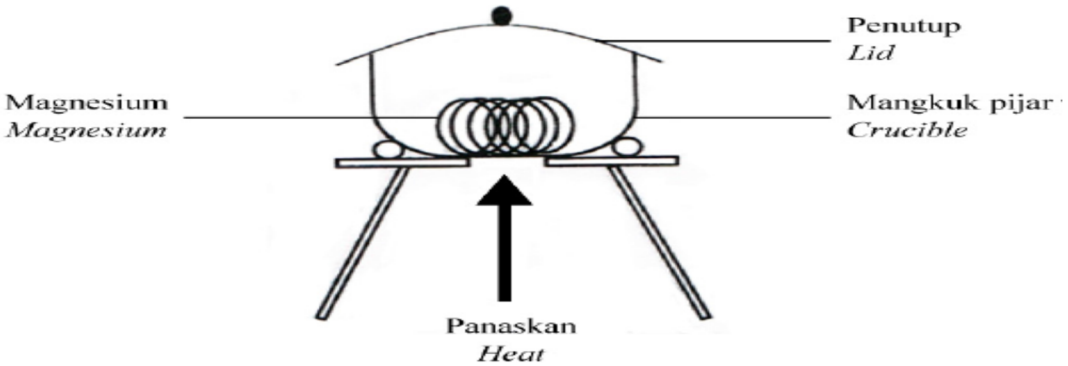
(b) Pembakaran gas propana , C_3H_8 dalam oksigen berlebihan menghasilkan air dan karbon dioksida.
Persamaan kimia untuk tindak balas itu adalah seperti berikut:
Combustion of propane gas, C_3H_8 in excess oxygen produces water and carbon dioxide.
Chemical equation for the reaction is as follows:

$$C_3H_8 + \underline{\mathbf{X}}\ O_2 \rightarrow \underline{\mathbf{Y}}CO_2 + \underline{\mathbf{Z}}H_2O$$

Seimbangkan persamaan kimia untuk tindak balas itu dengan menentukan nilai X, Y dan Z.
Balance the chemical equation for the reaction by determine the value of X, Y and Z.

X :..... Y :..... Z :..... [3M]

[Selangor2021-Set01-03]
3. Rajah 3 menunjukkan susunan radas untuk menentukan formula empirik magnesium oksida.
Diagram 3 shows the set-up of apparatus to determine the empirical formula of magnesium oxide.



(a) Apakah maksud formula empirik?
What is the meaning of empirical formula?

.....

..... [1M]

(b) Keputusan eksperimen itu ditunjukkan seperti di bawah.
The result of the experiment is shown as below.

Jisim mangkuk pijar + penutup Mass of crucible + lid	= 150.05 g = 150.05 g
Jisim mangkuk pijar + penutup + magnesium Mass of crucible + lid + magnesium	= 156.29 g = 156.29 g
Jisim mangkuk pijar + penutup + magnesium oksida Mass of crucible + lid + magnesium oxide	= 160.45 g = 160.45 g

(i) Hitung jisim bagi:
Calculate the mass of:

Magnesium/ Magnesium

Oksigen/ Oxygen:

[2M]

(ii) Tentukan formula empirik magnesium oksida.
[Jisim atom relatif: Mg = 24. O = 16]
Determine the empirical formula of magnesium oxide.
[Relative atomic mass: Mg = 24, O = 16]

[3M]

[Terengganu2021-03]
3. Jadual 3 menunjukkan formula empirik dan formula molekul bagi dua sebatian
Table 3 shows the empirical formulae and molecular formulae of two compounds.

Sebatian Compound	Formula Empirik Empirical formula	Formula molekul Molecular formula
M		C_4H_8
J	$Zn(NO_3)_2$	$Zn(NO_3)_2$

(a) Nyatakan maksud formula empirik.
State the meaning of empirical formula.

.....

..... [1M]

(b) Tulis formula empirik bagi sebatian M.
Write empirical formula of compound M.

..... [1M]

(c) Apabila sebatian J dipanaskan dengan kuat, ia akan terurai membentuk zink oksida, gas oksigen dan gas nitrogen dioksida.
When compound J is heated strongly, it will decompose to form zinc oxide, oxygen gas and nitrogen dioxide gas.

(i)Tuliskan persamaan kimia yang seimbang bagi penguraian sebatian J.
Write a balance chemical equation for the decomposition of compound J.

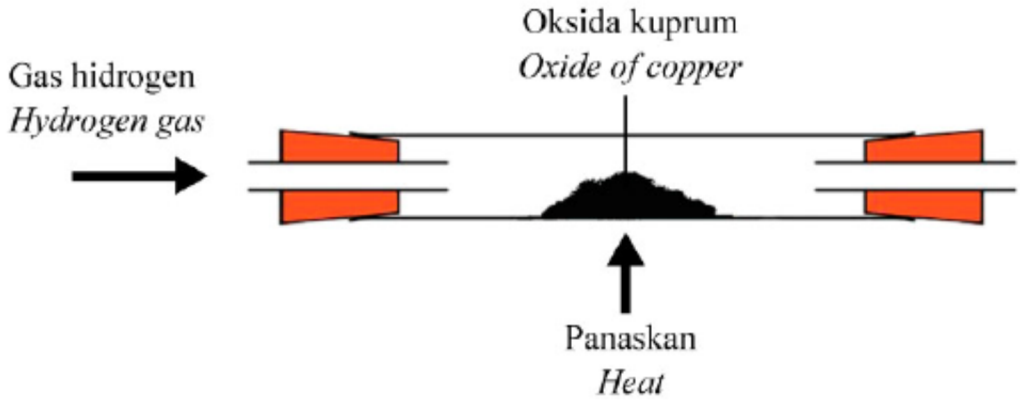
..... [2M]

(ii) Jika 1 mol sebatian J dipanaskan, hitungkan isi padu gas nitrogen dioksida yang terhasil pada keadaan bilik.
[Isi padu molar gas pada keadaan bilik iatah 24 dm^3 mol^{-1}]

If 1 mole of compound J is heated, calculate the volume of gas nitrogen dioxide produced at room condition.
[Molar volume of gas at room condition is 24 dm^3 mol^{-1}]

[2M]

[Selangor2021-Set01-03]
3. Rajah 3 menunjukkan susunan radas untuk menentukan formula empirik bagi oksida kuprum.
Diagram 3 shows the apparatus set-up to determine the empirical formula for oxide of copper.



(a) Apakah maksud formula empirik?
What is the meaning of empirical formula?

.....

..... [1M]

(b) Jadual 3 menunjukkan keputusan eksperimen.
Table 3 shows the results of experiment.

Jisim tabung pembakaran (g) Mass of combustion tube (g)	135.15
Jisim tabung pembakaran + oksida kuprum (g) Mass of combustion tube + oxide of copper (g)	151.15
Jisim tabung pembakaran + kuprum (g) Mass of combustion tube + copper (g)	147.95

Jadual 3
Table 3

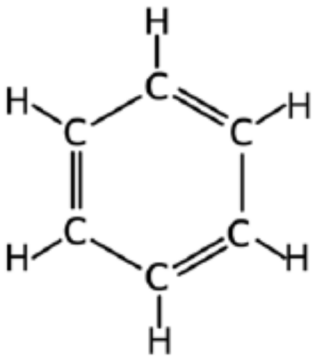
Tentukan formula empirik bagi oksida kuprum.
[Jisim atom relatif: O = 16, Cu = 64]
Determine the empirical formula for oxide of copper. [Relative atomic mass : O = 16, Cu = 64]

[4M]

(c) Formula empirik bagi magnesium oksida tidak boleh ditentukan dengan menggunakan kaedah yang sama. Terangkan pernyataan ini.
The empirical formula of magnesium oxide cannot be determined by using the same method. Explain the statement.

..... [1M]

[Kedah2021-Set01-03]
3. Benzena adalah sejenis hidrokarbon yang diperolehi dari minyak mentah. Ia merupakan bahan asas yang digunakan untuk membuat plastik, pewarna dan pestisid.
Formula struktur benzena adalah seperti dalam Rajah 3.
Benzene is a hydrocarbon found in crude oil. It is used as raw materials to make plastics, dyes and pesticides.
Structural formula of benzene are shown in Diagram 3.



Rajah 3
Diagram 3

(a) (i) Nyatakan maksud formula empirik.
State the meaning of empirical formula.

.....

..... [1M]

(ii) Tuliskan formula empirik bagi benzene.
Write the empirical formula of benzene.

..... [1M]

(b) (i) Benzena mengalami tindak balas pengklorinan untuk menghasilkan klorobenzena, iaitu bahan kimia yang digunakan dalam pembuatan pestisid. Persamaan kimia yang terlibat adalah
Benzene undergoes chlorination reaction to produce chlorobenzene, which is used in pesticide manufacturing. The chemical equation involved is

$$\mathbf{C_6H_6 + Cl_2 \rightarrow C_6H_5Cl + HCl}$$

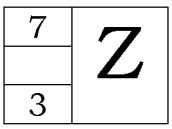
Sekiranya 1.5 mol asid hidroklorik terhasil dalam tindak balas ini, hitung isipadu benzena yang diperlukan pada keadaan bilik.
[Isipadu molar gas pada keadaan bilik =24 dm^{-3} mol^{-1}]
If 1.5 mol of hydrochloric acid is produced in this reaction, calculate the volume of benzene needed at room conditions.
[Molar volume of gas in room condition =24 dm^{-3} mol^{-1}]

[2M]

(ii) Sekiranya klorin digantikan dengan bromin, tuliskan persamaan kimia bagi tindak balas itu..
If chlorine is replaced with bromine, write the chemical equation for the reaction.

..... [2M]

[Kedah2021-Set02-03]
3. Rajah 3 menunjukkan perwakilan piawai bagi atom Z.
Diagram 3 shows the standard representation of atom Z.



(a) Apakah yang diwakili oleh nombor 3?
What is represented by the number 3?

..... [1M]

(b) Tulis formula bagi ion Z
Write the formula of ion Z.

..... [1M]

(c) 0.05 mol Z bertindak balas dengan oksigen untuk membentuk oksida Z.
0.05 moles of Z react with oxygen to form oxide of Z.

(i) Tulis persamaan kimia bagi tindak balas antara Z dengan oksigen.
Write the chemical equation for the reaction between Z and oxygen.

..... [2M]

(ii) Hitung jisim oksida Z yang terbentuk. [Jisim atom relatif: Z = 7; O = 16]
Calculate the mass of oxide of Z formed. [Relative atomic mass: Z=7;O= 16].

[2M]

Johor2021-02-B3 Konsep Mol
3. Rajah 3 menunjukkan maklumat tentang mol.
Diagram 3 shows information about mole.

Diwakili oleh simbol NA
Represented by symbol NA

Rajah 3/ Diagram 3

(a) Apakah yang diwakili dengan simbol di atas.
What is represented by the symbol above.

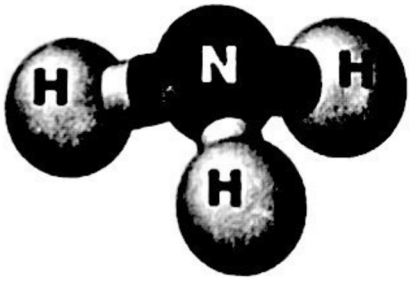
..... [1M]

(b) Nyatakan hubungan antara bilangan mol dengan bilangan zarah.
State the relationship between the number of moles and the number of particles.

.....

..... [1M]

(c) Rajah 3.1 menunjukkan formula struktur satu gas pada suhu bilik yang tidak berwarna, mempunyai bau yang menyengat, dan boleh menyebabkan tercekik.
Diagram 3.1 shows a structural formula of a gas at room temperature which is colourless, highly irritating gas with a pungent, and suffocating odour.



(i) Apakah isi padu untuk 0.01 mol gas tersebut pada suhu bilik dalam cm^3?
[Isi padu molar gas pada suhu bilik = 24 dm^3 mol^{-1}]
What is the volume for 0.01 mol of the gas at room temperature in cm^3?
[Molar volume = 24 dm^3 mol^{-1} at room temperature]

[1M]

(ii) Berapakah bilangan molekul dalam gas di atas?
[Pemalar Avogadro = 6.02×10^{23} mol^{-1}]
How many molecules are there in the gas above?
[Avogadro's constant = 6.02×10^{23} mol^{-1}]

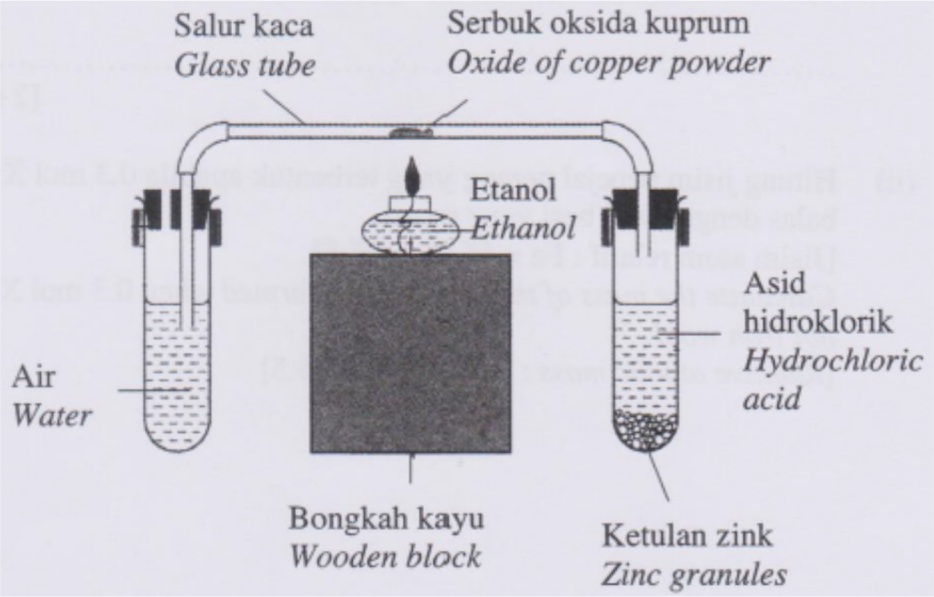
[1M]

(d) Pentana, C_5H_{12} terbakar dengan lengkap dalam oksigen untuk menghasilkan karbon dioksida dan air.
Tuliskan persamaan kimia seimbang bagi tindak balas ini.
Pentane, C_5H_{12} burns completely in oxygen to produce carbon dioxide and water. Write a balanced chemical equation for this reaction.

..... [2M]

[SBP2021-04]

4. Rajah 4 menunjukkan susunan radas eksperimen untuk menentukan formula empirik bagi oksida kuprum.
Diagram 4 shows the apparatus set-up of an experiment to determine the empirical formula for oxide of copper.



(a) Apakah maksud formula empirik?
What is the meaning of empirical formula ?

.....

..... [1M]

(b) Apakah peranan ketulan zink dan asid hidroklorik dalam eksperimen ini?
What is the role of zinc granules and hydrochloric acid in this experiment?

..... [1M]

(c) Namakan satu oksida logam lain yang formula empiriknya boleh ditentukan dengan menggunakan kaedah seperti yang ditunjukkan dalam Rajah 4.
Name another oxide of metal which the empirical formula can be determined by using the same method as shown in Diagram 4.

..... [1M]

(d) Jadual 4 menunjukkan keputusan eksperimen yang diperolehi oleh seorang pelajar.
Table 4 shows the results of an experiment obtained by a student.

Penerangan Description	Jisim (g) Mass (g)
Jisim salur kaca Mass of glass tube	9.25
Jisim salur kaca + oksida kuprum Mass of glass tube + oxide of copper	9.35
Jisim salur kaca + kuprum Mass of glass tube + copper	9.33

Berdasarkan Jadual 4,/ Based on Table 4,

(i) Hitung jisim bagi:/ Calculate the mass of.

Kuprum / Copper : .....

Oksigen/ Oxygen : .....

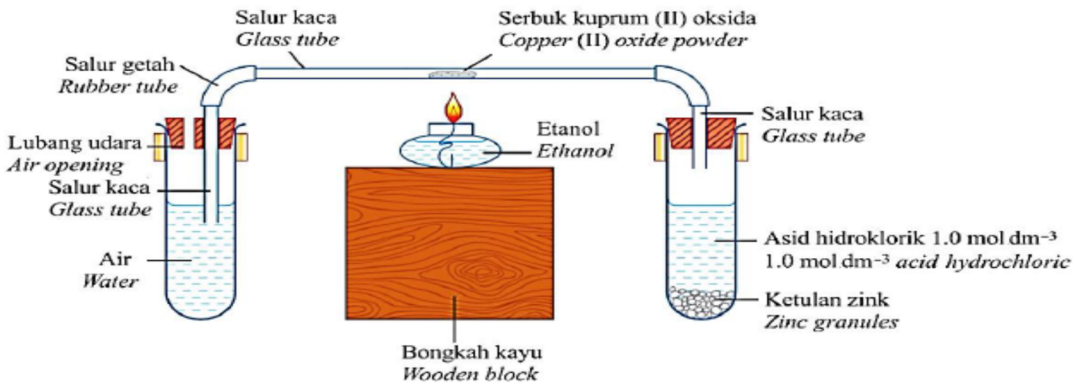
[1M]

(ii) Hitungkan bilangan mol bagi atom kuprum dan atom oksigen dan seterusnya tentukan formula empirik bagi oksida kuprum itu.
[Jisim atom relatif: Cu = 64,0 = 16]
Calculate the number of moles of copper atom and oxygen atom and then determine the empirical formula for the oxide of copper.
[Relative atomic mass: Cu = 64, O = 16]

[3M]

[Perlis2021-04]

4. Rajah 3 menunjukkan susunan radas untuk menentukan formula empirik bagi kuprum(II) oksida.
Diagram 3 shows the apparatus set-up to determine the empirical formula of copper(II) oxide.



Jadual 2 di bawah menunjukkan keputusan eksperimen ini.
Table 2 below shows the result of this experiment.

Penerangan Description	Jisim (g) Mass (g)
Salur kaca Glass tube	32.25
Salur kaca + kuprum(II) oksida Glass tube + copper(II) oxide	42.25
Salur kaca + kuprum Glass tube + copper	40.25

(a) Apakah maksud formula empirik?
What is the meaning of empirical formula?

.....

..... [1M]

(b) (i) Berdasarkan jadual di atas, hitung jisim bagi:
Based on the table above, calculate the mass of:

Kuprum / Copper : .....

Oksigen/ Oxygen : .....

[2M]

(ii) Hitung nisbah mol bagi atom kuprum kepada atom oksigen.
[Jisim atom relatif: O = 16, Cu = 64]
Calculate the ratio of moles of copper atoms to oxygen atoms.
[Relative atomic mass: O = 16, Cu = 64]

[2M]

(iii) Tentukan formula empirik bagi kuprum(II) oksida.
Determine the empirical formula of copper(II) oxide.

..... [1M]

(c) Nyatakan bagaimana untuk menentukan bahawa tindak balas yang berlaku antara kuprum oksida dengan hidrogen telah lengkap.
State how to determine that the reaction between copper oxide with hydrogen has completed.

.....

..... [1M]

Tingkatan 4 Bab 4

[Johor2021-01]
1 Rajah 1 menunjukkan Jadual Berkala Unsur. Huruf yang digunakan bukan simbol sebenar untuk unsur-unsur tersebut.
Diagram 1 shows a Periodic Table of Elements. The letter used are not the actual atomic symbols for the elements.

Berdasarkan Rajah 1,/ Based on Diagram 1,

(a) Apakah maksud kala?
What is the meaning of period?

..... [1M]

(b) Apakah prinsip asas yang digunakan dalam penyusunan unsur-unsur dalam Jadual Berkala Unsur?
What is the basic principle used in arranging the elements in the Periodic Table of Elements?

..... [1M]

(c) Unsur T ialah argon, namakan kumpulan bagi unsur T.
Element T is argon, name the group of T.

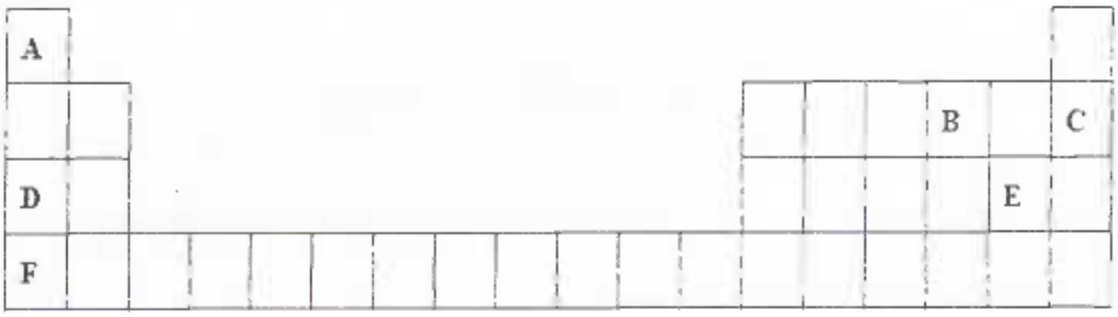
..... [1M]

(d) Unsur manakah mempunyai sifat kimia yang sama?
Berikan alasan jawapan anda.
Which elements have the same chemical properties?
Give a reason for your answer.

.....

..... [2M]

[Terengganu2021-02]
2. Rajah 2 menunjukkan sebahagian daripada Jadual Berkala Unsur. A, B, C, D, E, F bukan merupakan simbol sebenar unsur.
Diagram 2 shows part of the Periodic Table of Elements. A, B, C, D, E, F are not the actual symbols of the elements.



Berdasarkan Rajah 2,/ Based on Diagram 2,

(a) Apakah prinsip asas yang digunakan dalam penyusunan unsur-unsur dalam Jadual Berkala Unsur?
What is the basic principle used in arranging the elements in the Periodict Table of Elements?

..... [1M]

(b) Nyatakan dua unsur yang terietak dalam kumpulan yang sama. State two elements that are placed in the same group.

..... [1M]

(c) Tulis susunan elektron bagi atom B.
Write the electron arrangement for atom B.

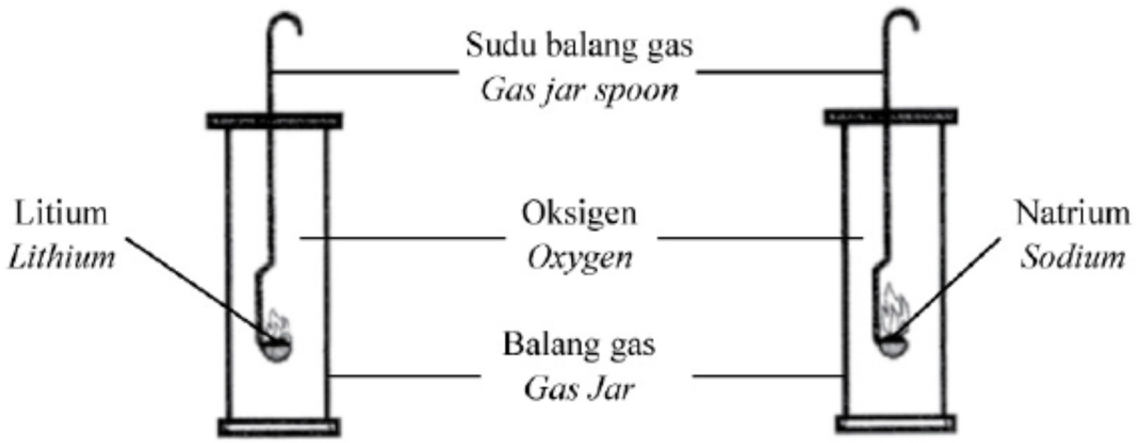
..... [1M]

(d) Saiz atom E lebih kecil daripada saiz atom D. Terangkan.
Atomic size of E is smaller than atomic size of D. Explain.

