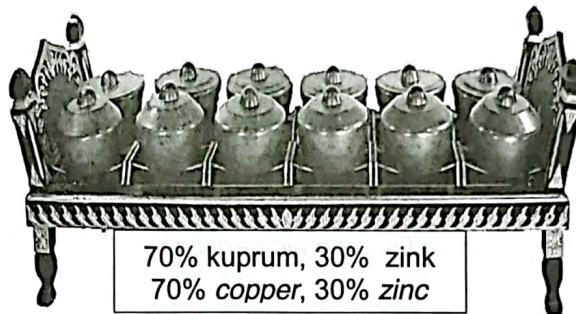


Bahagian A
Section A

[60 markah]
[60 marks]

Jawab **semua** soalan dalam bahagian ini.
*Answer **all** questions in this section.*

- 1 Rajah 1 menunjukkan satu set warisan seni muzik gamelan. Alat muzik gamelan diperbuat daripada aloi P dengan komposisi tertentu di mana logam tulennya ialah kuprum.
Diagram 1 shows a heritage set of gamelan music art. Gamelan musical instrument is made of an alloy P with a certain composition where the pure metal is copper.

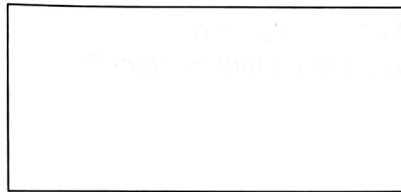


Rajah/ Diagram 1

- (a) Namakan aloi P yang terbentuk apabila zink ditambah kepada kuprum.
Name the alloy P formed when zinc is added to copper.

[1 mark]

- (b) Lukis susunan atom dalam aloi yang dinyatakan dalam 1(a) dan label atom-atom yang hadir.
Draw an atom arrangement in alloy that is stated in 1(a) and label the atoms present.



[2 marks]

- (c) (i) Bandingkan dari segi kekerasan aloi P dengan logam tulennya, kuprum.
Compare in terms of hardness of alloy P with its pure metal, copper.

[1 mark]

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

[1 mark]

- 2 Jadual 2 menunjukkan nombor proton dan nombor nukleon dalam atom P, Q dan R. Huruf yang digunakan bukan simbol sebenar bagi atom-atom itu.
Table 2 shows the proton number and nucleon number in atom P, Q and R. The letters used are not the actual symbols of the atoms.

Atom <i>Atom</i>	Nombor proton <i>Proton number</i>	Nombor nukleon <i>Nucleon number</i>
P	11	23
Q	6	12
R	6	14

Jadual / Table 2

- (a) Nyatakan istilah 'atom-atom bagi unsur yang sama dengan mempunyai bilangan proton yang sama tetapi bilangan neutron berbeza'.
State the term for 'atoms of the same element that have same number of proton but different number of neutron'.

.....
 [1 mark]

- (b) Namakan zarah sub-atom yang bercas positif.
Name the positively charged subatomic particles.

.....
 [1 mark]

- (c) Merujuk Jadual 2, nyatakan atom yang mempunyai sifat kimia yang sama dan berikan alasan.
Referring to Table 2, state the atoms that have same chemical properties and give a reason

.....

 [2 marks]

- (d) Lukis susunan elektron bagi atom P
Draw the electron arrangement of atom P.

[1 mark]

- 3 Jadual 3 menunjukkan dua jenis polimer dan ciri-cirinya.
Table 3 show two types of polymer and its characteristic.

Jenis Polimer <i>Types of polymer</i>	Ciri-ciri <i>Characteristic</i>
P	Apabila dipanaskan ia melebur dan mengeras apabila disejukkan. <i>When heated, it melts and solidifies when cooled.</i>
Q	Apabila dipanaskan ia akan terurai. <i>When heated, it will decompose.</i>

Jadual / Table 3

- (a) Nyatakan maksud polimer.
State the meaning of polymer.

.....
 [1 mark]

- (b) Nyatakan jenis polimer P dan polimer Q.
State the type of polymer P and polymer Q.