.....

..... [2M]

[Selangor2021-Set01-04]
4. Rajah 4 menunjukkan susunan radas bagi satu eksperimen untuk membandingkan kereaktifan litium dan natrium terhadap oksigen.
Diagram 4 shows the set-up of apparatus of an experiment to compare the reactivity of lithium and sodium towards oxygen.



(a) (i) Bandingkan kereaktifan litium dan natrium terhadap oksigen.
Compare the reactivity of lithium and sodium towards oxygen.

..... [1M]

(ii) Terangkan jawapan anda di 4(a)(i).
Explain your answer in 4(a)(i).

.....

.....

.....

..... [3M]

(b)(i) Nyatakan jenis ikatan yang terbentuk di antara natrium dan oksigen.
State the type of bond that formed between sodium and oxygen.

..... [1M]

(ii) Lukis susunan elektron bagi sebatian yang terbentuk di antara natrium dan oksigen.
Draw the electron arrangement of the compound formed between sodium and oxygen.

[2M]

[Melaka2021-04]

4. Rajah 4.1 menunjukkan unsur-unsur dalam jadual berkala.
Diagram 4.1 shows elements in a periodic table.

23	Na	39	K	35.5	Cl
11		19		17	

(a) Dalam kumpulan manakah unsur klorin berada dalam Jadual Berkala?
In which group of the periodic table, chlorine located?

..... [1M]

(b) Tulis susunan elektron bagi atom kalium.
Write the electron arrangement for potassium atom.

..... [1M]

(c)

" Unsur natrium dan kalium bertindak balas dengan air menghasilkan larutan logam hidroksida dan gas hidrogen.
Sodium and potassium elements react with water to produce metal hydroxide solution and hydrogen gas."

Berdasarkan kenyataan tersebut, tuliskan persamaan kimia bagi tindak balas kalium dengan air
Based on the statement, write the chemical equation for the reaction potassium with water.

..... [1M]

(d) Secebis ketulan natrium yang terbakar dimasukkan dengan cepat ke dalam balang gas yang berisi gas oksigen
A piece of burning sodium is placed quickly into a gas jar containing oxygen gas.

(i) Nyatakan pemerhatian bagi tindak balas ini.
State the observation of the reaction.

.....

..... [1M]

(ii) Namakan jenis sebatian yang terbentuk.
Name the type of the compound formed

..... [1M]

(iii) Lukiskan gambar rajah susunan elektron bagi sebatian di (d) (ii).
Draw the electron arrangement of the compound in (d) (ii).

[2M]

[Kelantan2021-04]
4. Rajah 4 menunjukkan tiga unsur dalam Jadual Berkala Unsur.
Diagram 4 shows the three elements in the Periodic Table of Elements

23	Na	35	Cl	40	Ar
11		17		18	

(a) Nyatakan satu kegunaan unsur argon.
State one use of the element argon.

..... [1M]

(b) (i) Nyatakan satu persamaan antara unsur-unsur di dalam Rajah 4.
State one similarity between the elements in Diagram 4.

..... [1M]

(ii) Mengapa argon tidak bertindak balas dengan klorin?
Why argon does not react with chlorine?

..... [1M]

(iii) Natrium terbakar cergas dengan gas klorin membentuk sebatian berwarna putih, natrium klorida. Tuliskan persamaan kimia bagi tindak balas ini.
Jelaskan bagaimana sebatian ini terbentuk.
Sodium burns vigorously with chlorine gas to form a white compound, sodium chloride. Write the chemical equation for this reaction.
Explain how this compound is formed.

.....

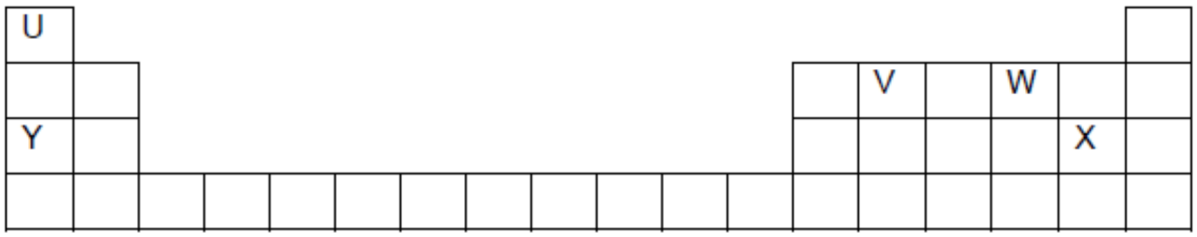
.....

.....

.....

..... [4M]

[Kedah2021-Set02-04]
4. Rajah 4.1 menunjukkan beberapa unsur dalam Jadual Berkala Unsur yang diwakili dengan huruf U, V, W, X dan Y.
Diagram 4.1 shows some of the elements in the Periodic Table of Elements represented by the letters U, V, W, X and Y.



Berdasarkan Rajah 4.1:/ Based on Diagram 4.1:

(a) Nyatakan unsur yang boleh bergabung untuk membentuk sebatian ion.
State the elements that can combine to form ionic compounds.

..... [1M]

(b) Unsur V dan unsur W bertindak balas untuk menghasilkan sebatian Z.
Element V and element W react to produce compound Z.

i) Tulis formula bagi sebatian Z.
Write the formula of compound Z.

..... [1M]

ii) Nyatakan jenis ikatan bagi sebatian Z.
State the type of bond in compound Z.

..... [1M]

(c) Rajah 4.2 menunjukkan alat pemadam api yang menggunakan sebatian Z sebagai bahan utama dalam penghasilan alat pemadam api. Alat pemadam api ini memadam kebakaran yang melibatkan peralatan elektrik, gas dan wap.
Figure 4.2 shows a fire extinguisher that uses compound Z as the main ingredient in the production of a fire extinguisher. These fire extinguishers extinguish fires involving electrical appliances, gas and steam.

Berdasarkan Rajah 4.2,/ Based on Diagram 4.2,

(i) terangkan mengapa sebatian Z sesuai digunakan untuk memadam api yang melibatkan peralatan elektrik, gas dan wap?
explain why compound Z is suitable for extinguishing fires involving electrical appliances, gas and steam?

.....

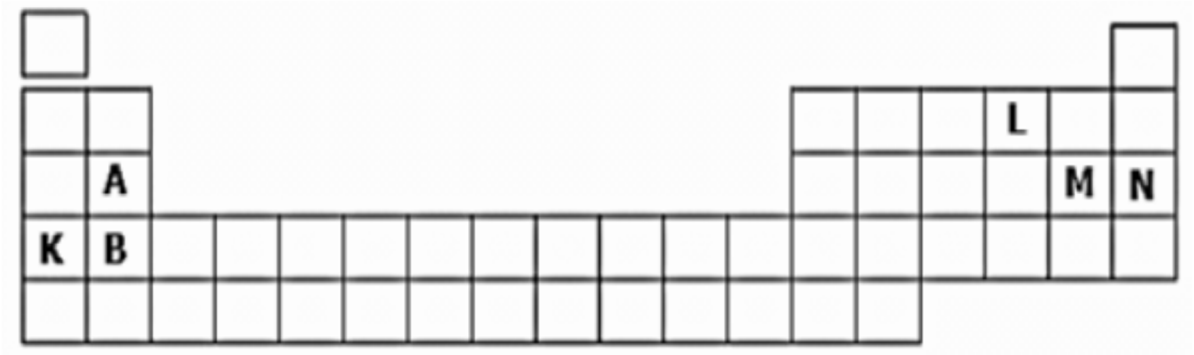
..... [2M]

(ii) Bolehkah air menggantikan sebatian Z sebagai bahan utama dalam pemadam api pada Rajah 4.2? Berikan alasan anda.
Can water replace compound Z as the main ingredient in a fire extinguisher in Figure 4.2? Give your reasons.

.....

..... [2M]

[Kedah2021-Set01-05]
5. Rajah 5 menunjukkan sebahagian daripada Jadual Berkala Unsur.
Diagram 5 shows part of the Periodic Table of Elements.



Huruf A, B, K, L, M, dan N bukan mewakili simbol sebenar unsur
The letters A, B, K, L, M, and N do not represent the actual symbols of the elements

(a) Nyatakan kedudukan unsur L dalam Jadual Berkala Unsur.
State the position of element L in the Periodic Table of the Elements.

..... [1M]

(b) Unsur manakah yang wujud sebagai molekul dwiatom?
Which element exists as diatomic molecule?

..... [1M]

(c) 9.4 g oksida bagi unsur K bertindak balas dengan 250 cm_3 air suling untuk menghasilkan suatu larutan beralkali.
9.4 g oxide of element K reacts with 250 cm_3 of distilled water to produce an alkaline solution.
[Jisim atom relatif ,K=39 ; O=16 ; H=1]
[Relative atomic mass, K=39 ; O=16 ; H=1]

(i) Tuliskan persamaan kimia seimbang bagi tindakbalas tersebut
Write a balanced chemical equation for the reaction

..... [2M]

(ii) Hitungkan kemolaran bagi larutan yang terhasil
Calculate the molarity of the solution formed

[2M]

(d) Unsur A dan B berada dalam kumpulan yang sama tetapi mempunyai kereaktifan berbeza apabila bertindak balas dengan oksigen. Terangkan mengapa terdapat perbezaan kereaktifan antara dua unsur tersebut.
Elements A and B are in the same group but have different reactivity when react with oxygen. Explain why there is a difference in reactivity between the two elements.

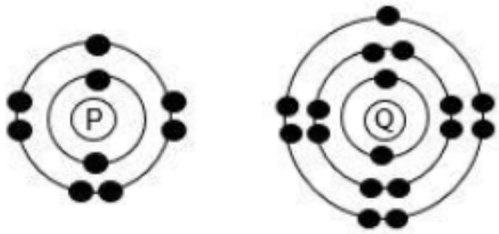
.....

..... [2M]

Esei/ Essay

[Perlis2021-09]

9. Rajah 8.1 menunjukkan susunan elektron bagi unsur P dan Q .
Diagram 8.1 shows the electron arrangement of element P and Q.



(a) (i) Nyatakan kedudukan unsur P di dalam Jadual Berkala Unsur.
Berikan alasan bagi jawapan anda.
State the position of element P in the Periodic Table of Elements.
Give reason for your answer.

[4M]

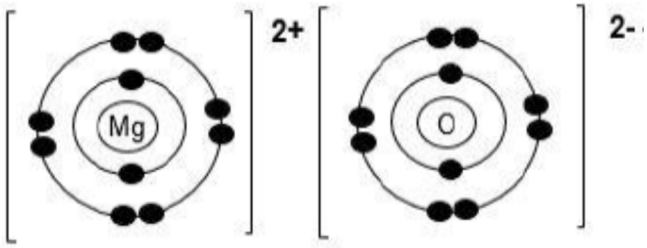
(ii) Unsur Q bertindak balas dengan wul besi panas membentuk pepejal perang.
Tuliskan persamaan kimia untuk menunjukkan tindak balas yang berlaku.
Element Q reacts with hot iron wool to form brown solid.
Write the chemical equation to show the reaction occurred.

[2M]

(iii) Unsur P dan Q mempunyai sifat kimia yang sama tetapi menunjukkan kereaktifan berbeza dalam tindak balas kimia.
Bandingkan kereaktifan unsur P dan Q. Terangkan jawapan anda.
Elements P and Q have the same chemical properties but show different reactivity in chemical reactions.
Compare the reactivity of element P and Q. Explain your answer.

[4M]

(b) Rajah 8.2 menunjukkan susunan elektron bagi magnesium oksida.
Diagram 8.2 shows the electron arrangement of magnesium oxide.



(i) Huraikan pembentukan ikatan kimia di antara unsur magnesium dan oksigen dalam magnesium oksida.
Describe the formation of the chemical bond between elements of magnesium and oxygen in the magnesium oxide.

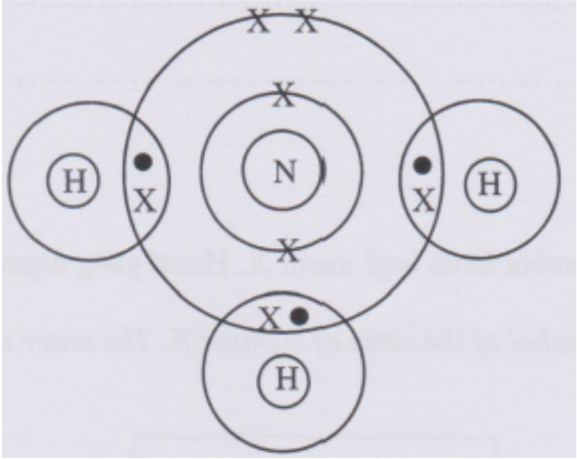
[6M]

(ii) Magnesium oksida wujud sebagai pepejal pada suhu bilik.
Terangkan mengapa?
Magnesium oxide exists as solid at room temperature. Explain why?

[4M]

Tingkatan 4 Bab 5

[SBP2021-02]
2. Rajah 2 menunjukkan susunan elektron bagi gas A.
Diagram 2 shows the electron arrangement of gas A.



(a) Nyatakan jenis zarah dalam gas A.
State the type of particles in gas A.

..... [1M]

(b) Apakah tujuan pembentukan ikatan kimia?
What is the purpose of chemical bond formation?

.....

..... [1M]

(c) Berdasarkan Rajah 2,
Based on Diagram 2,

(i) Nyatakan jenis ikatan kimia dalam gas A.
State the type of chemical bond in gas A.

..... [1M]

(ii) Terangkan bagaimana ikatan kimia itu terbentuk.
Explain how the chemical bond is formed.

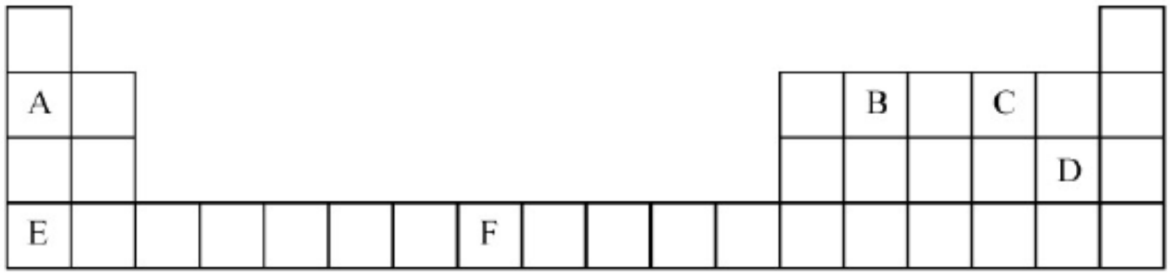
.....

..... [2M]

[Selangor2021-Set01-04]

4. Rajah 4 menunjukkan sebahagian daripada Jadual Berkala Unsur. A, B, C, D, E dan F bukan simbol sebenar bagi atom-atom itu. Gunakan huruf tersebut untuk menjawab soalan berikut.

Diagram 4 shows part of the Periodic Table of Elements. A, B, C, D„ E and F are not the actual symbols of the atoms. Use the letters to answer the following questions.



(a) Unsur A dan E boleh bertindak balas dengan gas D untuk membentuk pepejal putih.

Elements A and E can react with gas D to form a white solid.

(i) Antara unsur A dan E, yang manakah lebih reaktif apabila bertindak balas dengan gas D?

Between elements A and E, which is more reactive when reacting with gas D?

..... [1M]

(ii) Terangkan jawapan anda di 4(a)(i).

Explain your answer in 4(a)(i).

.....

..... [2M]

(b) Unsur B dan C bertindak balas untuk membentuk suatu sebatian yang digunakan untuk memadamkan api.

Elements B and C react to form a compound used to extinguish fire.

(i) Lukis susunan elektron bagi sebatian terbentuk.

Draw the electron arrangement for the compound formed.

[2M]

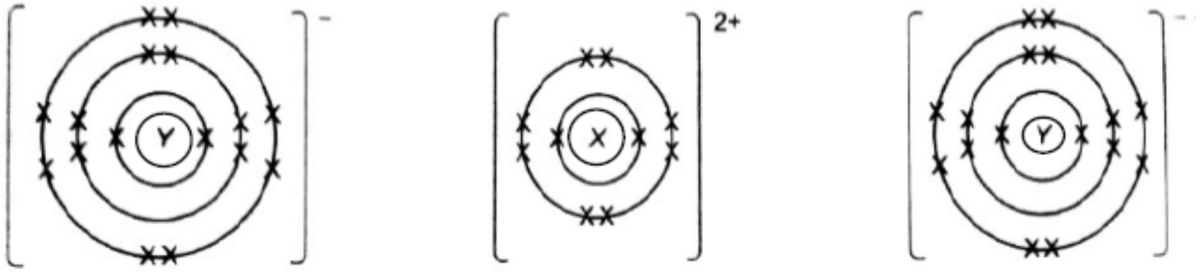
(ii) Jelaskan mengapa sebatian tersebut sesuai digunakan untuk memadamkan kebakaran melibatkan peralatan elektrik.
Explain why the compound is suitable used for extinguishing fire involving electrical appliance.

..... [1M]

(c) Unsur F digunakan dalam Proses Haber untuk meningkatkan kadar pengeluaran ammonia.
Nyatakan satu ciri istimewa yang lain bagi unsur F.
Element F is used in the Haber Process to increase the rate of ammonia production.
State one other special characteristic of element F.

..... [1M]

[Kedah2021-Set01-04]
4. Rajah 4.1 menunjukkan susunan elektron bagi satu sebatian terbentuk antara unsur X dan unsur Y.
Diagram 4.1 shows the electron arrangement of a compound formed between elements X and Y.



(a) Bagaimana ikatan kimia terbentuk?
How the chemical bond formed?

..... [1M]

(b) Berdasarkan Rajah 4.1:
Based on Diagram 4.1:

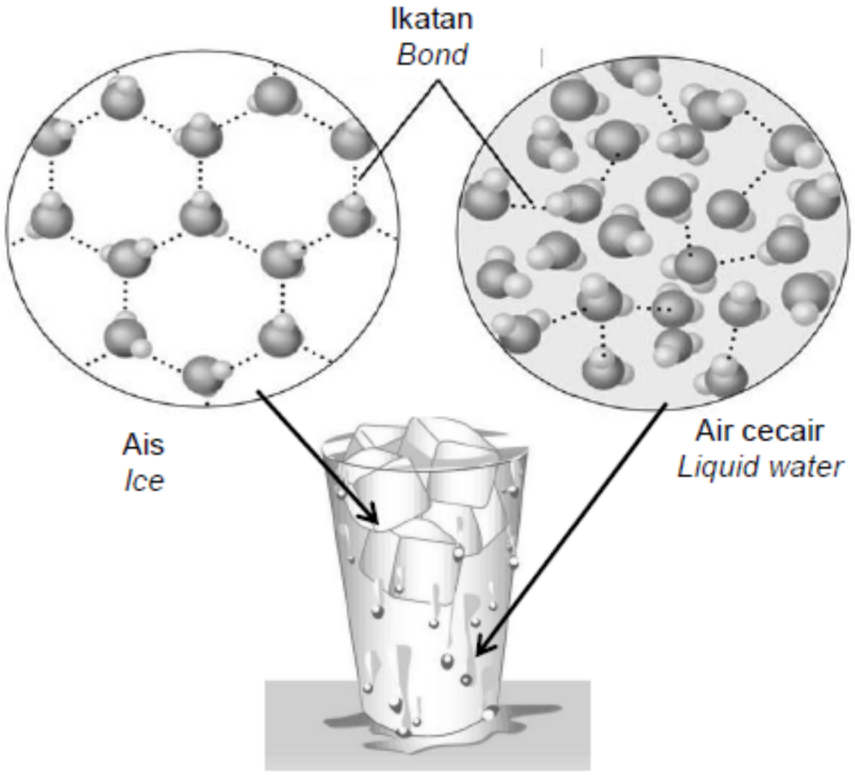
(i) Nyatakan jenis sebatian itu.
State the type of compound.

..... [1M]

(ii) Tulis formula bagi sebatian itu.
Write the formula of the compound

..... [1M]

Rajah 4.2 menunjukkan susunan molekul air dalam air cecair dan ais.
Figure 4.2 shows the arrangement of water molecule in liquid water and ice.



Rajah 4.2
Diagram 4.2

(c) (i) Nyatakan jenis ikatan yang terdapat di antara molekul air.
State the type of bond that exists between water molecules

..... [1M]

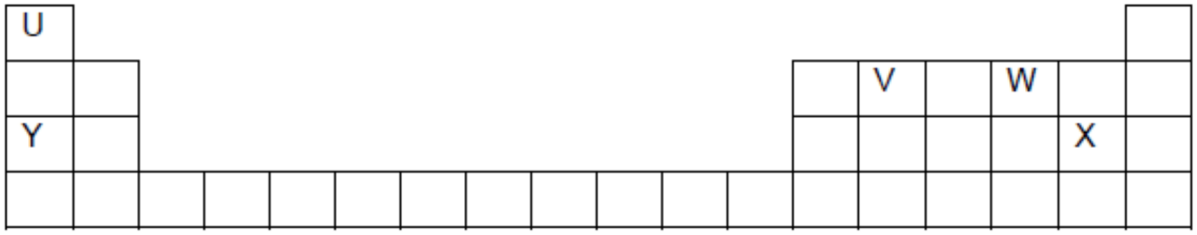
(ii) Air ditambahkan ke dalam gelas yang berisi kiub ais. Apakah yang dapat diperhatikan? Terangkan pemerhatian dari segi pembentukan ikatan.
Water is added into a glass containing ice cube. What can be observed? Explain the observation in terms of bond formation.

.....

.....

..... [3M]

[Kedah2021-Set02-04]
4. Rajah 4.1 menunjukkan beberapa unsur dalam Jadual Berkala Unsur yang diwakili dengan huruf U, V, W, X dan Y.
Diagram 4.1 shows some of the elements in the Periodic Table of Elements represented by the letters U, V, W, X and Y.



Berdasarkan Rajah 4.1:
Based on Diagram 4.1:

(a) Nyatakan unsur yang boleh bergabung untuk membentuk sebatian ion.
State the elements that can combine to form ionic compounds.

..... [1M]

(b) Unsur V dan unsur W bertindak balas untuk menghasilkan sebatian Z.
Element V and element W react to produce compound Z.

i) Tulis formula bagi sebatian Z.
Write the formula of compound Z.

..... [1M]

ii) Nyatakan jenis ikatan bagi sebatian Z.
State the type of bond in compound Z.

..... [1M]

(c) Rajah 4.2 menunjukkan alat pemadam api yang menggunakan sebatian Z sebagai bahan utama dalam penghasilan alat pemadam api. Alat pemadam api ini memadam kebakaran yang melibatkan peralatan elektrik, gas dan wap.
Figure 4.2 shows a fire extinguisher that uses compound Z as the main ingredient in the production of a fire extinguisher. These fire extinguishers extinguish fires involving electrical appliances, gas and steam.

Rajah 4.2
Diagram 4.2

Berdasarkan Rajah 4.2,
Based on Diagram 4.2,

(i) terangkan mengapa sebatian Z sesuai digunakan untuk memadam api yang melibatkan peralatan elektrik, gas dan wap?
explain why compound Z is suitable for extinguishing fires involving electrical appliances, gas and steam?

.....

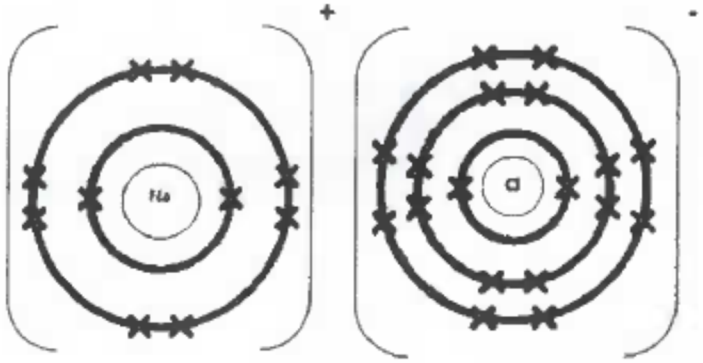
..... [2M]

(ii) Bolehkah air menggantikan sebatian Z sebagai bahan utama dalam pemadam api pada Rajah 4.2? Berikan alasan anda.
Can water replace compound Z as the main ingredient in a fire extinguisher in Figure 4.2? Give your reasons.

.....

..... [2M]

[Terengganu2021-05]
5 (a) Rajah 5.1 menunjukkan susunan elektron bagi sebatian natrium kiorida.
Diagram 5.1 shows the electron arrangement of sodium chloride compound.



(i) Nyatakan jenis ikatan bagi sebatian natrium klorida.
State the type of bond for sodium chloride compound.

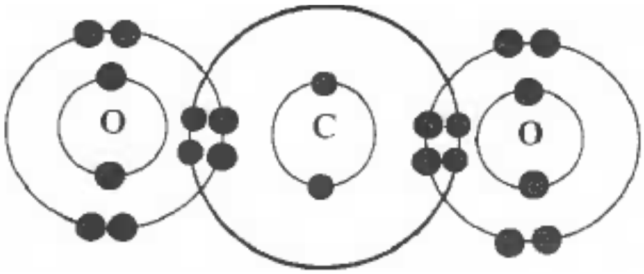
..... [1M]

(ii) Bagaimanakah ion natrium dan ion klorida terbentuk daripada atom masing- masing?
How are sodium ion and chloride ion formed from their respective atoms?

.....

..... [2M]

(b) Rajah 5.2 menunjukkan susunan elektron bagi sebatian X yang terbentuk apabila oksigen bertindak balas dengan karbon.
Diagram 5.2 shows the electron arrangement of compound X formed when oxygen reacts with carbon.



(i) Nyatakan satu sifat bagi sebatian X.
State the one properties of compound X.

..... [1M]

(ii) Persamaan kimia di bawah menunjukkan tindak balas antara sebatian X dengan ammonia bagi menghasilkan urea dan air.
Lengkapkan dan seimbangkan persamaan tersebut.
Chemical equation below shows the reaction between compound X and ammonia to form urea and water.
Complete and balance the equation.

$$.....NH_3 + CO_2 \rightarrow (NH_2)_2CO + ...$$

[2M]

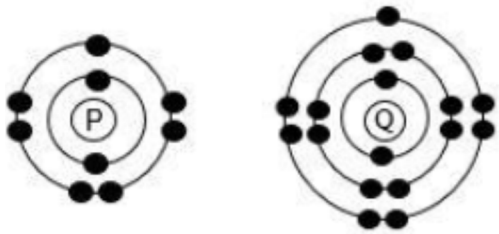
(iii) Jika 24 dm^3 gas X bertindak balas dengan ammonia, hitung jisim urea yang terbentuk.
[Jisim molar urea = 60 g mol^{-1}, Isi padu molar gas pada keadaan bilik ialah 24 dm^3 mol^{-1}]
If 24 dm^3 of gas X reacts with ammonia, calculate the mass of urea formed.
[Molar mass of urea = 60 g mol'1, Molar volume of gas at room conditions is 24 dm^3 mol^{-1}]

[2M]

Esei/ Essay

[Perlis2021-09]

9. Rajah 8.1 menunjukkan susunan elektron bagi unsur P dan Q .
Diagram 8.1 shows the electron arrangement of element P and Q.



(a) (i) Nyatakan kedudukan unsur P di dalam Jadual Berkala Unsur.
Berikan alasan bagi jawapan anda.
State the position of element P in the Periodic Table of Elements.
Give reason for your answer.

[4M]

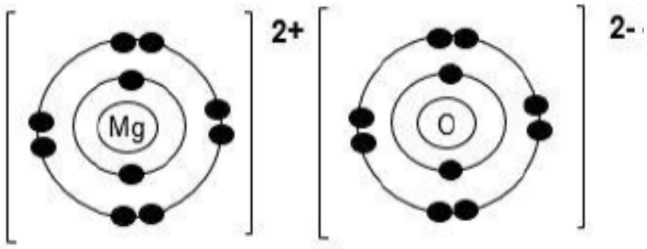
(ii) Unsur Q bertindak balas dengan wul besi panas membentuk pepejal perang.
Tuliskan persamaan kimia untuk menunjukkan tindak balas yang berlaku.
Element Q reacts with hot iron wool to form brown solid.
Write the chemical equation to show the reaction occurred.

[2M]

(iii) Unsur P dan Q mempunyai sifat kimia yang sama tetapi menunjukkan kereaktifan berbeza dalam tindak balas kimia.
Bandingkan kereaktifan unsur P dan Q. Terangkan jawapan anda.
Elements P and Q have the same chemical properties but show different reactivity in chemical reactions.
Compare the reactivity of element P and Q. Explain your answer.

[4M]

(b) Rajah 8.2 menunjukkan susunan elektron bagi magnesium oksida.
Diagram 8.2 shows the electron arrangement of magnesium oxide.



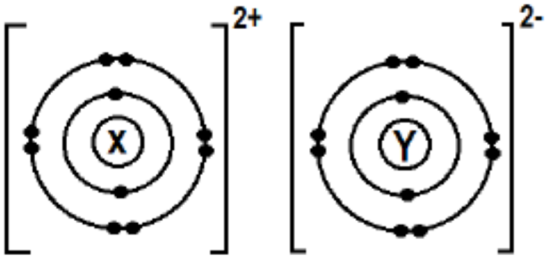
(i) Huraikan pembentukan ikatan kimia di antara unsur magnesium dan oksigen dalam magnesium oksida.
Describe the formation of the chemical bond between elements of magnesium and oxygen in the magnesium oxide.

[6M]

(ii) Magnesium oksida wujud sebagai pepejal pada suhu bilik.
Terangkan mengapa?
Magnesium oxide exists as solid at room temperature. Explain why? [4M]

[Melaka2021-10]

10. (a) Rajah 10.1 menunjukkan susunan elektron bagi sebatian XY.
Diagram 10.1 shows the electron arrangement for XY compound.



Berdasarkan rajah 10.1, terangkan kedudukan unsur X dalam Jadual Berkala.
Based on diagram 10.1, explain the position of element Y in the Periodic table

[5M]

(b) Rajah 10.2 menunjukkan simbol-simbol kimia yang mewakili unsur P, Q dan R. Huruf-huruf ini bukan simbol sebenar unsur-unsur ini dalam Jadual Berkala.
Diagram 10.2 shows the chemical symbols which represent three elements, P, Q and R. These letters are not the actual symbols of the elements in the Periodic Table.

12	P	1	Q	16	R
6		1		8	

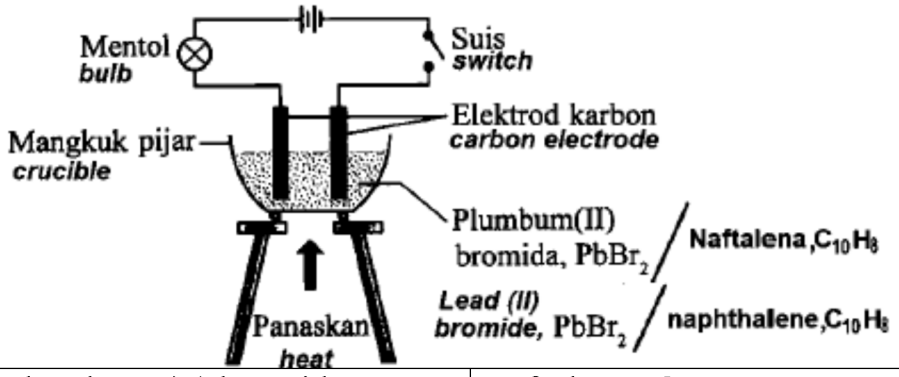
Menggunakan maklumat dalam rajah 10.2, terangkan pembentukan sebatian antara :
- unsur P dan Q.
- Lukiskan susunan elektron sebatian yang terbentuk.

Using the information in the diagram 10.2, explain the formation of compound formed from the :

- element of P and Q
- Draw the electron arrangement of the compound formed.

[5M]

(c) Rajah 10.3 dan Jadual 10.1 menunjukkan susunan radas dan pemerhatian bagi suatu eksperimen untuk mengkaji kekonduksian elektrik dan takat lebur antara sebatian ion dan sebatian kovalen.
Diagram 10.3 and Table 10.1 show the apparatus setup and observations obtained for an experiment that conducted to study the electrical conductivity and melting point between ionic and covalent compound.

Susunan radas Apparatus set up				
Sebatian substance	Plumbum (II) bromida, $PbBr_2$ Lead (II) bromide, $PbBr_2$		Naftalena, $C_{10}H_8$ Naphthalene, $C_{10}H_8$	
Keadaan State	Pepejal Solid	Leburan Molten	Pepejal solid	Leburan molten
Pemerhatian Observation	Mentol tidak menyala Bulb does not light up	Mentol menyala Bulb lights up	Mentol tidak menyala Bulb does not light up	

Berdasarkan kepada pemerhatian dalam Rajah 10.3 dan Jadual 10.1, nyatakan perbezaan pemerhatian bagi sebatian ion dan sebatian kovalen ini berdasarkan kepada aspek berikut :

- Kekonduksian elektrik
- Takat lebur.

Terangkan jawapan anda.

Based on your observation in Diagram 10.3 and Table 10.1, state the difference in observation for ionic and covalent compound in term of :

- Electrical conductivity
- Melting point.

Explain your answer.

[10M]

Tingkatan 4 Bab 6

[Perlis2021-06]
6. Jadual 4 menunjukkan nilai pH bagi larutan asid A dan asid B yang mempunyai kepekatan yang sama. Kedua-dua asid itu adalah asid monoprotik.
Table 4 shows the pH values for solutions of acid A and acid B which have the same concentration. Both of the acids are monoprotic acids.

Asid Acid	Nilai pH pH value
A	1
B	4

(a) (i) Cadangkan nama bagi asid A dan asid B.
Suggest the names of acid A and acid B.

A: .....

B: .....
[2M]

(ii) Terangkan mengapa dua larutan asid ini mempunyai nilai pH yang berbeza.
Explain why these two acid solutions have different pH values.

.....

.....

.....

..... [3M]

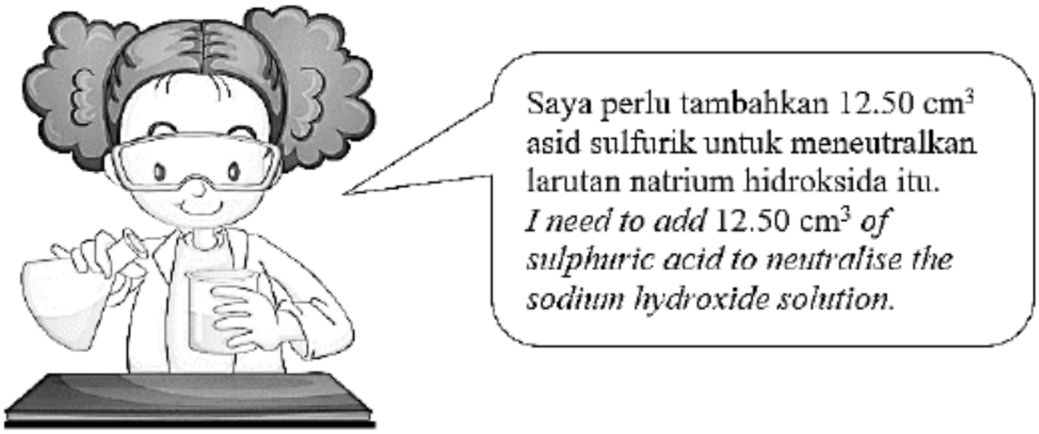
(iii) Hitung kemolaran bagi asid A.
Calculate the molarity of acid A.

[1M]

(b) 25 cm^3 asid A melengkapkan peneutralan 50 cm^3 larutan natrium hidroksida, NaOH. Dengan menggunakan asid A yang dinamakan di 6(a)(i), tulis persamaan kimia seimbang bagi tindak balas peneutralan itu.
25 cm^3 of acid A completely neutralises 50 cm^3 of sodium hydroxide solution, NaOH. By using the named acid A at 6(a)(i), write a balanced chemical equation for the neutralisation reaction.

..... [1M]

(c) Rajah 5 menunjukkan seorang murid sedang mencampurkan asid sulfurik yang sama kepekatannya dengan asid A kepada larutan natrium hidroksida yang sama di 6(b).
Diagram 5 shows a student adding sulphuric acid with the same concentration as acid A to the sodium hydroxide solution as in 6(b).

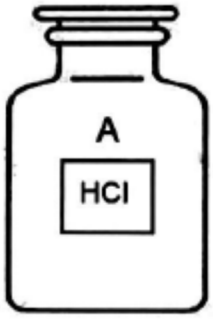
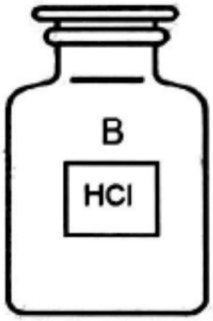


Adakah murid itu menambahkan isi padu asid sulfurik dengan betul? Berikan sebab.
Does the student add the correct volume of the sulphuric acid? Give the reason.

.....

..... [2M]

[Johor2021-07]
7 Rajah 7.1 menunjukkan dua botol reagen.
Diagram 7.1 shows two reagent bottles.

	
0.100 mol dm^{-3}	0.001 mol dm^{-3}

(a) Nyatakan maksud asid kuat?
State the meaning of strong acid?

..... [1M]

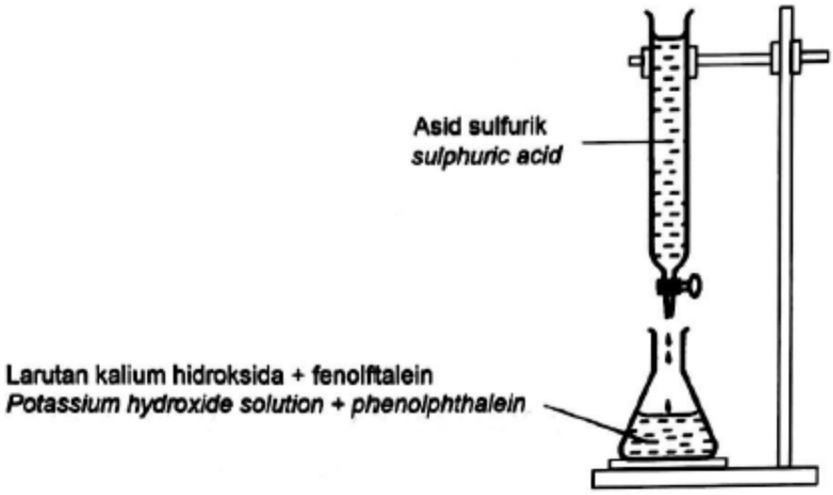
(b) (i) Berdasarkan Rajah 7.1, botol reagen yang manakah memberi nilai pH yang rendah?
Based on Diagram 7.1, which reagent bottle gives a lower pH value?

..... [1M]

(ii) Nyatakan nilai pH bagi asid HCI pada botol B.
State the pH value of HCI acid in bottle B.

..... [1M]

(c) Rajah 7.2 menunjukkan kaedah pentitratan yang dijalankan oleh seorang murid.
Diagram 7.2 shows titration method carry out by a student



(i) Tuliskan persamaan kimia yang seimbang bagi tindak balas di atas.
Write a balanced chemical equation for above reaction.

..... [2M]

(ii) Eksperimen diulangi oleh dengan menggunakan asid etanoik. Asid manakah yang akan menggunakan isipadu yang lebih banyak? Terangkan jawapan anda.
The experiment is repeated by using ethanoic acid. Which acid will use more volume ?
Explain your answer.

.....

.....

.....

..... [3M]

(iii) Semasa menjalankan eksperimen, apakah yang perlu anda lakukan agar isi padu asid yang digunakan semasa pentitratan adalah 2 kali ganda daripada Rajah 7.2? Wajarkan tindakan anda itu.
During the experiment, what should you do so that the volume of acid used while titration is doubled than in Diagram 7.2? Justify your actions.

[2M]

Esei// Essay

[Selangor2021-Set01-09]
9. Jadual 9 menunjukkan maklumat tentang larutan P dan larutan Q dengan kepekatan yang sama tetapi nilai pH yang berbeza.
Table 9 shows the information about solution P and solution Q with the same concentration but different pH value.

Larutan Solution	Maklumat Information
P	• Nilai pH kurang daripada 7 pH value less than 7 • Bertindak balas dengan kuprum(Il) oksida untuk menghasilkan kuprum(II) klorida dan air Reacts with copper(11) oxide to produce copper{\\) chloride and water
Q	• Nilai pH kurang daripada 7 pH value less than 1 • Bertindak balas dengan larutan kalium hidroksida untuk menghasilkan kalium etanoat dan air Reacts with potassium hydroxide solution to produce potassium ethanoate and water

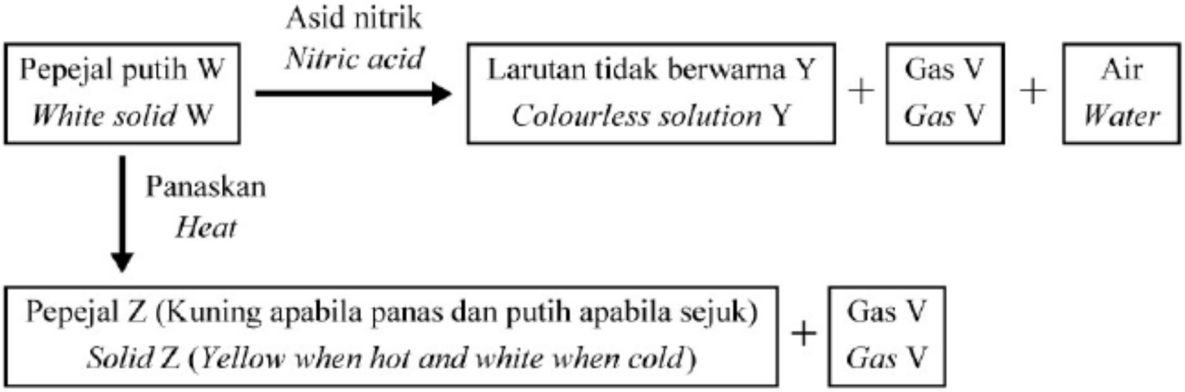
(a) (i) Berdasarkan Jadual 9, nyatakan nama bagi larutan P dan larutan Q. Larutan manakah yang menunjukkan nilai pH yang lebih tinggi? Terangkan jawapan anda.
Based on Table 9, stale the names of solution P and solution Q. Which solution shows a higher pH value? Explain your answer.

[5M]

(ii) 100 cm^3 larutan P 0.1 mol dm^{-3} bertindak balas dengan kuprum(II) oksida berlebihan untuk menghasilkan kuprum(II) klorida dan air. Tulis persamaan kimia bagi tindak balas itu dan hitung jisim kuprum(II) klorida yang terhasil.
[Jisim molar kuprum(II) klorida = 135 g mol^{-1}]
100 cm^3 of 0.1 mol dm^{-3} of solution P reacts with excess copper(II) oxide to produce copper(II) chloride and water.
Write the chemical equation for the reaction and calculate the mass of copper(II) chloride produced.
[Molar mass of copper(II) chloride = 135 g mol^{-1}]

[5M]

(b) Rajah 9 menunjukkan tindak balas bagi pepejal putih W.
Diagram 9 shows the reaction of white solid W.



Berdasarkan Rajah 9,/ Based on Diagram 9,

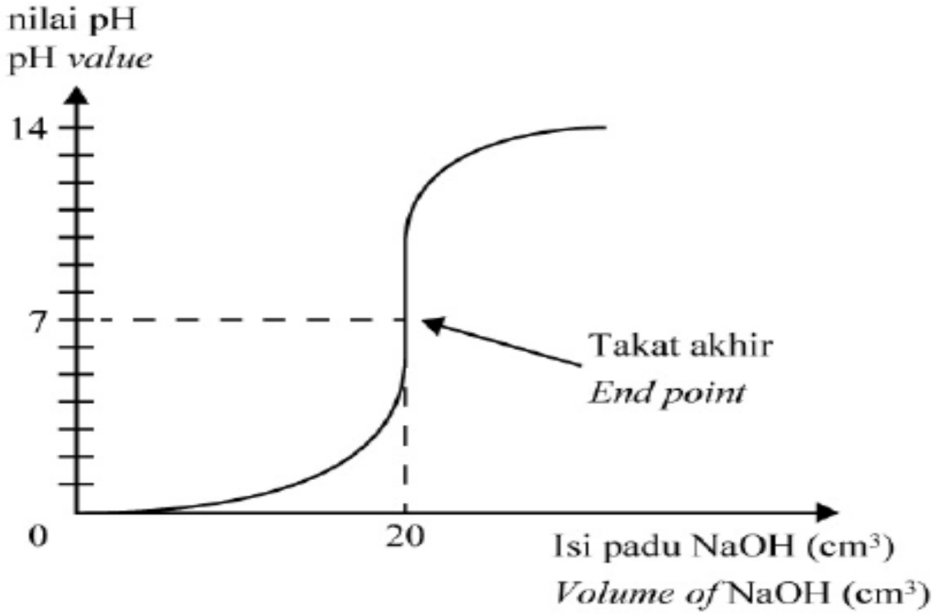
(i) kenal pasti bahan V, W, Y dan Z.
identify substances V, W, Y and Z.

[4M]

(ii) huraikan satu ujian kimia untuk menentusahkan kehadiran kation dan anion dalam larutan Y.
describe a chemical test to verify the cation and anion present in solution Y.