P:

Q:

[2 marks]

- (c) Pilih jenis polimer yang boleh dikitar semula.
Choose type of polymer that can be recycle.

.....
 [1 mark]

- (d) Adakah sesuai untuk melupuskan polimer sintetik dengan cara membakarnya.
 Jelaskan jawapan anda.
Is it suitable to dispose of synthetic polymers by burning them? Explain your answer.

.....

 [2 marks]

4. Rajah 4 menunjukkan susu magnesia yang mengandungi magnesium hidroksida untuk meneutralkan asid hidroklorik berlebihan dalam perut pesakit gastrik.
Diagram 4 shows milk of magnesia containing magnesium hydroxide to neutralize excess hydrochloric acid in the stomach of gastric patients.



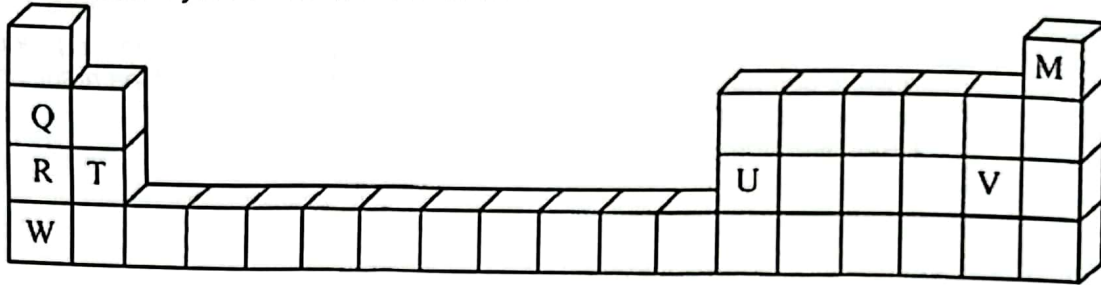
Rajah / Diagram 4

- (a) (i) Nyatakan jenis sebatian bagi magnesium hidroksida.
State the type of compound for magnesium hydroxide.
-
- [1 mark]
- (ii) Nyatakan ion-ion yang hadir dalam magnesium hidroksida.
State the ions present in the magnesium hydroxide.
-
- [1 mark]
- (iii) Namakan daya yang wujud antara kedua-dua ion dalam sebatian itu.
Name the force that exists between these ions in the compound.
-
- [1 mark]
- (b) (i) Tuliskan persamaan kimia tindak balas antara magnesium hidroksida dan asid hidroklorik.
Write chemical equation between magnesium hydroxide and hydrochloric acid
-
- [2 marks]

- (ii) Jika 0.5 mol asid hidroklorik bertindak balas dengan magnesium hidroksida menghasilkan sebatian putih setelah dipanaskan, hitung jisim sebatian putih yang terhasil.
[Jisim atom relatif : Mg = 24 , Cl = 35.5]
If 0.5 mol of hydrochloric acid reacts with magnesium hydroxide to produce a white compound after being heated, calculate the mass of the resulting white compound.
[Relative atomic mass : Mg = 24 , Cl = 35.5]

[2 marks]

5. Rajah 5.1 menunjukkan sebahagian daripada Jadual Berkala Unsur. Huruf M, Q, R, T, U, V dan W bukan simbol sebenar bagi unsur ini.
 Diagram 5.1 shows a part of Periodic Table of Element. M, Q, R, T, U, V and W are not the actual symbols for these elements.



Rajah / Diagram 5.1

Berdasarkan Rajah 5.1,
 Based on Diagram 5.1,

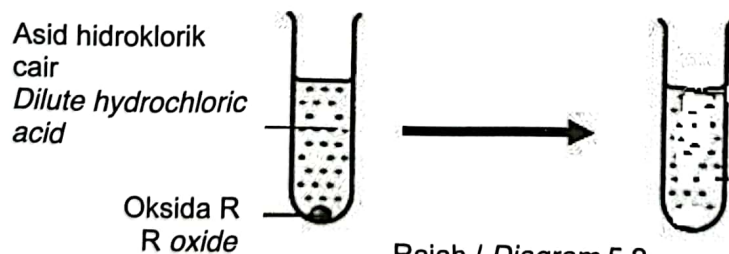
- (a) Nyatakan nama kumpulan yang terletak di antara Kumpulan 2 dan Kumpulan 13.
 State the name of group which located between Group 2 and Group 13.