[6M]

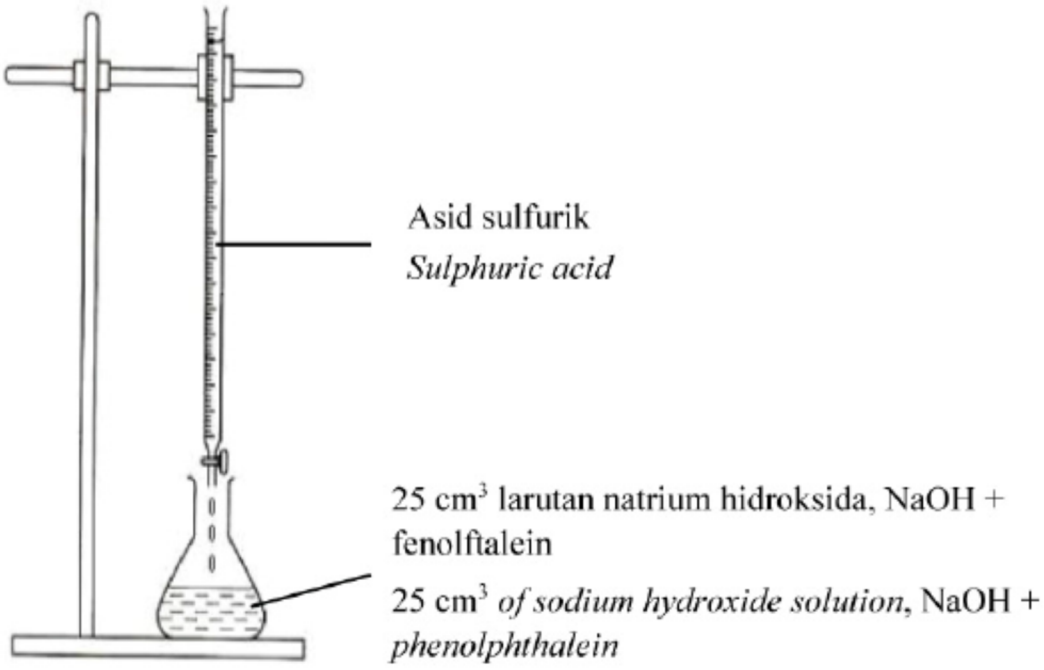
[Selangor2021-Set01-9]
9. Rajah 9.1 menunjukkan lengkung pentitratan berdasarkan kepada tindak balas antara larutan natrium hidroksida, NaOH dan asid hidroklorik 1.0 mol dm^{-3}, HCl menggunakan fenolftalein sebagai penunjuk.
Diagram 9.1 shows the titration curve based on the reaction between sodium hydroxide solution, NaOH and 1.0 mol dm^{-3} hydrochloric acid, HCl using phenolphthalein as the indicator.



(a) Namakan jenis tindak balas yang berlaku dalam kelalang kon itu.
Nyatakan perubahan warna bagi larutan dalam kelalang kon itu apabila takat akhir pentitratan tercapai.
Nyatakan nilai pH pada takat akhir pentitratan.
Name the type of reaction that occurs in the conical flask.
State the colour change of the solution in the conical flask when the end point of titration is reached.
State the pH value at the end point of titration.

[3M]

(b) Rajah 9.2 menunjukkan pentitratan 50 cm^3 asid sulfurik, H_2SO_4 0.5 mol dm^{-3} bertindak balas lengkap dengan 25 cm^3 larutan natrium hidroksida, NaOH.
Diagram 9.2 shows the titration of 50 cm^3 of 0.5 mol dm^{-3} sulphuric acid, H_2SO_4 reacts completely with 25 cm^3 of sodium hydroxide solution, NaOH.



(i) Tulis persamaan kimia bagi tindak balas ini.
Hitung kemolaran larutan natrium hidroksida. NaOH yang diperlukan untuk meneutralkan asid sulfurik itu.
Write the chemical equation for the reaction.
Calculate the molarity of the sodium hydroxide solution, NaOH needed to neutralise the sulphuric acid.

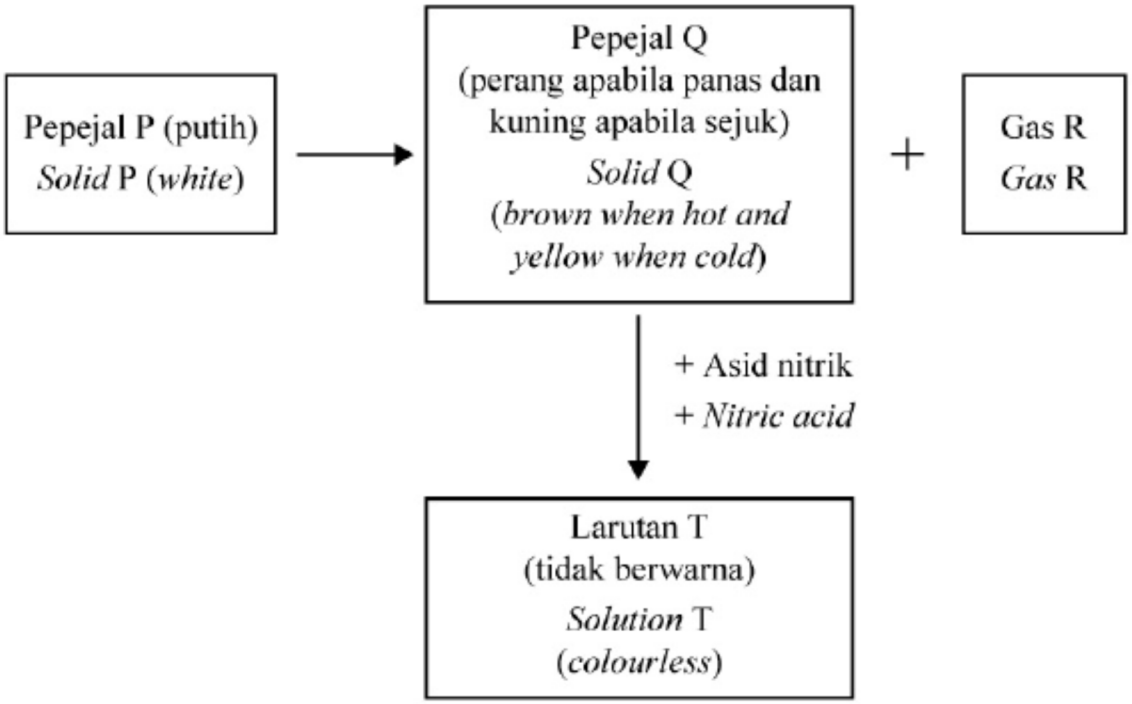
[5M]

(ii) Sekiranya asid sulfurik dalam soalan 9(b)(i) digantikan dengan asid hidroklorik yang sama isi padu dan kepekatan, ramalkan kemolaran larutan natrium hidroksida yang diperlukan.
Terangkan jawapan anda.

If the sulphuric acid in question 9(b)(i) is replaced with hydrochloric acid with the same volume and concentration, predict the molarity of sodium hydroxide solution needed.
Explain your answer.

[2M]

(c) Rajah 9.3 menunjukkan tindak balas melibatkan pepejal P. Pepejal P adalah suatu garam karbonat.
Diagram 9.3 shows the reaction involving a solid P. Solid P is a carbonate salt.



(i) Apabila pepejal P dipanaskan dengan kuat, ia terurai kepada pepejal Q dan gas R. Kenal pasti P, Q dan R.
When solid P is heated strongly, it decomposes into solid Q and gas R. Identify P, Q and R.

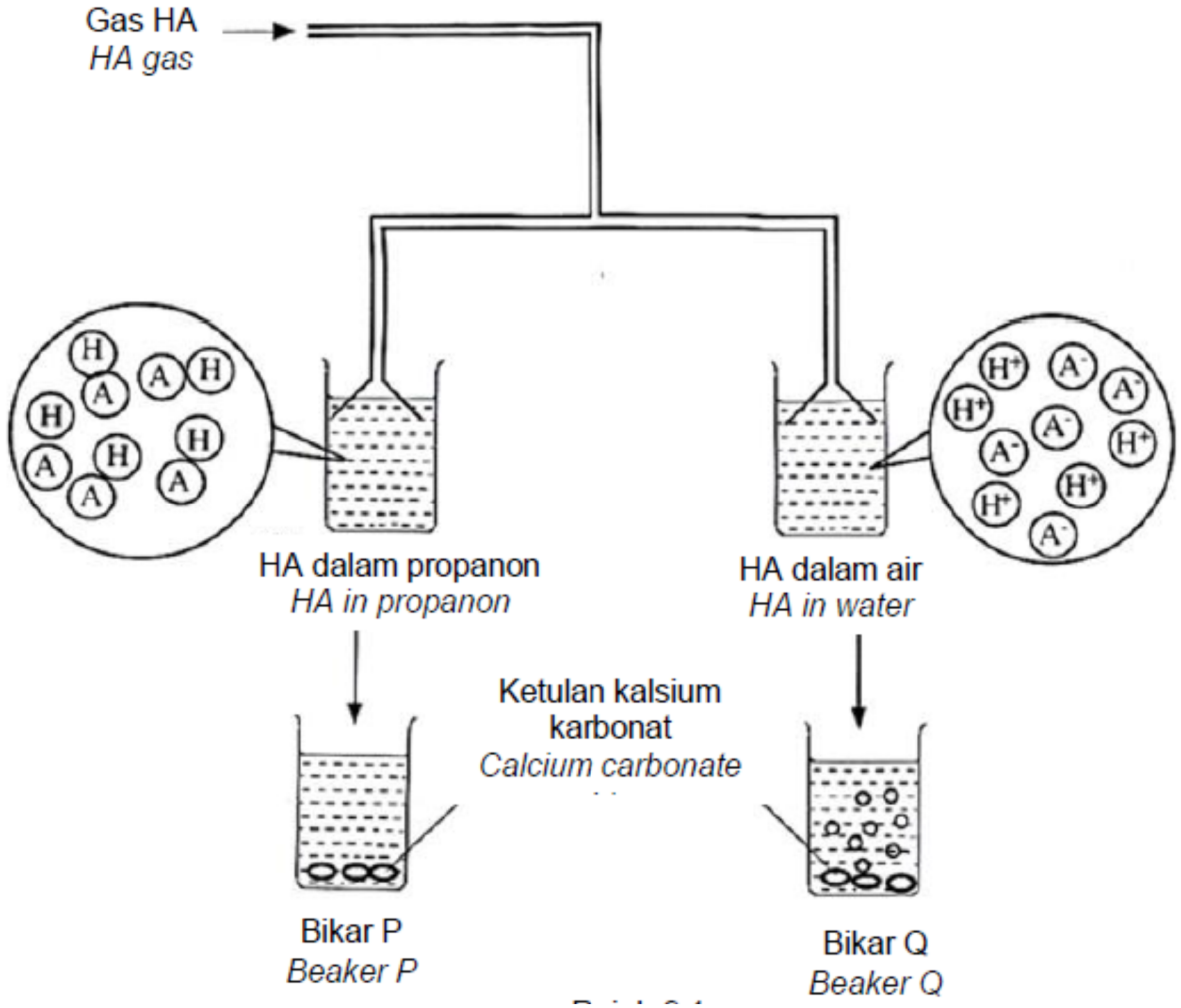
[3M]

(ii) Pepejal Q bertindak balas dengan asid nitrik untuk menghasilkan larutan T tanpa warna.
Nyatakan nama larutan T.
Huraikan ujian kimia untuk menentusahkan kehadiran kation dan anion dalam larutan T.
Solid Q reacts with nitric acid to produce colourless solution T.
State the name of solution T.
Describe chemical test to verify the presence of cation and anion in the solution T.

[7M]

[Kedah2021-Set02-09]

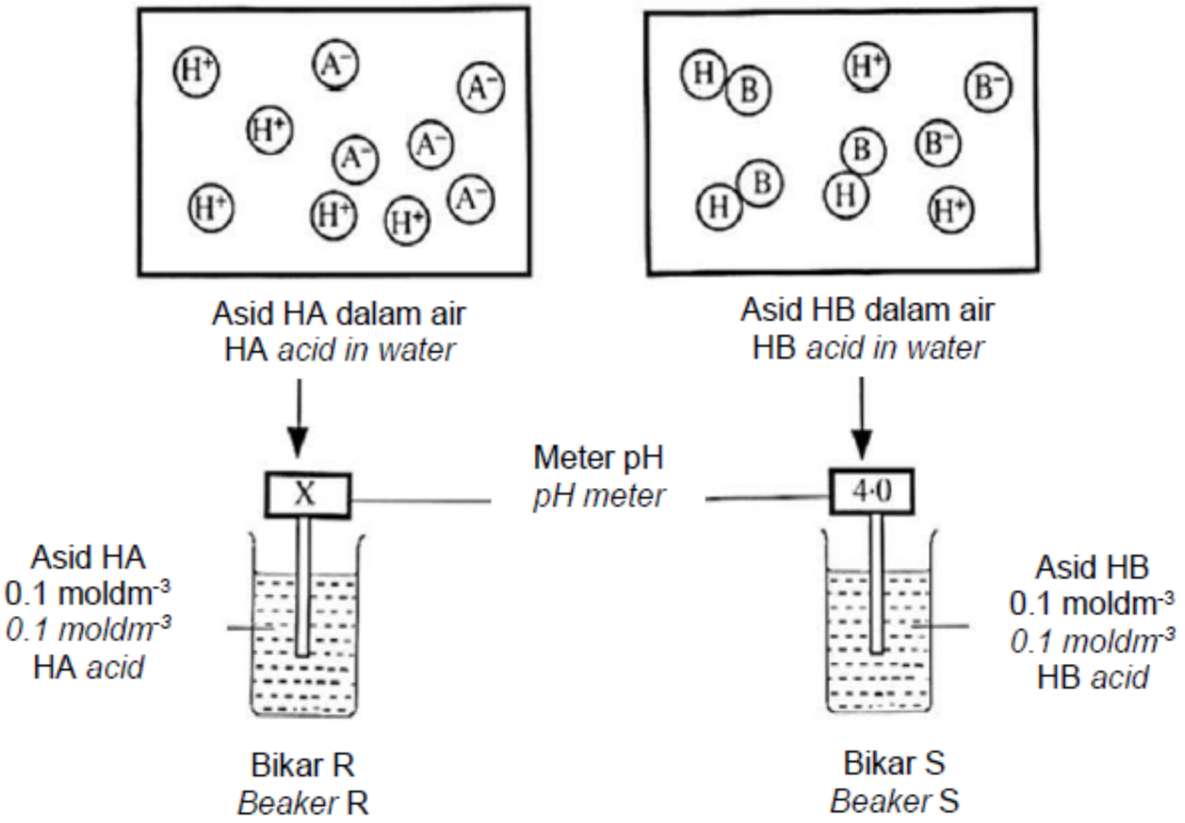
9. Rajah 9.1 menunjukkan gas HA dialirkan ke dalam dua bikar yang masing-masing mengandungi propanon dan air untuk mengkaji sifat asid.
Diagram 9.1 shows HA gas is flowed into two beakers containing propanone and water respectively to study the properties of acid.



(a) Berdasarkan Rajah 9.1, bandingkan pemerhatian dalam bikar P dan bikar Q. Terangkan jawapan anda
Based on Diagram 9.1, compare the observations in beaker P and beaker Q. Explain your answer.

[5M]

(b) Rajah 9.2 menunjukkan nilai pH bagi asid, HA dan HB. Kedua-dua asid adalah asid monoprotik.
Diagram 9.2 shows the pH value of acids, HA and HB. Both are monoprotic acids.

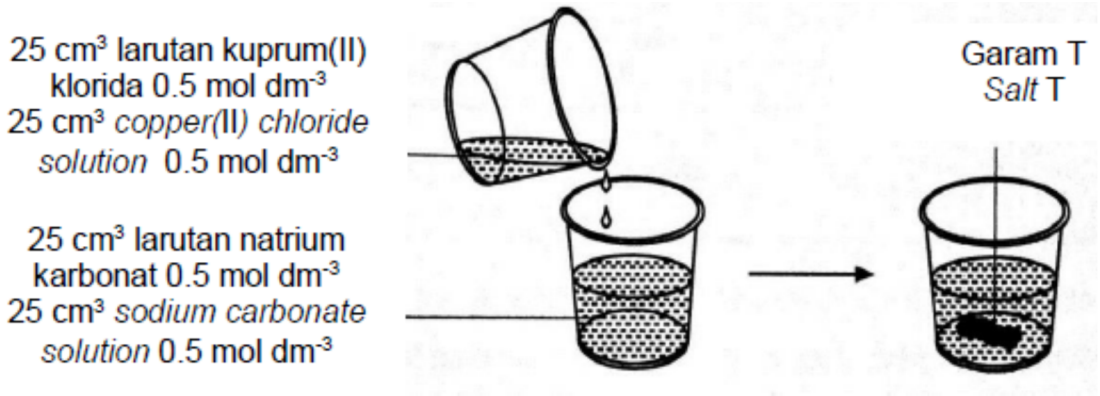


Rajah 9.2
Diagram 9.2

(i) Cadangkan nama bagi asid HA dan asid HB. Ramal nilai X dalam Bikar R. Terangkan perbezaan antara kedua-dua asid dalam Bikar R dan Bikar S.
Suggest the names of HA acid and HB acid. Predict the value of X in Beaker R. Explain the difference between the two acids in Beaker R and Beaker S.
[5M]

(ii) 50 cm3 asid HB dalam bikar S ditambah dengan 20 cm3 air. Nyatakan nama bagi proses yang terlibat dan terangkan perubahan dalam nilai pH.
50 cm3 of acid HB in beaker S is added with 20 cm3 of water. State the name of the process involved and explain the change in the pH value.
[3M]

(c) Rajah 9.3 menunjukkan susunan radas bagi suatu eksperimen untuk menyediakan garam tak terlarutkan,T.
Diagram 9.3 shows the apparatus set-up for an experiment to prepare insoluble salt T.



Berdasarkan maklumat dalam Rajah 9.3, nyatakan nama bagi tindak balas penyediaan garam tak terlarutkan T. Tulis persamaan kimia bagi tindak balas yang berlaku dan hitung jisim garam T yang terbentuk. Cadangkan satu bahan lain yang boleh menggantikan larutan kuprum(II) klorida untuk menghasilkan garam T.
[Jisim molar garam T: 124 g mol-1]
Based on information in Diagram 9.3, state the name of the reaction for the preparation of insoluble salt T. Write the chemical equation for the reaction occurred and calculate the mass of the salt T formed. Suggest one substance that can replace the
copper(II) chloride solution to produce salt T.
[Molar mass of salt T: 124 g mol-1]

[7M]

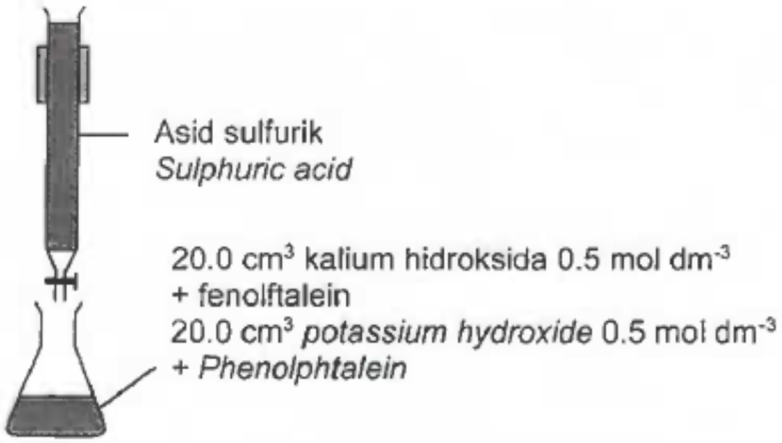
[Terengganu2021-10]
10. (a) Jadual 10.1 menunjukkan maklumat tentang larutan P dan larutan Q dengan kepekatan yang sama tetapi nilai pH yang berbeza,
Table 10.1 shows information about solution P and solution Q with same concentration but different pH value.

Larutan Solution	Maklumat Information
P	Nilai pH kurang daripada 7 Bertindak balas dengan kuprum(II) oksida menghasilkan kuprum(II) nitrat dan air pH value less than 7 React with copper(II) oxide to produced copper(II) nitrate and water.
Q	Nilai pH kurang daripada 7 Bertindak balas dengan larutan natrium hidroksida menghasilkan natrium etanoat dan air pH value less than 7 React with sodium hydroxide solution to produced sodium ethanoate and water

Berdasarkan Jadual 10.1, nyatakan nama bagi larutan P dan larutan Q. Larutan manakah yang menunjukkan nilai pH yang lebih tinggi dan terangkan jawapan anda.
Based on the Table 10.1, state the name of solution P and solution Q. Which solution shows higher pH value and explain your answer.

[4M]

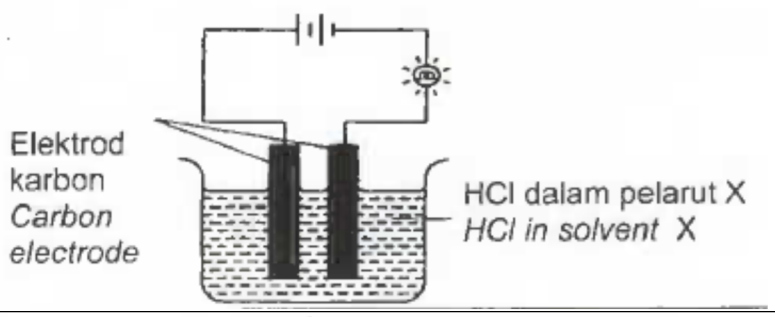
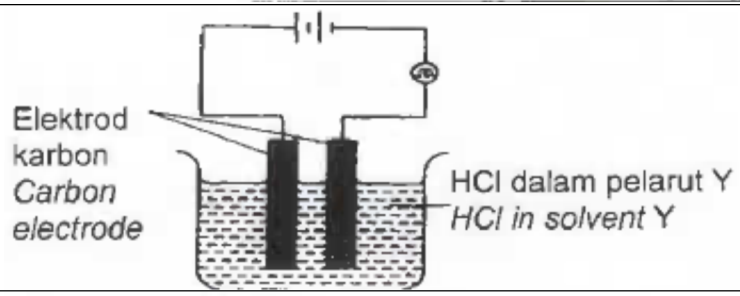
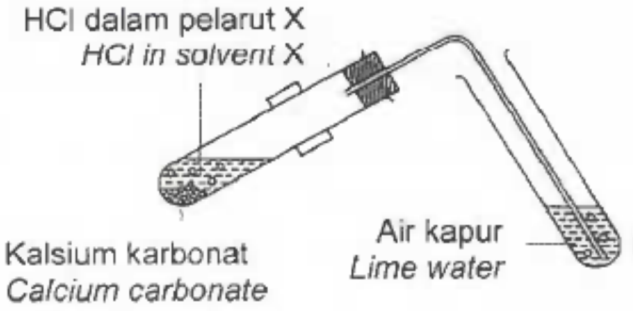
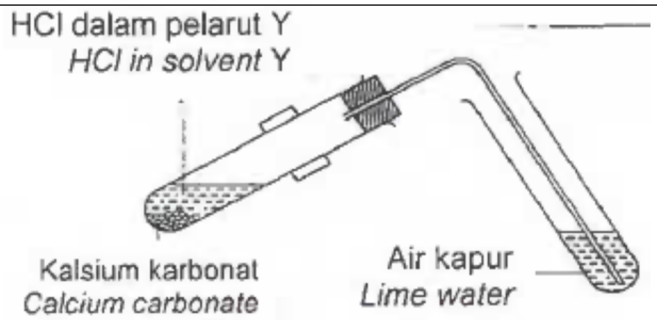
(b) Rajah 10.2 menunjukkan susunan radas yang digunakan dalam proses pentitratan asid dan alkali.
Diagram 10.2 shows set-up of apparatus that using in titration process of acid and aikaii.



Nyatakan jenis tindak balas yang berlaku dalam kelalang kon. Tulis persamaan kimia tindak balas seterusnya hitungkan kemolaran asid sulfurik jika takat akhir pentitratan ialah 10.0 cm^3.
State the type of reaction that occurred in conical flask. Write the chemical equation, hence calculate molarity of sulphuric acid if end point of titration is 10.0 cm^3.

[6M]

(c) Jadual 10.3 menunjukkan susunan radas bagi dua set eksperimen untuk mengkaji kekonduksian elektrik dan satu sifat asid apabila hidrogen klorida dilarutkan dalam pelarut X dan pelarut Y.
Table 10.3 shows set-up of apparatus for two set experiment to investigate electric conductivity and one of acid properties when hydrogen chloride dissolved in solvent X and solvent Y.

Set	Susunan radas Apparatus set-up
I	
	
II	
	

Cadangkan pelarut X dan pelarut Y. Terangkan perbezaan pemerhatian dalam kedua-dua set eksperimen.
Suggest of solvent X and solvent Y. Explain the differences of observation in both set of experiments.

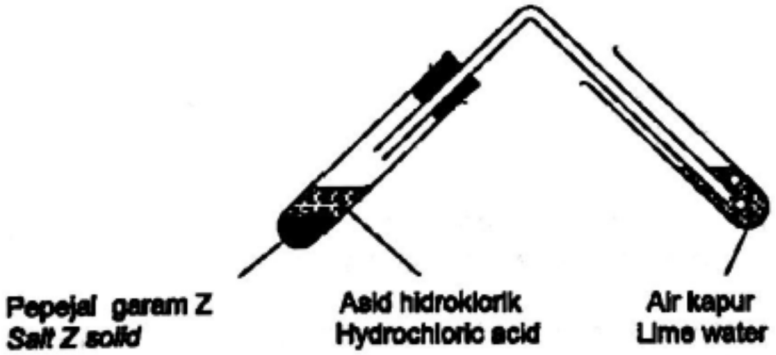
[8M]

[Johor2021-10]
10. (a) Rajah 10.1 menunjukkan terumbu karang yang terdapat di perairan Pulau Sibu. Terumbu karang ini terbentuk daripada garam Z.
Diagram 10.1 shows coral reefs found in Sibu Island. These coral reefs are formed from salt Z.

(i) Nyatakan maksud garam dan namakan satu garam tak terlarutkan.
State the meaning of salt and name insoluble salt.

[2M]

(ii) Rajah 10.2 menunjukkan susunan radas bagi tindak balas asid hidroklorik dengan pepejal garam Z.
Diagram 10.2 shows apparatus set-up for the reaction of hydrochloric acid with solid salt Z.



Pepejal garam Z mengandungi unsur kalsium, Apakah garam Z dan gas yang terbebas semasa tindak balas seperti rajah 10.2?
Solid Z salt contain calcium element, what is salt Z and the gas released during the reaction in diagram 10.2?

[2M]

[Johor2021-10]
10. (b) Jadual 10 menunjukkan keputusan satu eksperimen bagi mengkaji faktor yang mempengaruhi kadar tindak balas.
Table 10 shows the result of an experiment to study the factor that affect reaction.

Eksperimen Experiment	I	II	III
Bahan tindak balas Reactants	Serbuk zink berlebihan + 20 cm^3 asid sulfurik 0.1 mol dm^{-3} Excess zinc powder + 20 cm^3 of 0.1 mol dm^{-3} sulphuric acid	Serbuk zink berlebihan + 20 cm^3 asid sulfurik 0.1 mol dm^{-3} + larutan kuprum(II) sulfat Excess zinc powder + 20 cm^3 of 0.1 mol dm^{-3} sulphuric acid + copper(II) sulphate solution	Serbuk zink berlebihan + 20 cm^3 asid sulfurik 0.1 mol dm^{-3} Excess zinc powder + 20 cm^3 of 0.1 mol dm^{-3} sulphuric acid
Suhu (°C) Temperature (°C)	30.0	30.0	40.0
Masa yang diambil untuk mengumpul 30 cm^3 gas yang terbebas (s) Time taken for collecting 30 cm^3 of gas released, (s)	20.0	12.0	10.0

(i) Tuliskan persamaan kimia bagi tindak balas antara zink dan asid sulfurik. Kira purata kadar tindak balas untuk Eksperimen I dan Eksperimen II dalam unit cm^3 s^{-1}.
Write the chemical equation for the reaction between zinc and sulphuric acid. Calculate the average rate of the reaction for Experiment I and Experiment II in cm^3 s^{-1}.

[4M]

(ii) Lakarkan graf isi padu melawan masa bagi kedua-dua eksperimen di dalam paksi yang sama.
Sketch the graph volume against time for both experiment in same axis.

[2M]

(iii) Berdasarkan Jadual 10, bandingkan kadar tindak balas antara Based on Table 10, compare the rate of reaction between

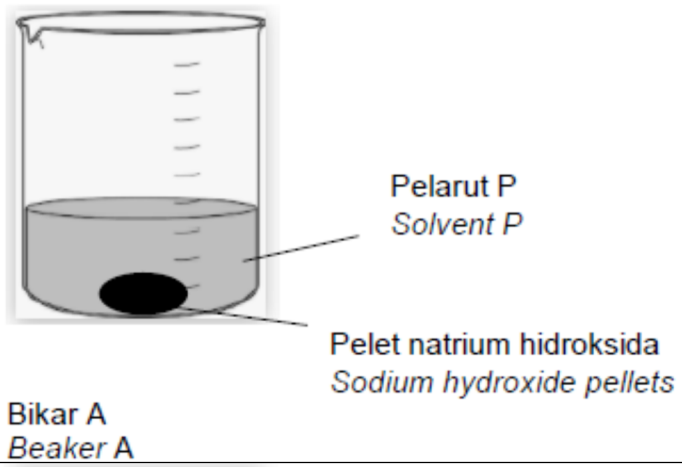
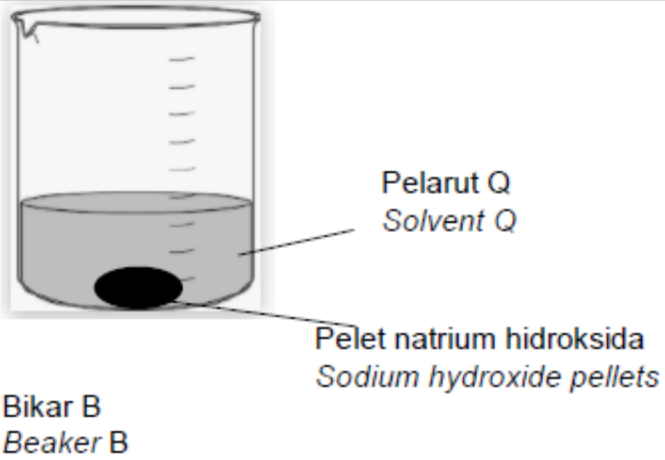
• Eksperimen I dan II / Experiment I and II

• Eksperimen I dan III / Experiment I and III

Untuk setiap kes, nyatakan faktor yang mempengaruhi kadar tindak balas dan terangkan perbezaan kadar tindak balas dengan merujuk kepada teori perlanggaran.
In each case, state the factor affect the rate of reaction and explain the difference in the rate of reaction with reference to the collision theory.

[10M]

[Kedah2021-Set01-09]
9. (a) Jadual 9 menunjukkan pemerhatian apabila sekeping kertas litmus merah kering dicelupkan ke dalam dua bikar yang masing-masing mengandungi pellet natrium hidroksida di dalam pelarut P dan pelarut Q untuk mengkaji sifat-sifat alkali.
Table 9 shows observations when a dry red litmus paper is dipped into two beakers containing sodium hydroxide pellet in solvent P and solvent Q respectively to study the properties of alkali.

Bikar Beaker	Pemerhatian Observation
	Warna kertas litmus merah tidak bertukar warna. Colour of red litmus paper does not change.
	Kertas litmus merah bertukar biru Red litmus paper turns blue

(i) Berdasarkan Jadual 9, nyatakan formula kimia natrium hidroksida. Kenalpasti pelarut P dan pelarut Q. Terangkan mengapa terdapat perbezaan dalam pemerhatian .

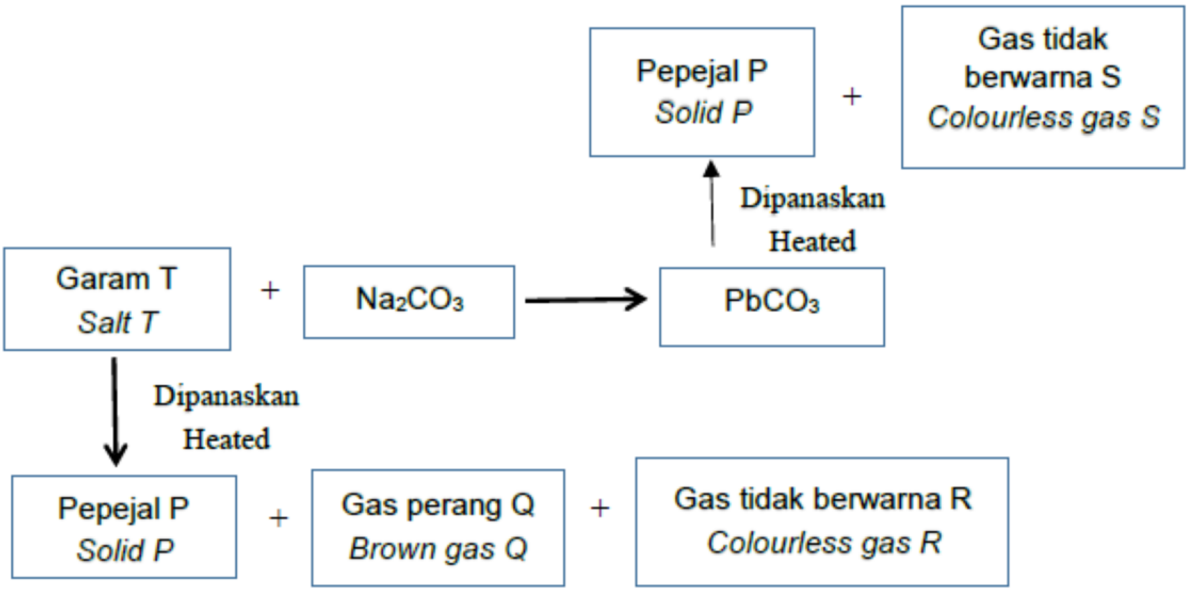
Based on the Table 9, state the chemical formula of sodium hydroxide. Identify solvent P and solvent Q. Explain why there are differences in the observation.

[5M]

(ii) Seorang pelajar menambahkan 25 cm^3 asid hidroklorik 0.01 mol dm^{-3} ke dalam 20 cm^3 larutan natrium hidroksida. Kirakan kepekatan larutan natrium hidroksida yang digunakan. Tentukan nilai pH larutan natrium hidroksida tersebut.
A student added 25 cm^3 of 0.01 mol dm^{-3} hydrochloric acid into 20 cm^3 of sodium hydroxide solution. Calculate the concentration of sodium hydroxide solution. Determine the pH value of the sodium hydroxide solution.

[6M]

(b) Rajah 9 menunjukkan carta alir bagi garam T.
Diagram 9.2 shows a flowchart of salt T.



Rajah 9
Diagram 9

(i) Kenal pasti bahan P, Q, R, S dan T.
Identify substances P, Q, R, S and T.

(ii) Garam T adalah pepejal berwarna putih. Terangkan satu ujian kimia untuk mengesahkan kehadiran anion di dalam garam itu.
Salt T is a white solid. Describe a chemical test to verify anion presence in the salt.

[9M]

[Kelantan2021-11]

11. Ali adalah seorang pesakit gastrik. Rajah 11.1 menunjukkan ubat yang diambil oleh Ali yang mengandungi bes.
Ali is a gastric patient. Diagram 11.1 shows the medication that Ali needs to take which contain base.

(a) (i) Apakah maksud bes?
What is the meaning of base?

[1M]

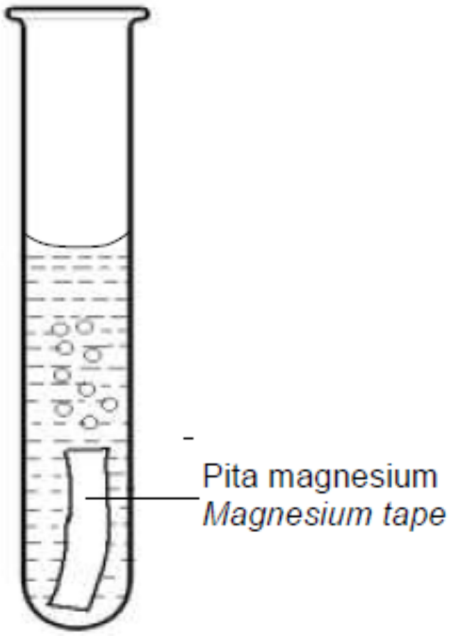
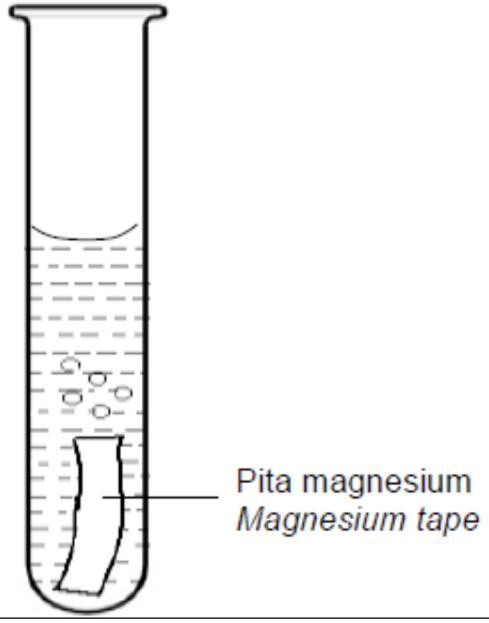
(ii) Bagaimanakah ubat dalam Rajah 11.1 dapat membantu Ali untuk merawat sakit gastriknya.
How can the medicine in Diagram 11.1 help Ali to treat his gastric pain.

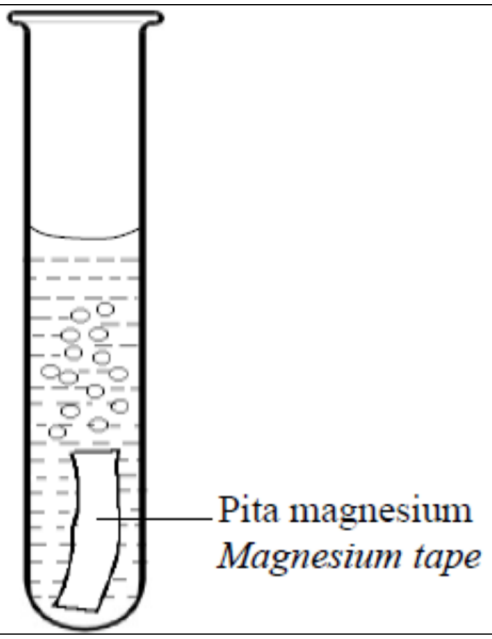
[2M]

(iii) Jisim ubat yang diambil oleh Ali ialah 1000 mg di mana nisbah kandungan aluminium hidroksida kepada magnesium hidroksida ialah 1 : 0.6. Kepekatan asid hidroklorik di dalam perut Ali ialah 1.0 mol dm^{-3}. Tentukan bilangan mol asid yang telah bertindak balas dengan salah satu bahan yang terdapat di dalam ubat berkenaan.
[Jisim molar : $Al(OH)_3$ = 78 g mol^{-1}, $Mg(OH)_2$ = 58 g mol^{-1}; 1g = 1000 mg]
The mass of medicine taken by Ali is 1000 mg where the ratio of aluminum hydroxide content to magnesium hydroxide is 1: 0.6. The concentration of hydrochloric acid in Ali's stomach is 1.0 mol dm^{-3}.
Determine the number of moles of acid that have reacted with one of the substances present in the medicine.
[Molar mass : $Al(OH)_3$ = 78 g mol^{-1}, $Mg(OH)_2$ = 58 g mol^{-1}1; 1g = 1000 mg]

[4M]

(b) Tiga keping pita magnesium yang sama panjang telah dimasukkan ke dalam tiga jenis asid berlainan yang berkepekatan 1.0 mol dm^{-3}. Jadual 11 menunjukkan keputusan eksperimen.
Three pieces of magnesium tape of equal length were inserted into three different types of acid with a concentration of 1.0 mol dm^{-3}. Table 11 shows the experimental results.

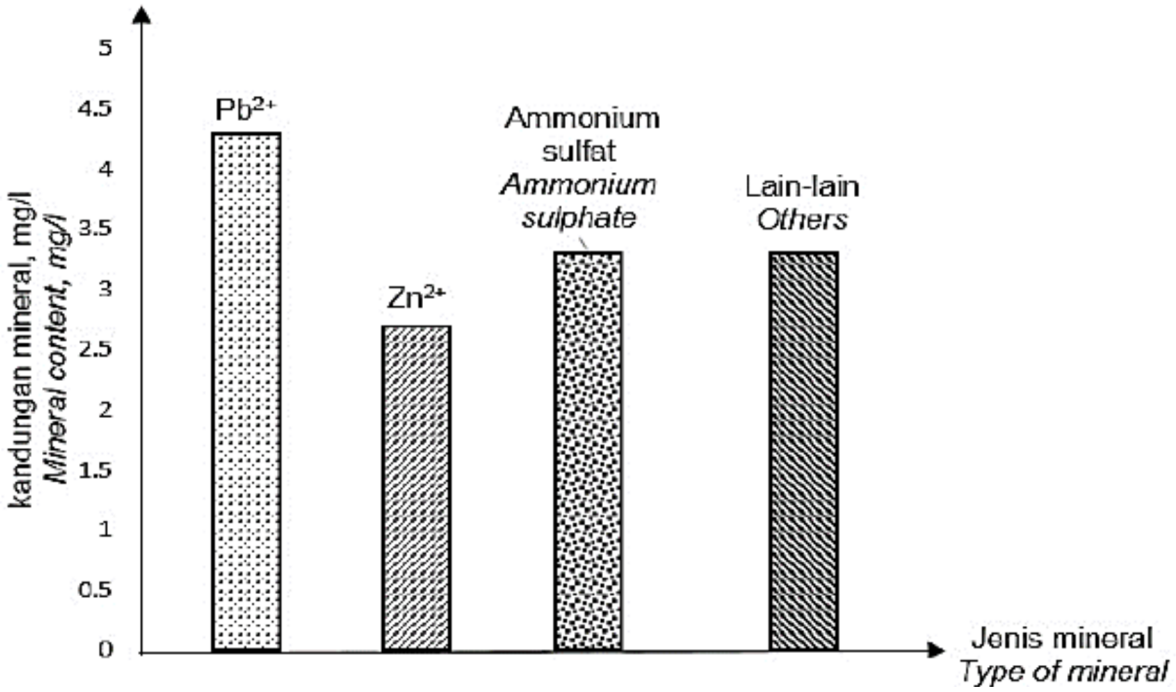
Asid Acid	Pemerhatian Observation	Tempoh masa tindak balas selesai (min) Time taken for the reaction to complete (min)
HX		4.5
HY		7.0

H_2Z		2.0

Pada pendapat anda mengapa terdapat perbezaan pemerhatian bagi tindak balas di atas. Berikan contoh yang sesuai bagi asid HY dan H2Z.
In your opinion why there are differences in the above observations for the reactions. Give suitable examples of acids HY and H2Z.

[5M]

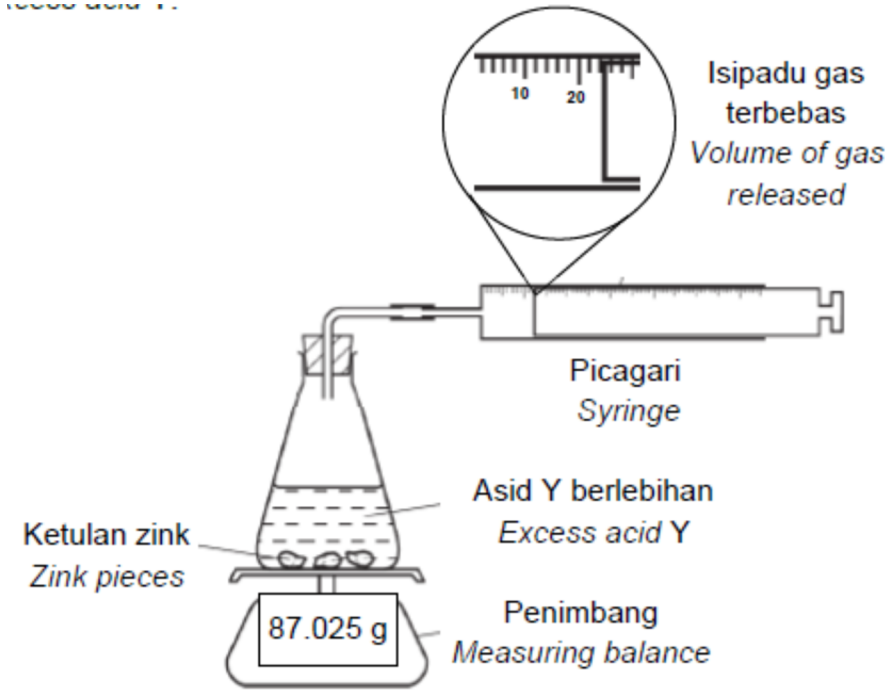
(c) Rajah 11.2 menunjukkan graf jenis mineral dan kandungannya dalam air lombong bijih timah Q.
Diagram 11.2 shows a graph of the type of mineral and its content in the water of tin mines Q.



Q adalah lombong bijih timah yang telah berhenti beroperasi. Q terletak berhampiran kawasan pertanian. Air daripada lombong ini tidak selamat untuk diminum dan berbau busuk kerana mengandungi logam berat dan mengandungi baja daripada kawasan pertanian akibat daripada proses larut lesap serta membentuk enapan.
Pada pendapat anda mengapakah air tersebut berbau busuk dan apakah nama bahan yang terkandung di dalam enapan tersebut. Bagaimanakah anda ingin membuktikan bahawa air tersebut mengandungi ion-ion sebatian seperti yang anda nyatakan di dalam enapan dan menentusahkan bahan yang menyebabkan air berbau busuk.
Q is a tin mine that has ceased to operate. Q is located near an agricultural area. Water from this mine is not safe to drink and smells bad because it contains heavy metals and fertilizer from agricultural areas as a result of leaching and sediment is formed.
In your opinion, why is the water smells bad and what is the name of the substance contained in the sediment. How do you want to prove that the water contains that form the compound you specify in the sediment and verify the substance that causes the water to stink.

[8M]

[Melaka2021-11]
11 (a) Rajah 11.1 menunjukkan susunan radas yang digunakan untuk mengkaji sifat kimia asid dengan menggunakan asid Y berlebihan
Diagram 11.1 shows the apparatus setup used to investigate the chemical properties acid using excess acid Y.