[1 mark]

- (b) Nyatakan unsur yang boleh membentuk oksida amfoterik.
 State the element that can form an amphoteric oxide.

[1 mark]

- (c) Rajah 5.2 menunjukkan pemerhatian apabila oksida R ditambah ke dalam asid hidroklorik cair.
 Diagram 5.2 shows the observation when R oxide is added into diluted hydrochloric acid.



Rajah / Diagram 5.2

- (i) Berdasarkan pemerhatian, nyatakan sifat bagi oksida R.
 Based on observation, state the property of oxide R.

[1 mark]

- (ii) Tuliskan persamaan kimia apabila oksida R bertindak balas dengan asid hidroklorik cair.
 Write chemical equation when R oxide reacts with dilute hydrochloric acid.

[2 marks]

- (d) R, T, U dan V terletak dalam kala yang sama.
R, T, U and V are placed in the same period.

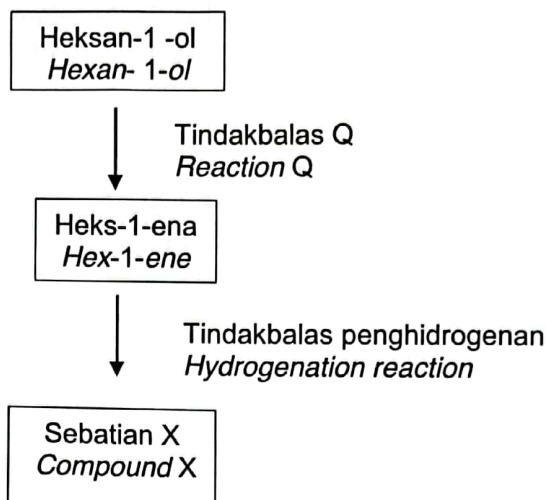
- (i) Susun unsur-unsur tersebut berdasarkan saiz atom dalam tertib menurun.
Arrange these elements according to the atomic size in descending order.

.....
[1 mark]

- (ii) Terangkan jawapan anda di 5(d)(i).
Explain your answer in 5(d)(i)

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

- 6 Rajah 6 menunjuk carta alir penukaran beberapa siri homolog.
Diagram 6 shows a flow chart the conversion of a few homologous series.



Rajah / Diagram 6

- (a) Nyatakan kumpulan berfungsi bagi heksan-1-ol.
State the functional group for hexan-1-ol.
-
- [1 mark]
- (b) (i) Heksan-1-ol boleh ditukar kepada heks-1-ena menerusi tindakbalas Q. Nyatakan nama tindakbalas Q.
Hexan-1-ol can be converted to hex-1-ene through Q reaction. State the name of Q reaction
-
- [1 mark]
- (ii) Tuliskan persamaan kimia bagi tindakbalas Q.
Write the chemical equation for Q reaction.
-
- [2 marks]
- (iii) Jika 2 mol heksan-1-ol digunakan dalam tindak balas Q, hitung jisim heks-1-ena yang terhasil. [Jisim atom relatif: C = 12, H=1]
If 2 moles of hexan-1-ol is used in the reaction, calculate the mass of hex-1-ene produced.

[2 marks]

- (c) Sebatian heks-1-ena dan sebatian X boleh dibezakan melalui tindak balas dengan air bromin. Terangkan perbezaan pemerhatian tindak balas antara sebatian heks-1-ena dan sebatian X dengan air bromin.
Compound hex-1-ene and compound X can differentiate by reacting with bromine water. Explain the difference in observation for the reaction between hex-1-ene and compound X with bromine water.