Asid Y yang digunakan ialah asid kuat monobes.
Acid Y used is a monoprotic serong acid.

Berdasarkan Rajah 11.1,/ Based on Diagram 11.1,

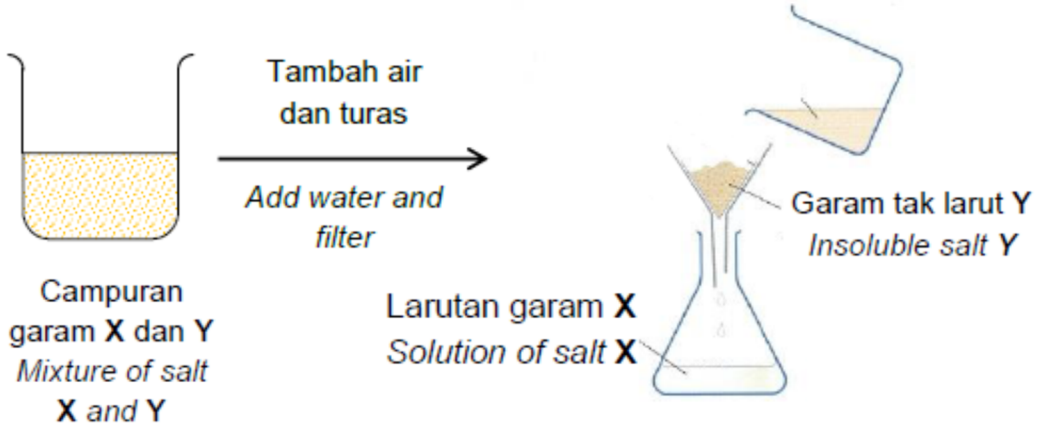
(i) Cadangkan asid Y dan kenal pasti gas yang terbebas.
Suggest acid Y and identify the gas released.

[2M]

(ii) Tuliskan persamaan kimia bagi tindak balas antara asid Y dan zink. Nyatakan isi padu gas yang terbebas dalam Rajah 11.1 dan hitungkan jisim zink yang digunakan dalam eksperimen itu.
Write the chemical equation for the reaction between acid Y and zinc. State the volume of gas released in Diagram 11.1 and calculate the mass of zinc used in the experiment.

[5M]

(b) Rajah 11.2 menunjukkan bagaimana satu campuran dua jenis garam berbeza, garam X dan garam Y diasingkan. Kedua-dua garam itu mempunyai kation yang sama. Garam X larut dalam air manakala garam Y tidak larut dalam air.
Diagram 11.2 shows how a mixture of two different salts, salt X and salt Y is separated. Both salts contain the same cation. Salt X is soluble while salt Y is insoluble in water.



Larutan garam X dan garam tak larut Y kemudiannya diuji dengan ujian lain seperti di dalam Jadual 11.1
Solution of salt X and insoluble salt Y are then tested with other tests shown in Table 11.1

Garam Salt	Ujian Test	Observations Pemerhatian
X	Tambahkan beberapa titis larutan kalium iodida Add a few drops of potassium iodide solution	Mendakan kuning terbentuk Yellow precipitate formed

	Tambahkan asid sulfurik dan larutan ferum (II) sulfat. Asid sulfurik pekat ditambah perlahan-lahan Add sulphuric acid and iron (II) sulphate. Add concentrated sulphuric acid is added slowly	Cincin perang terbentuk Brown ring formed
Y	Dipanaskan dan gas terbebas diuji dengan air kapur Heated and gas released is tested with limewater	Baki pepejal B perang menjadi kuning setelah disejukkan. Brown residue B turned yellow when cooled Air kapur menjadi keruh Limewater turns cloudy

Berdasarkan Jadual 11.1, apakah kation bagi kedua-dua garam itu. Kenal pasti garam X, garam Y dan baki pepejal B. Nyatakan gas yang terbebas apabila garam Y dipanaskan.
Based on Table 11.1, what is the cation for both salts. Identify salt X, salt Y and residue B. State the gas released when salt Y is heated.

[5M]

(c) Sebuah syarikat air minuman tempatan telah memasarkan dua jenis air berperisa sitrus, Lemonade dan Orangeade, yang mengandungi asid sitrik seperti yang ditunjukkan dalam Rajah 11.3. Asid sitrik ialah sejenis asid yang boleh didapati dalam buah-buahan sitrus seperti lemon dan oren.
A beverage company has marketed two different types of citrus flavoured drinks, Lemonade and Orangeade, that contains citric acid as shown in Diagram 11.3. Citric acid is a type of acid that can be found in citrus fruits such as lemon and orange.

Lemonade
Mengandungi asid sitrik dari buah lemon
Contains citric acid from lemon fruit

Orangeade
Mengandungi asid sitrik dari buah oren
Contains citric acid from orange fruit

Kepekatan asid sitrik boleh ditentukan dengan larutan kalium hidroksida atau bahan kimia lain yang sesuai.
The concentration of citric acid can be determined using potassium hydroxide solution of any other suitable chemical.

Rancang satu penyiasatan untuk menunjukkan air minuman yang manakah yang mengandungi kepekatan asid sitrik yang lebih tinggi. Sertakan kesimpulan yang boleh didapati dari eksperimen tersebut.
Plan an investigation to show which of the two drinks contain the higher concentration of citric acid. Include the conclusion that could be obtained from the experiment.

Anda boleh menggunakan alat radas dan bahan yang biasa digunakan di dalam makmal untuk perancangan anda.
You can use common laboratory apparatus and materials for your planning

[8M]

[Perlis2021-11]

11. (a) Jadual 8 menunjukkan pemerhatian apabila magnesium bertindak balas dengan hidrogen klorida di dalam pelarut X dan pelarut Y.
Table 8 shows the observation when magnesium reacts with hydrogen chloride in solvent X and solvent Y.

Bahan Substance	Pelarut Solvent	Pemerhatian Observation
Magnesium + hidrogen klorida Magnesium + hydrogen chloride	X	Gelembung gas Bubbles of gas
Magnesium + hidrogen klorida Magnesium + hydrogen chloride	Y	Tiada gelembung gas No bubbles of gas

(i) Berdasarkan Jadual 8, cadangkan nama pelarut X dan pelarut Y. Jelaskan pemerhatian.
Based on Table 8, suggest the name of solvent X and solvent Y. Explain the observations.

[7M]

(ii) Tindak balas antara magnesium dan hidrogen klorida dalam pelarut X menghasilkan larutan garam yang mengandungi ion klorida.
Huraikan satu ujian pengesahan bagi ion klorida.
Reaction between magnesium and hydrogen chloride in solvent X produces a salt solution containing chloride ions.
Describe one confirmatory test for chloride ion.

[3M]

(b) Anda dibekalkan dengan tiga bahan kimia, iaitu:

- larutan natrium karbonat
- asid sulfurik cair
- larutan zink klorida

Dengan menggunakan ketiga-tiga bahan kimia itu, huraikan bagaimana anda menyediakan garam zink sulfat dalam makmal.
Dalam huraian anda, sertakan:

- prosedur
- persamaan kimia bagi tindak balas yang terlibat.

You are given three chemicals, which are:

- sodium carbonate solution
- dilute sulphuric acid
- zinc chloride solution

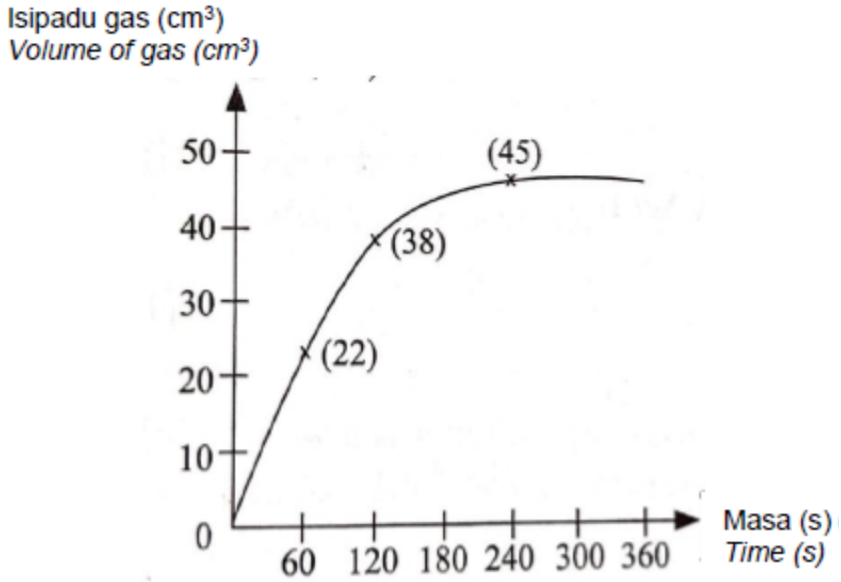
By using all the three chemicals, describe how to prepare zinc sulphate salt in the laboratory.
In your description, include:

- procedure
- chemical equations of the reactions involved.

[10M]

Tingkatan 4 Bab 7

[Melaka2021-03]
3 (a) Rajah 3.1 menunjukkan graf isi padu gas yang terbebas melawan masa bagi satu tindak balas antara kalsium karbonat dengan asid hidroklorik.
Diagram 3.1 shows the graph of the volume of gas released against time for the reaction between calcium carbonate and hydrochloric acid



Berdasarkan Rajah 3.1,/ Based on Diagram 3.1,

(i) Nyatakan maksud kadar tindak balas.
State the meaning of rate reaction.

.....

..... [1M]

(ii) Nyatakan satu perubahan yang dapat diperhatikan dalam eksperimen ini yang boleh digunakan untuk menentukan kadar tindak balas.
State one observable change in this experiment that can be used to determine the rate of reaction.

.....

..... [1M]

(iii) Hitung kadar tindak balas purata bagi keseluruhan tindak balas.
Calculate the overall average rate of reaction

[2M]

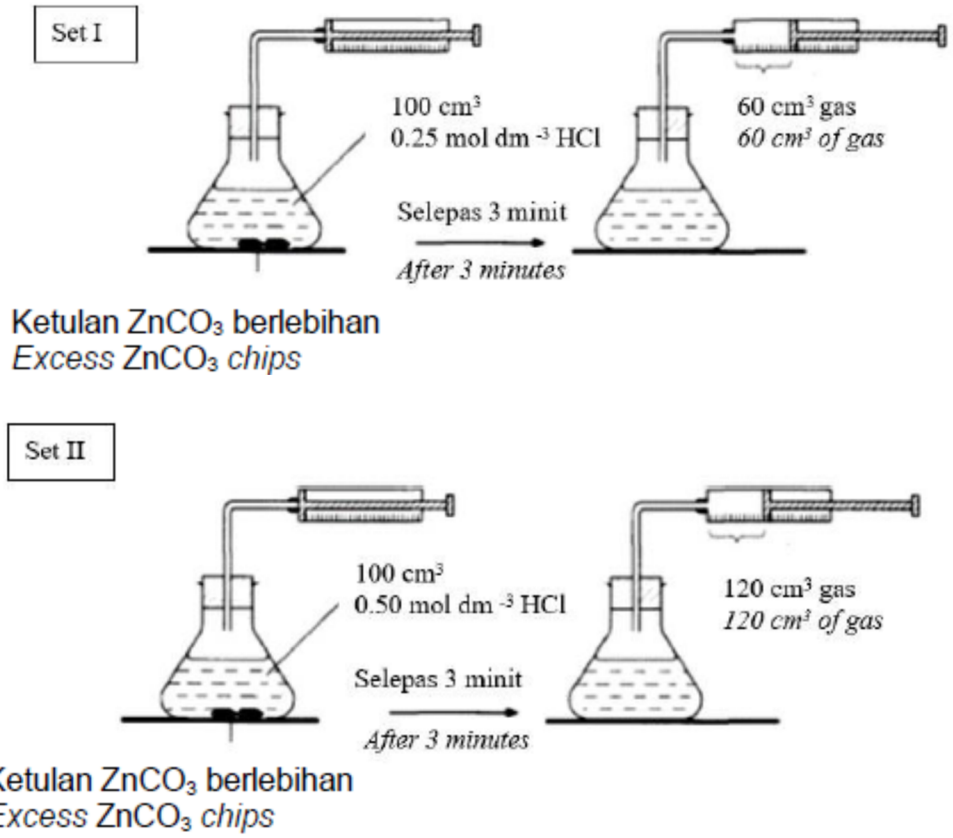
(b) Kelaskan tindak balas berikut kepada tindak balas yang cepat dan tindak balas yang perlahan dalam jadual yang disediakan.
Classify the following reactions into fast reaction and slow reaction in the table provided.

- Tindak balas dalam sel elektrik/ Electric cells reaction
- Pembakaran bunga api/ Fireworks
- Kakisan batu/ Rock erosion
- Penapaian/ Fermentation

Tindak balas cepat Fast reaction	Tindak balas lambat Slow reaction

[2M]

[Kedah2021-Set02-07]
7. Rajah 7 menunjukkan dua set eksperimen untuk mengkaji faktor yang mempengaruhi kadar tindak balas antara asid hidroklorik, HCl dengan zink karbonat, $ZnCO_3$.
Diagram 7 shows two sets of experiment to study the factor affecting the rate of reaction between hydrochloric acid, HCl and calcium carbonate, $ZnCO_3$.



(a) Nyatakan satu faktor yang mempengaruhi kadar tindak balas dari rajah 7.
State one factor that affects the rate of reaction from diagram 7.

..... [1M]

(b) Apakah bacaan yang perlu dicatat dalam kedua dua eksperimen untuk menentukan kadar tindak balas dalam masa 3 minit?
What is the reading needed to be recorded in both experiments to determine the rate of reaction in 3 minutes?

..... [1M]

(c) Tulis persamaan kimia bagi tindak balas dalam eksperimen ini.
Write a chemical equation for the reaction in these experiments.

..... [2M]

(d) Hitung kadar tindak balas purata bagi set I.
Calculate the average rate of reaction in set I.

[1M]

(e) Bandingkan kadar tindak balas bagi set I dan set II. Jelaskan jawapan anda dengan merujuk kepada teori perlanggaran.
Compare the rate of reaction in set I and set II. Explain your answer with reference to the collision theory.

.....

.....

..... [3M]

(f) Seorang murid ingin meningkatkan kadar tindak balas bagi Set I dengan menggantikan asid hidroklorik dengan asid sulfurik yang sama kepekatan. Pada pandangan anda, adakah murid itu membuat keputusan yang betul? Terangkan jawapan anda.
A student wishes to increase the rate of reaction for Set I by changing the hydrochloric acid to sulphuric acid of the same concentration.
In your opinion, do you think he makes a correct decision? Explain your answer.

.....

.....

..... [2M]

[Selangor2021-Set01-07]

7. Jadual 7 menunjukkan maklumat bagi dua set eksperimen untuk menyiasat faktor-faktor yang mempengaruhi kadar tindak balas antara kalsium karbonat dengan asid hidroklorik.
Table 1 shows the information for two sets of experiment to investigate the factors affecting the rate of reaction between calcium carbonate and hydrochloric acid.

Eksperimen Experiment	Bahan tindak balas Reactants	Masa yang diambil untuk mengumpul 40 cm^3 gas karbon dioksida (s) Time taken to collect 40 cm^3 of carbon dioxide gas (s)
Set 1	5 g serbuk kalsium karbonat + 50 cm^3 asid hidroklorik 1.0 mol dm^{-3} 5 g calcium carbonate powder + 50 cm^3 of 1.0 mol dm^{-3} hydrochloric acid	33
Set II	5 g ketulan kalsium karbonat + 50 cm^3 asid hidroklorik 1.0 mol dm^{-3} 5 g calcium carbonate chip + 50 cm^3 of 1.0 mol dm^{-3} hydrochloric acid	45

(a) Tulis persamaan ion bagi tindak balas dalam eksperimen ini.
Write an ionic equation for the reaction in this experiment.

..... [1M]

(b) (i) Bandingkan kadar tindak balas bagi Set I dan Set II.
Compare the rate of reaction for Set I and Set 11.

..... [1M]

(ii) Jelaskan jawapan anda di 7(b)(i) dengan merujuk kepada teori perlanggaran.
Explain your answer in 7(b)(i) with reference to the collision theory.

.....

.....

.....

..... [4M]

(c) Lakarkan graf isi padu gas karbon dioksida melawan masa bagi Set I dan Set II.
Sketch the graph of volume of carbon dioxide gas against time for Set I and Set II.

[2M]

(d) Seorang murid ingin meningkatkan kadar tindak balas bagi Set II dengan menukar asid hidroklorik dengan asid sulfurik yang sama kepekatan.
Pada pandangan anda, adakah anda fikir murid itu membuat keputusan yang betul?
Terangkan jawapan anda.
A student wishes to increase the rate of reaction for Set II by changing the hydrochloric acid with sulphuric acid of the same concentration.
In your opinion, do you think the student made the correct decision?
Explain your answer.

.....

.....

..... [2M]

[Selangor2021-Set01-07]
7. Jadual 7 menunjukkan maklumat bagi dua set eksperimen untuk menyiasat satu faktor yang mempengaruhi kadar tindak balas antara zink dan asid nitrik.
Table 7 shows the information for two sets of experiment to investigate one factor that affecting the rate of reaction between zinc and nitric acid.

Set Set	Bahan tindak balas Reactants	Isi padu gas terkumpul dalam 1 minit (cm^3) Volume of gas collected in 1 minute (cm^3)
I	50 cm^3 asid nitrik 1.0 mol dm^{-3} + serbuk zink berlebihan 50 cm^3 of 1.0 mol dm^{-3} nitric acid + excess zinc powder	30.00
II	50 cm^3 asid nitrik 1.0 mol dm^{-3} + serbuk zink berlebihan + mangkin X 50 cm^3 of 1.0 mol dm^{-3} nitric acid + excess zinc powder + catalyst X	50.00

Berdasarkan Jadual 7,
Based on Table 7,

(a) cadangkan nama mangkin X dalam Set II.
suggest the name of catalyst X in Set II.

..... [1M]

(b) nyatakan nama gas yang terbebas dalam kedua-dua eksperimen.
state the name of the gas released in both experiment.

..... [1M]

(c) hitung kadar tindak balas purata dalam unit $cm^3\ s^{-1}$.
calculate the average rate of reaction in unit of $cm^3\ s^{-1}$.

Set I :
Set I

Set II :
Set 11

[2M]

(d) (i) Bandingkan kadar tindak balas antara Set I dan Set II.
Compare the rate of reaction between Set I and Set II.

..... [1M]

(ii) Jelaskan jawapan anda di 7(d)(i) berdasarkan Teori Perlanggaran.
Explain your answer in 7(d)(i) based on Collision Theory.

.....

.....

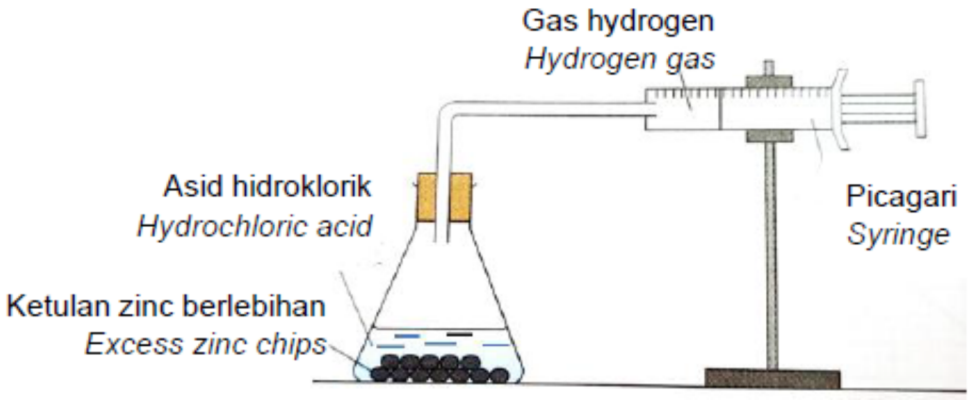
.....

..... [3M]

(e) Lukis gambar rajah profil tenaga bagi tindak balas antara zink dan asid nitrik bagi kedua-dua set eksperimen itu. Kemudian, tunjukkan tenaga pengaktifan bagi Set I dan Set II.
Draw the energy profile diagram for the reaction between zinc and nitric acid for both sets of the experiment. Then, show the activation energy for Set I and Set II.

[2M]

[Kedah2021-Set01-07]
7. Rajah 7 menunjukkan susunan radas untuk menentukan kadar tindak balas antara asid hidroklorik dan logam zink
Diagram 7 shows apparatus set-up to determine rate of reaction between hydrochloric acid and zinc metal.



Berdasarkan rajah di atas,/ Based on diagram above,

(a) Apakah maksud kadar tindak balas
What is the meaning of rate of reaction

..... [1M]

(b) Nyatakan satu pemerhatian dalam eksperimen itu.
State an observation in the experiment.

..... [1M]

(c) Tulis persamaan kimia seimbang bagi tindak balas tersebut.
Write a balanced chemical equation for the reaction.

..... [2M]

(d) Jika eksperimen ini diulang dengan menggunakan asid sulfurik bagi menggantikan asid hidroklorik ramalkan kadar tindak balas yang berlaku.
If the experiment is repeated by using sulphuric acid to replaced hydrochloric acid, predict the rate of reaction occurred.

..... [1M]

(e) Berikut adalah sebahagian daripada keputusan hasil tindak balas dari eksperimen
The following is part of results of the experiment

Masa (s) Time (s)	0	60	12	180	240	300
Jumlah isipadu gas hidrogen (cm^3) Total volume of hydrogen gas (cm^3)	0.00	17.20	30.90	40.10	45.30	45.30

Berdasarkan keputusan dalam jadual 7, kira:
Based on the result in the table 7, calculate:

(i) kadar tindak balas purata keseluruhan bagi eksperimen ini
the overall average rate of reaction in the experiment.

[1M]

(ii) kadar tindak balas purata dalam minit ke tiga
average rate of reaction in the third minute.

[2M]

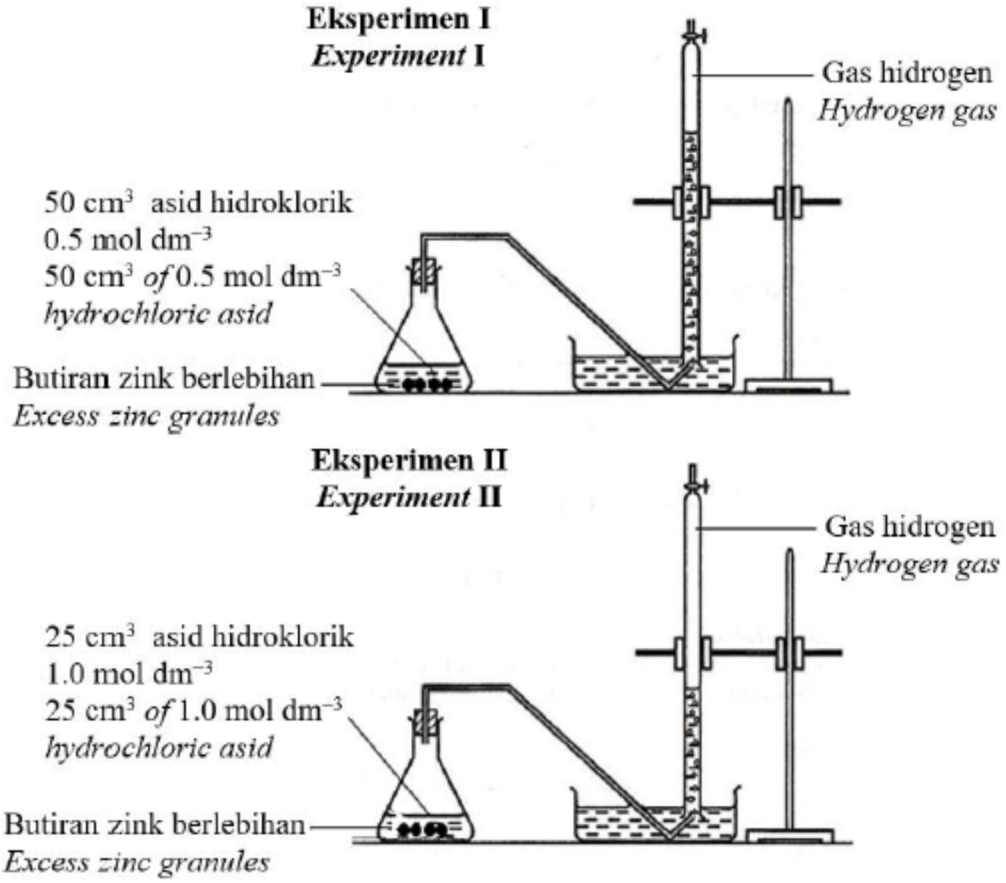
(f) Dalam suatu majlis gotong-royong sempena satu karnival memasak, Rizal ditugaskan untuk menambahkan ubi kentang sebagai bahan utama dalam masakan. Terangkan bagaimana dia dapat memasak ubi kentang dengan cepat dan nyatakan faktor yang terlibat.
In a community cooking event for a food carnival, Rizal has assigned to add potatoes as one of the main ingredient in the food. Explain how he can cook the potatoes quickly and state that factor involve.

.....

..... [2M]

[Perlis2021-08]

8. Rajah 7 menunjukkan dua eksperimen untuk mengkaji satu faktor yang mempengaruhi kadar tindak balas antara zink dan asid hidroklorik.
Diagram 7 shows two experiments to investigate one factor that affects the rate of reaction between zinc and hydrochloric acid.



(a) Bagaimanakah kadar tindak balas ditentukan dalam eksperimen ini?
How to determine the rate of reaction in this experiment?

.....

..... [1M]

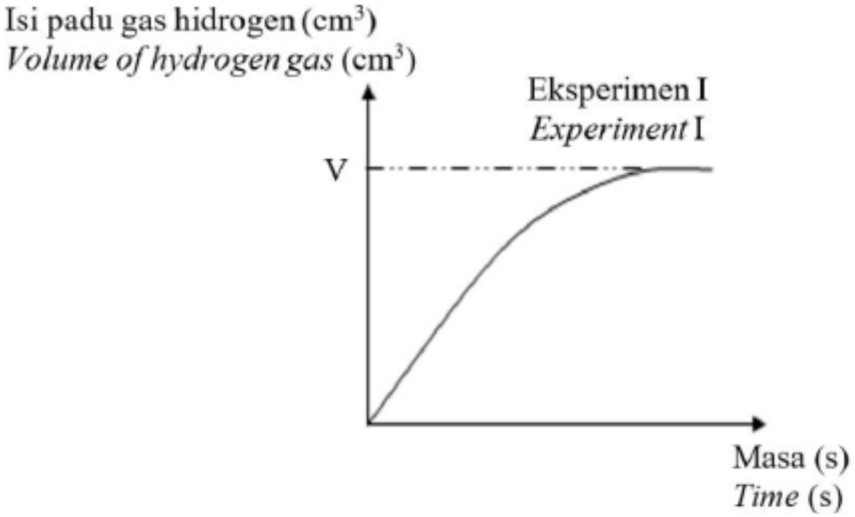
(b) Isipadu maksimum gas hidrogen yang terbebas dalam Eksperimen I ialah V cm^3.
The maximum volume of hydrogen gas released in Experiment I is V cm^3.

(i) Berapakah isipadu gas hidrogen yang dibebaskan dalam Eksperimen II berbanding Eksperimen I? Terangkan.
What is the volume of hydrogen gas released in Experiment II compared to Experiment I? Explain.

.....

..... [2M]

(ii) Graf isipadu gas melawan masa untuk Eksperimen I dilakarkan seperti ditunjukkan dalam Graf 1.1.
The graph for the volume of gas against time for Experiment I is sketched as shown in Graph 1.1.



Lakarkan lengkung untuk Eksperimen II di atas paksi yang sama dalam Graf 1.1.
Sketch the curve for Experiment II on the same axes in Graph 1.1.

[1M]

(c) (i) Berdasarkan Rajah 7, eksperimen manakah mempunyai kadar tindak balas yang lebih tinggi?
Based on Diagram 7, which experiment has a higher rate of reaction?

..... [1M]

(ii) Merujuk kepada teori perlanggaran, terangkan bagaimana kadar tindak balas dalam Eksperimen I dan Eksperimen II berbeza.
Referring to the collision theory, explain how the rate of reaction in Experiment I and Experiment II are different.

.....

.....

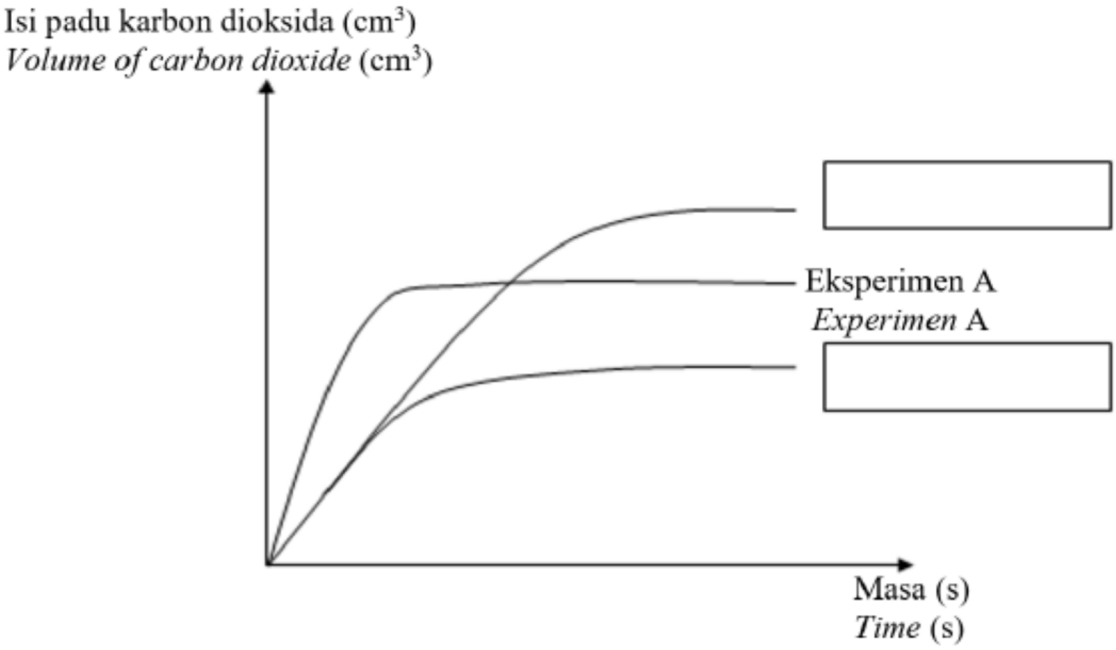
.....

..... [3M]

(d) Jadual 6 menunjukkan tiga eksperimen yang telah dijalankan oleh seorang pelajar.
Table 6 shows three experiments carried out by a student.

Eksperimen Experiment	Bahan tindak balas Reactants
A	Ketulan kalsium karbonat berlebihan dan 25 cm^3 asid hidroklorik 1.0 mol dm^{-3}. Excess calcium carbonate chips and 25 cm^3 of 1.0 mol dm^{-3} hydrochloric acid.
B	Ketulan kalsium karbonat berlebihan dan 25 cm^3 asid hidroklorik 0.5 mol dm^{-3}. Excess calcium carbonate chips and 25 cm^3 of 0.5 mol dm^{-3} hydrochloric acid.
C	Ketulan kalsium karbonat berlebihan dan 100 cm^3 asid hidroklorik 0.5 mol dm^{-3}. Excess calcium carbonate chips and 100 cm^3 of 0.5 mol dm^{-3} hydrochloric acid.

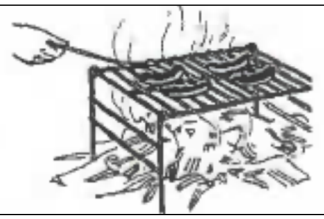
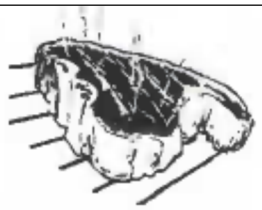
Berdasarkan Jadual 6, tentukan lengkung manakah mewakili Eksperimen B dan C dalam Graf 1.2 di bawah. Tuliskan jawapan anda dalam kotak yang disediakan.
Based on Table 6, determine which curves represent the Experiment B and C in Graph 1.2 below. Write your answers in the boxes provided.



[2M]

[Terengganu2021-09]

9. (a) Rajah 9 menunjukkan dua situasi memanggang 500 g daging.
Diagram 9 shows two situations of grilling 500 g of meat.

	
Situasi A Situation A	Situasi B Situation B

Berdasarkan Rajah 9, dalam situasi manakah daging akan masak dengan lebih cepat dan nyatakan faktor yang mempengaruhi kadar untuk memasak daging itu.
Based on Diagram 9, in which situation meat will cook faster and state the factor that affect the rate of cooking meat.

[2M]

(b) Jadual 9 menunjukkan maklumat tentang bahan tindak balas dan suhu yang digunakan dalam tiga eksperimen untuk mengkaji faktor yang mempengaruhi suatu kadar tindak balas. Tindak balas di antara kalsium karbonat dan asid hidroklorik menghasilkan gas X yang dapat mengeruhkan air kapur.
Table 9 shows information about the reactants and the temperature used in three experiment to study the factors affecting the rate of a reaction.
Reaction between calcium carbonate and hydrochloric acid produced gas X which make the lime water chalky.

Eksperimen Experiment	Bahan-bahan tindak balas Reactants	Suhu/°C Temperature/°C	Masa untuk mengumpul 50 cm^3 gas/ s Time to collect 50 cm^3 of gas/ s
I	Ketulan kalsium karbonat berlebihan dan 30 cm^3 asid hidroklorik 0.5 mol dm^{-3} Excess calcium carbonate chips and 30 cm^3 of 0.5 mol dm^{-3} hydrochloric acid	35	50
II	Ketulan kalsium karbonat berlebihan dan 30 cm^3 asid hidroklorik 0.5 mol dm^{-3}	45	30

	Excess calcium carbonate chips and 30 cm^3 of 0.5 mol dm^{-3} hydrochloric acid		
III	Ketulan kalsium karbonat berlebihan dan 30 cm^3 asid hidroklorik 1.0 mol dm^{-3} Excess calcium carbonate chips and 30 cm^3 of 1.0 mol dm^{-3} hydrochloric acid	45	20

(i) Apakah yang dimaksudkan dengan kadar tindak balas dan nyatakan nama gas X yang terhasil.
What is meant by rate of reaction and state the name of gas X produced.

[2M]

(ii) Tuliskan persamaan kimia bagi tindak balas antara kalsium karbonat dan asid hidroklorik. Hitungkan isi padu maksima bagi gas karbon dioksida yang terhasil dalam eksperimen I.
[Isi padu molar gas pada keadaan bilik ialah 24 dm^3 mol^{-1}]
Write the chemical equation for the reaction between calcium carbonate and hydrochloric acid. Calculate the maximum volume of carbon dioxide gas produced in experiment I.
[Molar volume of gas at room condition is 24 dm^3 mol^{-1}]

[5M]

(iii) Hitungkan kadar tindak balas purata bagi Eksperimen II.
Calculate the average rate of reaction for Experiment II

[1M]

(iv) Bandingkan kadar tindak balas antara
Compare the rate of reaction between

• Eksperimen I and Eksperimen II
Experiment I dan Experiment II

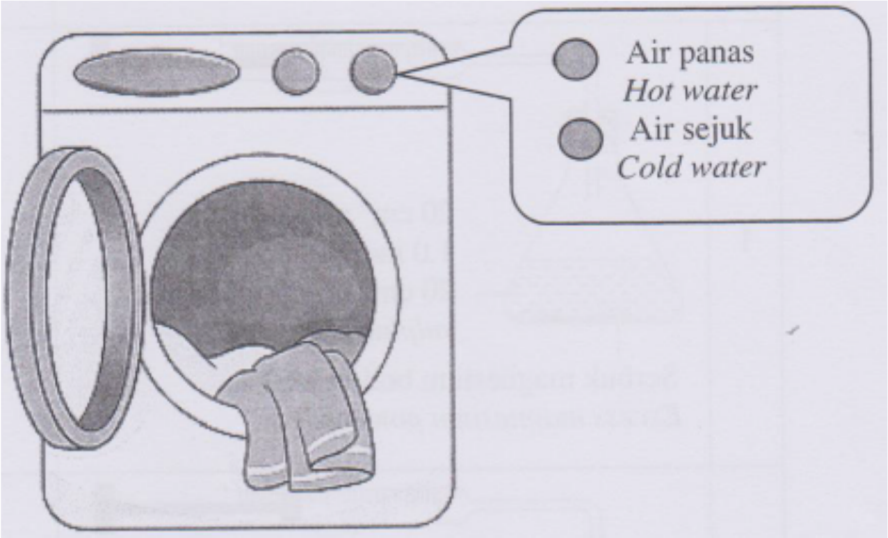
• Eksperimen II and Eksperimen III
Experiment II dan Experiment III

Terangkan perbandingan anda dengan merujuk kepada Teori Perlanggaran.
Explain your comparisons with reference to the Collision Theory.

[10M]

[SBP2021-09]

9. (a) Rajah 9 menunjukkan dua pilihan suhu air yang terdapat pada mesin basuh di kedai dobi.
Diagram 9 shows two water temperature options available on the washing machine in the laundry mart.



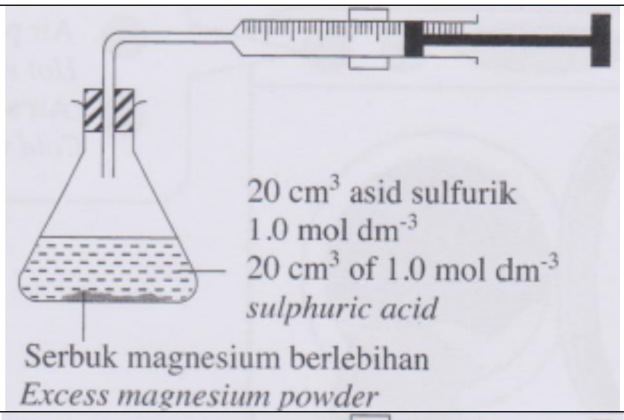
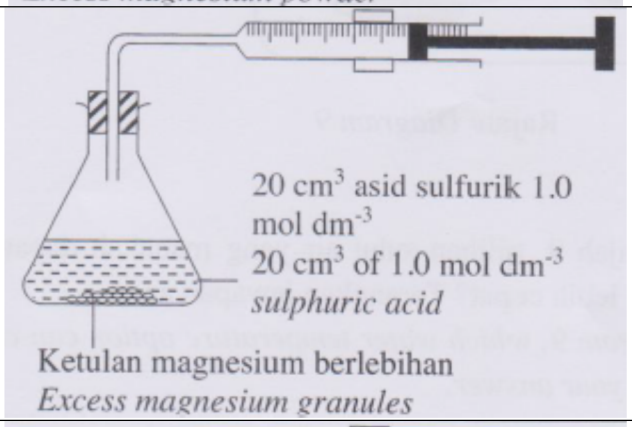
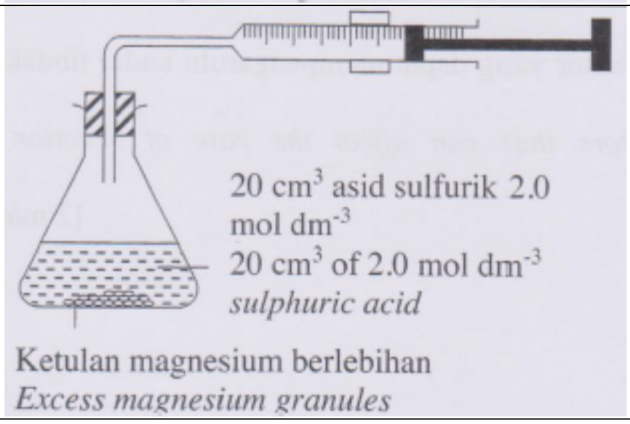
(i) Berdasarkan Rajah 9, pilihan suhu air yang manakah dapat membersih pakaian dengan lebih cepat? Terangkan jawapan anda.
Based on Diagram 9, which water temperature option can clean clothes faster! Explain your answer.

[3M]

(ii) Nyatakan dua faktor yang dapat mempengaruhi kadar tindak balas selain daripada suhu.
State two factors that can affect the rate of reaction other than temperature.

[2M]

(b) Seorang pelajar menjalankan tiga set eksperimen untuk mengkaji faktor yang mempengaruhi kadar tindak balas antara magnesium dan asid sulfurik.
Jadual 9 menunjukkan masa yang diambil untuk mengumpul 30 cm^3 gas yang terbebas bagi ketiga-tiga set eksperimen itu.
A student carried out three sets of experiment to investigate factors that affect the rate of reaction between magnesium and sulphuric acid.
Table 9 shows the time taken to collect 30 cm^3 of gas released for the three sets of

Set		Masa yang diambil untuk mengumpul 30 cm^3 gas (s) Time taken to collect 30 cm^3 of gas (s)
I		35
II		55
III		45

Based on Table 9,/ Berdasarkan Jadual 9,

(i) Tuliskan persamaan kimia bagi tindak balas dalam Set III.
Hitungkan isi padu maksimum gas yang terbebas.
[Isi padu molar pada keadaan bilik = 24 dm^3 mol^{-1}]
Write the chemical equation for the reaction in Set III.
Calculate the maximum volume of the gas released.
[Molar volume at room conditions = 24 dm^3 mol^{-1}]

[5M]

(ii) Bandingkan kadar tindak balas antara:
Compare the rate of reaction between:

• Set I dan Set II/ Set I and Set II
• Set II dan Set III/ Set II and Set III

Terangkan jawapan anda berdasarkan Teori Perlanggaran.
Explain your answer based on the Collision Theory.

[10M]

[Kelantan2021-09]
9. (a) Kadar tindak balas dipengaruhi oleh beberapa faktor.
Rajah 9.1 menunjukkan perbualan antara Wani dengan ibunya tentang kadar tindak balas.
The rate of reaction is affected by several factors.
Diagram 9.1 shows the conversation between Wani and her mother about rate of reaction.

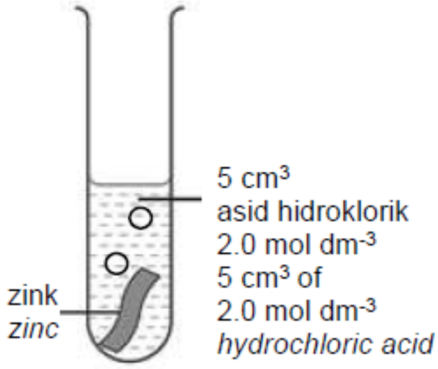
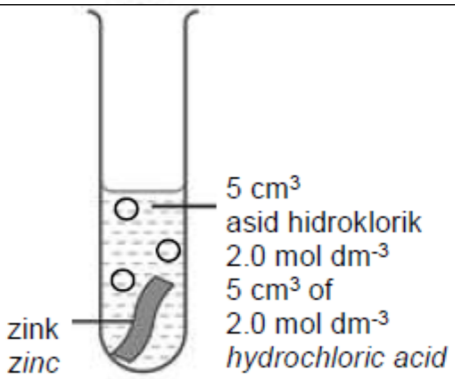
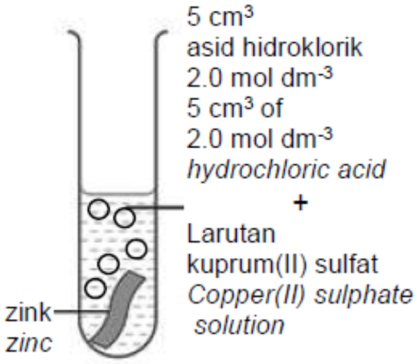
(i) Nyatakan maksud kadar tindak balas.
State the meaning of rate of reaction.

[1M]

(ii) Berdasarkan perbualan di atas, nyatakan satu faktor yang mempengaruhi masa yang diambil untuk daging masak.
Terangkan jawapan anda.
Based on the conversation above, state one factor that affect the time taken for the meat to cook.
Explain your answer.

[3M]

(b) Seorang pelajar menjalankan tiga eksperimen untuk mengkaji kesan faktor yang mempengaruhi kadar tindak balas. Jadual 9 menunjukkan keputusan bagi eksperimen itu.
A student carried out three experiments to investigate the effects of the factors influencing the rate of reaction. Table 9 shows the results of the experiments.

Eksperimen Experiment	Susunan radas Apparatus set up	Suhu Temperature (°C)	Masa yang diambil untuk tindak balas lengkap Time taken for the reaction completed (s)
I		30	50
II		40	30
III		40	10

(i) Persamaan kimia di bawah menunjukkan tindak balas antara zink dengan asid hidroklorik.
The chemical equation below shows the reaction between zinc and hydrochloric acid.

$$Zn(p) + 2HCl(ak)\ ZnCl_2(ak) + H_2(g)$$
$$Zn(s) + 2HCl(aq)\ ZnCl_2(aq) + H_2(g)$$

Hitungkan isi padu maksimum gas hidrogen yang terhasil.
[Isi padu molar gas : 24 $dm^3\ mol^{-1}$ pada keadaan bilik]
Calculate the maximum volume of hydrogen gas produced.
[Molar gas volume : 24 $dm^3\ mol^{-1}$ at room condition]

[3M]

(ii) Lakarkan graf isi padu gas hidrogen melawan masa bagi Eksperimen I, II dan III pada paksi yang sama.
Sketch the graphs for the volume of hydrogen gas against tim for Experiment I, II and III on the same axes.

[3M]

(iii) Bandingkan kadar tindak balas bagi Eksperimen I dengan Eksperimen II dan Eksperimen II dengan Eksperimen III.
Terangkan dengan merujuk kepada teori perlanggaran mengapa terdapat perbezaan kadar tindak balas dalam eksperimen tersebut.
Compare the rates of reaction between Experiment I and II, and between Experiment II and Experiment III.
Explain with reference to collision theory why there are differences in the rates of reaction in the experiments.