.....

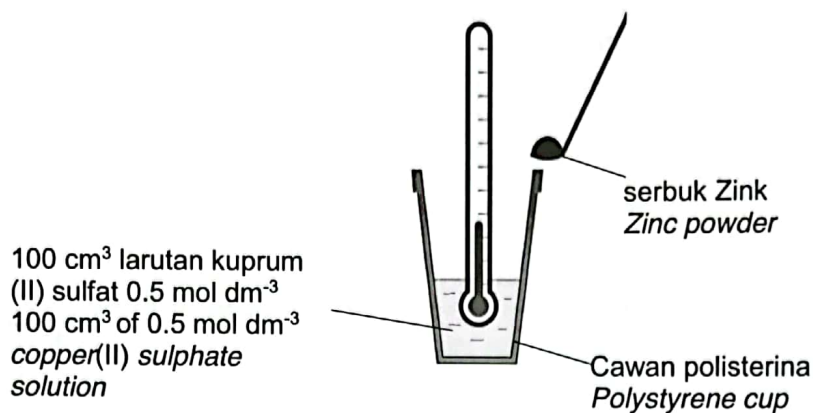
.....

.....

.....

[3 marks]

7. Rajah 7 menunjukkan susunan radas yang digunakan oleh digunakan oleh seorang pelajar untuk menentukan nilai haba penyesaran logam.
Diagram 7 shows the arrangement of the apparatus used by a student to determine the heat value of metal displacement



Rajah / Diagram 7

Keputusan eksperimen adalah seperti dalam Jadual 7 di bawah.
The result of the experiment is shown in Table 7 below

.Keterangan <i>Description</i>	Suhu (°C) <i>Temperature (°C)</i>
Suhu awal kuprum(II) sulfat <i>Initial temperature of copper (II) sulphate solution</i>	28.0
Suhu tertinggi campuran hasil tindak balas <i>Highest temperature of the mixture of products</i>	48.0

Jadual / Table 7

- (a) Apakah maksud haba penyesaran bagi eksperimen ini?
What is the meaning of heat of displacement for this experiment?

.....

 [1 mark]

- (b) Nyatakan satu pemerhatian dalam tindak balas ini .
State one observation in this reaction .

.....
 [1 mark]

- (c) Berdasarkan kepada eksperimen:
Based on the experiment:

- (i) Hitungkan perubahan haba dalam tindak balas itu.
 [Muatan haba tentu = $4.2 \text{ J g}^{-1} \text{ }^{\circ}\text{C}^{-1}$]
Calculate the heat change in the reaction.
 [Specific heat capacity = $4.2 \text{ J g}^{-1} \text{ }^{\circ}\text{C}^{-1}$]

[1 mark]

- (ii) Hitung haba penyesaran bagi eksperimen itu.
Calculate the heat of displacement of the experiment.

[2 marks]

- (iii) Lukiskan gambar rajah aras tenaga bagi tindak balas tersebut.
Draw the energy level diagram for the reaction.

[2 marks]

- (d) Eksperimen itu diulangi dengan menggunakan serbuk argentum menggantikan serbuk zink
The experiment is repeated by using silver powder replace the zinc powder

- (i) Ramalkan perubahan suhu bagi eksperimen itu.
Predict the temperature changes for the experiment.

..... [1 mark]

- (ii) Terangkan jawapan anda di 7(d)(i)
Explain your answer in 7(d)(i)

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

- (b) Rajah 8.2 menunjukkan Rayyan yang mengalami masalah batuk. Nenek Rayyan mencadangkan agar Rayyan mengambil ubat batuk secara tradisional manakala ibu Rayyan mencadangkan sebaliknya.
Diagram 8.2 shows Rayyan who has a cough problem. Rayyan's grandmother suggested that Rayyan take traditional cough medicine while Rayyan's mother suggested otherwise.