[10M]

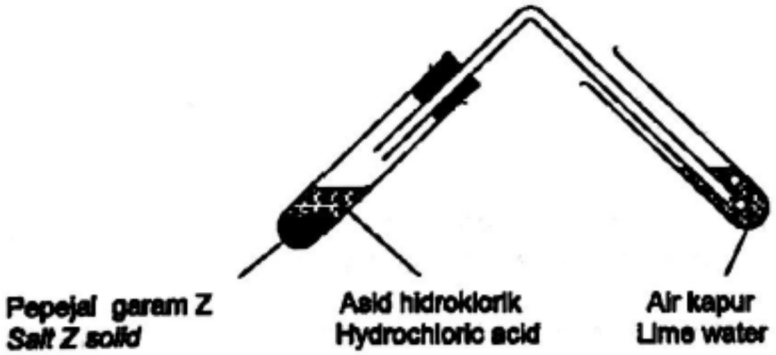
[Johor2021-10]
10. (a) Rajah 10.1 menunjukkan terumbu karang yang terdapat di perairan Pulau Sibu. Terumbu karang ini terbentuk daripada garam Z.
Diagram 10.1 shows coral reefs found in Sibu Island. These coral reefs are formed from salt Z.

Rajah 10.1
Diagram 10.1

(i) Nyatakan maksud garam dan namakan satu garam tak terlarutkan.
State the meaning of salt and name insoluble salt.

[2M]

(ii) Rajah 10.2 menunjukkan susunan radas bagi tindak balas asid hidroklorik dengan pepejal garam Z.
Diagram 10.2 shows apparatus set-up for the reaction of hydrochloric acid with solid salt Z.



Pepejal garam Z mengandungi unsur kalsium, Apakah garam Z dan gas yang terbebas semasa tindak balas seperti rajah 10.2?
Solid Z salt contain calcium element, what is salt Z and the gas released during the reaction in diagram 10.2?

[2M]

Johor2021-10 B7 Kadar

10. (b) Jadual 10 menunjukkan keputusan satu eksperimen bagi mengkaji faktor yang mempengaruhi kadar tindak balas.
Table 10 shows the result of an experiment to study the factor that affect reaction.

Eksperimen Experiment	I	II	III
Bahan tindak balas Reactants	Serbuk zink berlebihan + 20 cm^3 asid sulfurik 0.1 mol dm^{-3} Excess zinc powder + 20 cm^3 of 0.1 mol dm^{-3} sulphuric acid	Serbuk zink berlebihan + 20 cm^3 asid sulfurik 0.1 mol dm^{-3} + larutan kuprum(II) sulfat Excess zinc powder + 20 cm^3 of 0.1 mol dm^{-3} sulphuric acid + copper(II) sulphate solution	Serbuk zink berlebihan + 20 cm^3 asid sulfurik 0.1 mol dm^{-3} Excess zinc powder + 20 cm^3 of 0.1 mol dm^{-3} sulphuric acid
Suhu (°C) Temperature (°C)	30.0	30.0	40.0

Masa yang diambil untuk mengumpul 30 cm^3 gas yang terbebas (s) Time taken for collecting 30 cm^3 of gas released, (s)	20.0	12.0	10.0

(i) Tuliskan persamaan kimia bagi tindak balas antara zink dan asid sulfurik. Kira purata kadar tindak balas untuk Eksperimen I dan Eksperimen II dalam unit $cm^3\ s^{-1}$.
Write the chemical equation for the reaction between zinc and sulphuric acid. Calculate the average rate of the reaction for Experiment I and Experiment II in $cm^3\ s^{-1}$.

[4M]

(ii) Lakarkan graf isi padu melawan masa bagi kedua-dua eksperimen di dalam paksi yang sama.
Sketch the graph volume against time for both experiment in same axis.

[2M]

10 (iii) Berdasarkan Jadual 10, bandingkan kadar tindak balas antara
Based on Table 10, compare the rate of reaction between

- Eksperimen I dan II/ Experiment I and II
- Eksperimen I dan III/ Experiment I and III

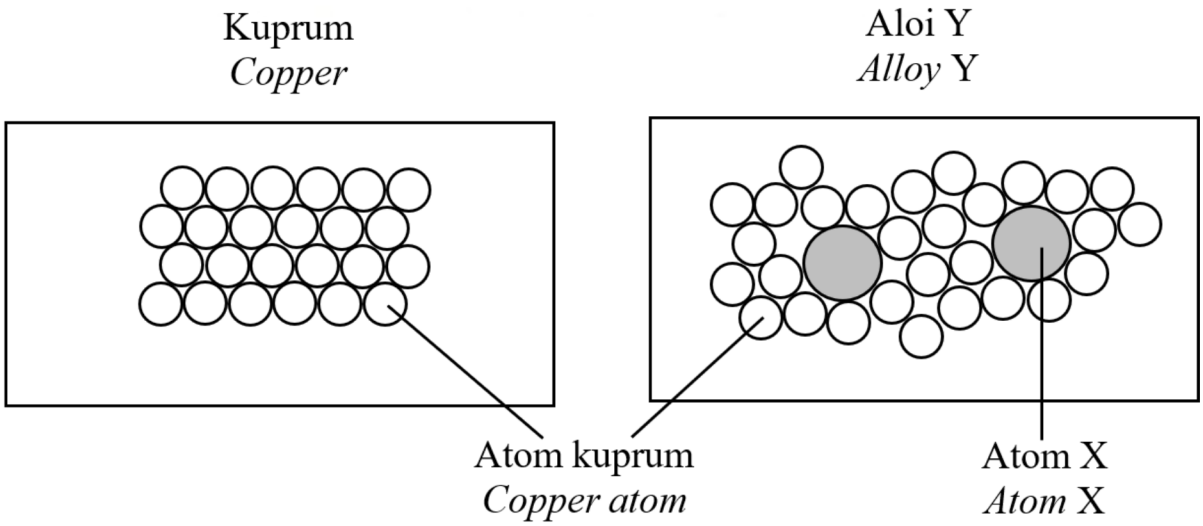
Untuk setiap kes, nyatakan faktor yang mempengaruhi kadar tindak balas dan terangkan perbezaan kadar tindak balas dengan merujuk kepada teori perlanggaran.
In each case, state the factor affect the rate of reaction and explain the difference in the rate of reaction with reference to the collision theory.

[10M]

Tingkatan 4 Bab 5

[Perlis2021-01]

1. Rajah 1.1 menunjukkan susunan atom dalam kuprum tulen dan aloi Y. Y ialah aloi bagi kuprum.
Diagram 1.1 shows the arrangement of atoms in pure copper and alloy Y. Y is an alloy of copper.



(a) (i) Nyatakan nama atom X.
State the name of atom X.

..... [1M]

(ii) Terangkan mengapa aloi Y lebih keras daripada logam tulennya?
Explain why alloy Y is harder than its pure metal?

.....

..... [2M]

(b) Rajah 1.2 menunjukkan peralatan makmal yang diperbuat daripada kaca.
Diagram 1.2 shows the laboratory glassware made of glass.

Rajah 1.2
Diagram 1.2

(i) Nyatakan komponen utama kaca.
State the main component of glass.

..... [1M]

(ii) Berikan satu sebab kenapa kaca borosilikat adalah kaca yang paling sesuai digunakan untuk membuat peralatan makmal.
State one reason why borosilicate glass is most suitable to use to make laboratory glassware?

.....

..... [1M]

[Selangor2021-Set01-02]
2. Jadual 2.1 menunjukkan dua jenis kaca dan komposisinya.
Table 2.1 shows two types of glass and their composition.

Kaca X Glass X	Kaca Y Glass Y
Komposisinya adalah silika, natrium karbonat, boron oksida dan aluminium oksida. Its composition are silica, sodium carbonate, boron oxide and aluminium oxide.	Komposisinya adalah silika, natrium karbonat dan kalsium karbonat. Its composition are silica, sodium carbonate and calcium carbonate.

(a) Rajah 2 menunjukkan sebuah periuk. Penutup periuk dibuat daripada sejenis kaca.
Diagram 2 shows a pot. The cover of the pot is made from a type of glass.

Nyatakan kaca yang manakah dalam Jadual 2.1 yang boleh digunakan untuk membuat penutup periuk.
Terangkan jawapan anda.
State the glass in Table 2.1 which can be used to make the cover of the pot.
Explain your answer.

.....

.....

..... [2M]

(b) Jadual 2.2 menunjukkan butiran tentang dua jenis bahan buatan dalam industri.
Table 2.2 shows the particulars of two different types of manufactured substances in the industries.

Bahan buatan Manufactured substances	Nama produk Name of the products	Komponen Components
M	Konkrit yang diperkukuhkan Reinforced concrete	Simen, pasir, batu kecil dan keluli Cement, sand, small pebbles and steel
N	Silikon karbida Silicone carbide	Silikon dan karbon Silicone and carbon

Berdasarkan Jadual 2.2, /Based on Table 2.2,

(i) Nyatakan jenis bahan buatan M dan N.
State the types of manufactured substances M and N.

M:

N:

[2M]

(ii) Apakah kelebihan menggunakan konkrit yang diperkukuhkan berbanding konkrit?
What is the advantage of using reinforced concrete compared to concrete?

..... [1M]

[Selangor2021-Set01-02]
2. Rajah 2 menunjukkan satu pingat yang diperbuat daripada gangsa.
Diagram 2 shows a medal made of bronze.

(a) Namakan unsur yang ditambah kepada kuprum untuk membentuk gangsa.
Name the element added to copper to form bronze.

..... [1M]

(b) Lukis susunan atom dalam gangsa.
Draw the arrangement of atoms in bronze.

[2M]

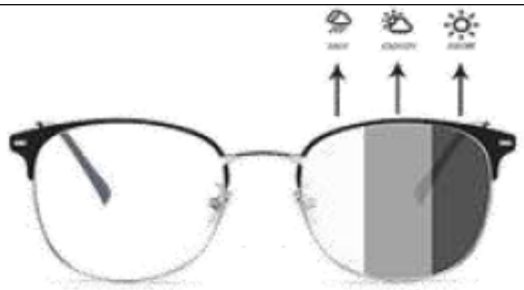
(c) Mengapakah gangsa adalah lebih sesuai untuk membuat pingat berbanding dengan kuprum?
Why is bronze more suitable for making medals compared to copper?

..... [1M]

(d) Namakan satu aloi lain bagi kuprum.
Name one other alloy of copper.

..... [1M]

[Kelantan2021-02]
2. (a) Rajah 2.1 adalah dua pasang cermin mata yang di buat dari dua jenis kanta berbeza
Diagram 2.1 shows two pairs of spectacles made from two different type of lenses.

	
A	B

Kanta cermin mata A diperbuat dari kaca silika terlakur manakala kanta cermin mata B di perbuat dari kaca fotokromik yang bertukar gelap apabila terkena cahaya matahari.
Lens for spectacle A is made from fused silica glass while lens for spectacle B is made from photochromic glass which turns dark when exposed to sunlight

(i) Nyatakan dua bahan fotokromik yang digunakan dalam kanta cermin mata B.
State two photochromic material used in spectacle lenses B

.....

..... [2M]

(ii) Nyatakan kelebihan kaca fotokromik tersebut
State the advantage of the photochromic glass

.....

..... [1M]

(b) Rajah 2.2 menunjukkan kereta api Maglev. Kereta api elektrik ini boleh mencapai kelajuan sehingga 581 km/j.
Diagram 2.2 shows a Maglev train. This electric train can reach speeds of up to 581 km/h.

Rajah 2.2
Diagram 2.2

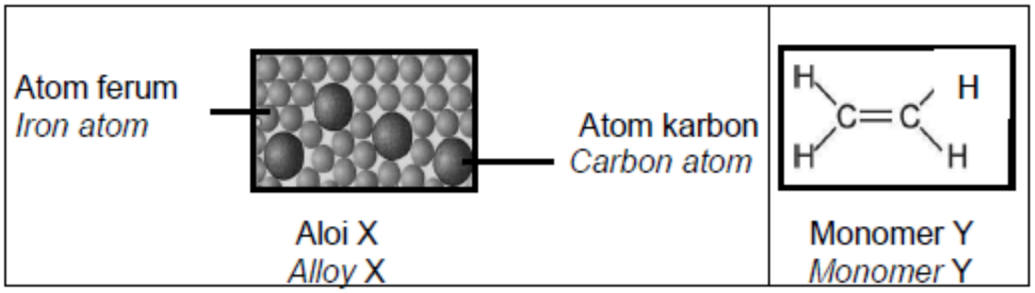
(i) Nyatakan aloi yang sesuai digunakan dalam pengangkutan ini.
State the appropriate alloy used in this transport.

..... [1M]

(ii) Mengapakah aloi di (b) (i) sesuai digunakan?
Why alloy in (b) (i) is suitable to use?

..... [1M]

[Kedah2021-Set02-02]
2. Rajah 2 menunjukkan susunan atom dalam aloi X dan formula struktur monomer Y.
Diagram 2 shows the arrangement of atoms in alloy X and the structural formula of monomer Y.



(a) Nyatakan maksud aloi./ State the meaning of alloy.

.....

..... [1M]

(b) (i) Nyatakan nama bagi aloi X./ State the name of alloy X.

..... [1M]

(ii) Nyatakan kekerasan aloi X berbanding dengan logam kuprum tulen.
State the hardness of alloy X compared to pure copper metal.

..... [1M]

(c) (i) Nyatakan nama monomer Y.
State the name of monomer Y.

..... [1M]

(ii) Lukis formula struktur bagi polimer yang terhasil daripada monomer Y.
Draw the structural formula of polymer formed from monomer Y.

[1M]

[Johor2021-06]
6. Rajah 6.1 menunjukkan satu pingat dan komposisinya.
Diagram 6.1 shows a medal and its compositions.

90% kuprum, 5% unsur Q
90% copper, 5% element Q

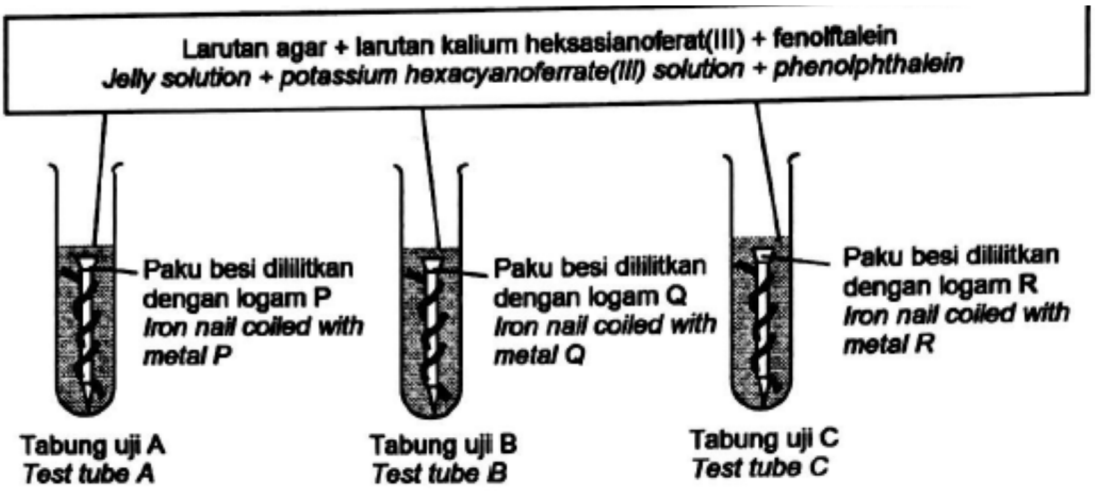
(a)(i) Apakah maksud aloi?/ What is the meaning of alloy?

..... [1M]

(ii) Nyatakan unsur Q./ State the element Q.

..... [1M]

(b) Rajah 6.2 menunjukkan susunan radas untuk mengkaji pengaratan besi.
Diagram 6.2 shows the apparatus set-up to investigate the rusting of iron.



Rajah 6.2, Diagram 6.2

Jadual 6 menunjukkan keputusan eksperimen:
Table 6 shows the results of experiment:

Tabung Uji Test Tube	A	B	C
Pemerhatian Observation	Keamatan warna biru rendah Low intensity of blue colour	Merah jambu Pink	Keamatan warna biru tinggi High intensity of blue colour

(i) Tuliskan setengah persamaan pengoksidaan dan penurunan tabung uji C jika logam R adalah kuprum.
Write oxidation and reduction half equation for test tube C if metal R is copper.

Setengah persamaan pengoksidaan: .....
Oxidation half equation:

Setengah persamaan penurunan: .....
Reduction half equation:

[4M]

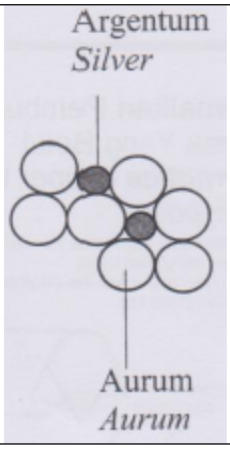
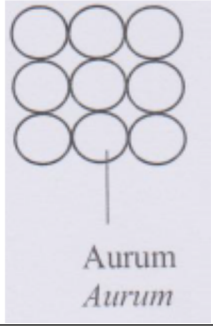
(ii) Berdasarkan Rajah 6.2, tabung uji manakah yang menunjukkan pengaratan. Terangkan jawapan anda.
Based on the Diagram 6.2, which test tube shows rusting.
Explain your answer

.....

.....

..... [3M]

[SBP2021-08]
8. (a) Aurum merupakan unsur utama dalam emas. Jadual 8 menunjukkan maklumat berkaitan dua jenis kepingan emas yang terdapat di pasaran.
Aurum is the main element consists in gold. Table 8 shows information related to the two types of gold bar available in the market.

Kepingan emas Gold bar	 A	 B
Susunan atom Arrangement of atoms		

(i) Nyatakan maksud aloi./ State the meaning of alloy.

.....

..... [1M]

(ii) Emas manakah yang lebih sesuai untuk dijadikan barang kemas?
Which gold bar is more suitable to make jewellery?

..... [2M]

(iii) Berdasarkan jawapan anda di 8(a)(ii), bandingkan kedua-dua jenis emas itu dari segi susunan atom bagi menerangkan pilihan anda.
Based on your answer in 8(a)(ii), compare the two types of gold in terms of the arrangement of atoms to explain your choice.

.....

.....

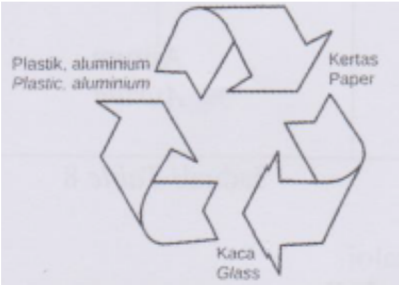
.....

..... [2M]

(b) Rajah 8.1 menunjukkan poster kempen berkaitan dengan pelaksanaan salah satu program Teknologi Hijau dalam komuniti.
Diagram 8.1 shows a campaign poster related to the implementation of one of the Green Technology programmes in the community.

Amalkan Pembuangan Sisa Yang Betul
Practice Proper Waste Disposal

Anda dapat membantu mewujudkan impian yang bersih dan hijau,
You can help make the clean and green dream come true



Lakukan bahagian anda hari ini./ Do your part today.

Pada pendapat anda. adakah kita perlu menyokong kempen yang ditunjukkan dalam Rajah 8.1? Terangkan jawapan anda.
In your opinion. do we need to support the campaign shown in Diagram 8.1? Explain your answer.

.....

.....

..... [3M]

(c) Rajah 8.2 menunjukkan keratan akhbar berkaitan pembuangan sampah di Malaysia
Diagram 8.2 shows newspaper clipping relating to rubbish disposal in Malaysia.

14 juta tan sampah pada 2022
Kuala Lumpur: Dianggarkan 14 juta tan sampah setahun akan dikutip menjelang 2022.
Itu anggaran yang boleh dibuat berdasarkan kepada trend pungutan sampah setiap hari di seluruh negara yang merekodkan peningkatan sejak 2012 sehingga tahun lalu.
Pengarah Institut Lautan dan Sains Bumi. Universiti Malaya (UM) Prof Dr Sumiani Yusoff berkata, anggaran penjanaan sisa pepejal di negara ini pada tahun lalu adalah 38,081 tan sĕhari dan angka itu terus meningkat pada tahun ini iaitu kutipan 38.699 tan sehari.
"Maka kos penghantaran sisa pepejal ke tapak pelupusan bandar akan meningkat, begitu juga dengan pelepasan gas rumah hijau serta

penggunaan tenaga yang banyak untuk penghantaran sisa pepejal dari kawasan bandar ke tapak pelupusan," katanya.
"Tanpa kaedah atau teknologi pengurusan sisa pepejal lain, keperluan terhadap pembinaan tapak pelupusan sisa pepejal akan terus meningkat dengan peningkatan jumlah kutipan sampah di seluruh Malaysia," katanya.

14 million tonnes of garbage by 2022
Kuala Lumpur: An estimated 14 million tonnes of rubbish a year will be collected by 2022.
That's an estimate that can be made based on a trend of daily garbage collection across the country that recorded an increase from 2012 until last year.
Director of the Institute of Oceans and Earth Sciences, University of Malaya (UM) Prof Dr Sumiani Yusoff said the estimated generation of solid waste in the country last year was 38,081 tonnes per day and the figure continues to increase this year at 38,699 tonnes per day.
"The cost of delivering solid waste to urban landfills will increase, as well as greenhouse gas emissions and a lot of energy consumption for the delivery of solid waste from urban areas to landfills," she said.
"Without other methods or technology in solid waste management, the need for the construction of solid waste landfills will continue to increase with the increasing amount of garbage collection throughout Malaysia" she said.

Sumber/ Source: hmetro.com, 2021

Berdasarkan keratan akhbar dalam Rajah 8.2, cadangkan dua kaedah yang melibatkan aplikasi Teknologi Hijau bagi mengatasi masalah yang diutarakan. Berikan kelebihan bagi salah satu kaedah yang dicadangkan.
Based on the newspaper clipping in Diagram 8.2, suggest two methods involving the application of Green Technology to solve the problem highlighted.
Give one advantage for one of the methods suggested.

.....

.....

.....

.....

..... [3M]

[Kedah2021-Set01-08]

8. Rajah 8 menunjukkan dua jenis basikal. Satu basikal diperbuat daripada logam tulen dan satu lagi diperbuat daripada aloi.
Diagram 8 shows two types of bicycles. One bicycle is made of pure metal and another one is made of alloy.

	
A	B

(a) (i) Nyatakan maksud aloi./ State the meaning of alloy

.....

..... [1M]

(ii) Berdasarkan gamba rajah, pilih basikal manakah mempunyai rangka yang lebih ringan?
Based on the diagram, choose which bicycle has a lighter frame?

..... [1M]

(iii) Lukis dan labelkan susunan zarah bahan yang digunakan di 8(a)(ii).
Draw and label the arrangement of particles of material used in 8(a)(ii).

[2M]

(iv) Uwais ingin membina sebuah rak untuk meletak kamus di perpustakaan sekolahnya. Wajarkan penggunaan aloi untuk membina rak buku tersebut. Cadangkan aloi yang boleh Uwais gunakan untuk membina rak buku tersebut.
Uwais wanted to build a rack to keep dictionaries in the library in his school. Justify the usage of alloy to build the books' rack. Suggest an alloy that Uwais can used to build the books rack.

.....

.....

..... [3M]

(b) Huraikan dengan ringkas bagaimana Uwais menguji kekerasan aloi yang dipilihnya.
Describe briefly how Uwais test the hardness of alloy that he has chosen.

.....

.....

..... [3M]