Rajah/ Diagram 8.2

- (i) Nyatakan ubat tradisional yang dicadangkan oleh nenek Rayyan dan apakah khasiat ubat tersebut.
State the traditional medicine suggested by Rayyan's grandmother and what are the benefits of the medicine

.....
 [2 marks]

- (ii) Ibu Rayyan tidak bersetuju dengan ubat yang dicadangkan oleh nenek Rayyan kerana beranggapan ubat-ubatan tradisional banyak kelemahan berbanding ubat moden. Nyatakan satu kelemahan ubat tradisional berbanding ubat moden.
Rayyan's mother did not agree with the medicine suggested by Rayyan's grandmother because he thinks the traditional medicines have many weaknesses compared to modern medicine. State one weakness of traditional medicine compared to modern medicine

..... [1 mark]

- (iii) Ibu Rayyan mencadangkan anaknya mengambil kodeina berbanding ubatan tradisional seperti di 8(b)(i) untuk merawat masalah batuk anaknya. Wajarkan penggunaan ubat yang dicadangkan oleh ibu Rayyan dan nenek Rayyan demi untuk kesihatannya.
Rayyan's mother suggested her son to take codeine instead of traditional medicine as in 8(b)(i) to treat his son's cough problem. Justify the use of medicine suggested by Rayyan's mother and Rayyan's grandmother for his health.

.....

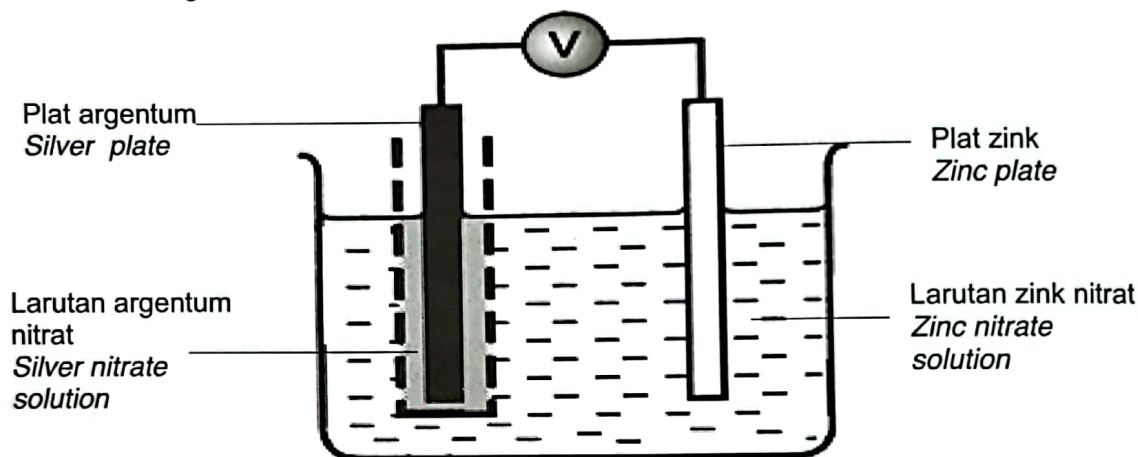
 [3 marks]

Bahagian B
Section B

[20 markah]
[20 marks]

Jawab mana-mana **satu** soalan daripada bahagian ini.
*Answer any **one** question from this section.*

- 9 (a) Rajah 9 menunjukkan susunan radas bagi satu sel kimia.
Diagram 9 shows an apparatus set-up for a voltaic cell.



Rajah/ Diagram 9

Jadual 9.1 menunjukkan nilai keupayaan elektrod piawai sel setengah:
Table 9.1 shows standard electrode potential of a half cell:

$\text{Mg}^{2+} + 2\text{e} \rightleftharpoons \text{Mg}$	$E^0 = -2.38 \text{ V}$
$\text{Zn}^{2+} + 2\text{e} \rightleftharpoons \text{Zn}$	$E^0 = -0.76 \text{ V}$
$\text{Ag}^+ + \text{e} \rightleftharpoons \text{Ag}$	$E^0 = +0.80 \text{ V}$

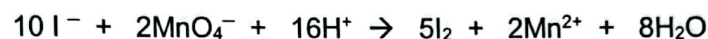
Jadual/ Table 9.1

- (i) Apakah yang dimaksudkan dengan tindak balas redoks?
What is meant by redox reaction? [1 mark]
- (ii) Berdasarkan Rajah 9,
Based on Diagram 9,
- Nyatakan pemerhatian pada terminal negatif dan terangkan
State the observation at negative terminal and explain
 - Tuliskan setengah persamaan bagi tindak balas pengoksidaan dan penurunan
Write the half equation for oxidation and reduction reaction
 - Tuliskan notasi sel bagi sel di atas
Write the cell notation of the cell
- [6 marks]

- (iii) Sekiranya logam zink ditukar kepada magnesium dan larutan zink nitrat kepada larutan magnesium nitrat, terangkan perubahan yang berlaku kepada nilai E^0 sel. Sertakan perhitungan nilai E^0 sel itu.
If zinc metal is changed to magnesium and zinc nitrate solution to magnesium nitrate solution. Explain the changes that occur to the E^0 value of the cell. Include the calculation of the value of E^0 cell.

[3 marks]

- (b) (i) Satu eksperimen dijalankan untuk mengkaji pemindahan elektron pada suatu jarak dalam tindak balas redoks antara larutan kalium manganat(VII) berasid dan larutan kalium iodida. Persamaan ion di bawah mewakili tindak balas yang berlaku.
An experiment was conducted to investigate the transfer of electrons at a distance in a redox reaction between acidified potassium manganate (VII) solution and potassium iodide solution. The ionic equation below represents the reaction occurs.



Berdasarkan persamaan ion di atas,
Based on the ionic equation above,

- Nyatakan perubahan warna bagi larutan kalium manganat(VII) berasid.
State the colour change of acidified potassium manganate (VII) solution.
- Kenal pasti agen pengoksidaan dan agen penurunan.
Tuliskan setengah persamaan bagi tindak balas penurunan
Identify the oxidising agent and reducing agent.
Write the half equation for the reduction reaction
- Hitungkan nombor pengoksidaan bagi mangan dalam ion manganat(VII).
Calculate the oxidation number of manganese in manganate (VII) ion.

[7 marks]

- (ii) Jadual 9.2 menunjukkan senarai radas dan bahan yang telah digunakan dalam eksperimen di(b)(i).
Table 9.2 shows the list of apparatus and materials used in experiment at (b)(i).

Radas dan bahan <i>Apparatus and materials</i>	
<ul style="list-style-type: none">• Tiub-U <i>U-Tube</i>• Galvanometer <i>Galvanometer</i>• Elektrod karbon <i>Carbon electrodes</i>• Wayar penyambung <i>Connecting wire</i>	<ul style="list-style-type: none">• Asid sulfurik cair <i>Dilute sulphuric acid</i>• Larutan kalium iodida <i>Potassium iodide solution</i>• Larutan kalium manganat(VII) berasid <i>Acidified potassium manganate (VII) solution</i>



Jadual / Table 9.2

Lukis satu gambarajah berlabel untuk menunjukkan susunan radas bagi mengkaji pemindahan elektron pada suatu jarak. Rajah itu hendaklah menggunakan radas dan bahan yang diberi dalam Jadual 9.2. Dalam rajah itu, lukis anak panah untuk menunjukkan arah pengaliran elektron.

Draw a labelled diagram to show the apparatus set-up to investigate the transfer of electrons at a distance. The diagram must include the apparatus and materials given in Table 9.2. In your diagram, draw the arrows to show the direction of electron flow.

[3 marks]

10. (a) Jadual 10.1 menunjukkan dua situasi cara memasak kentang goreng.
Table 10.1 shows two situations how to cook potatoes.

Situasi <i>Situation</i>	A	B
Bentuk kentang <i>Shape of potatoes</i>	Jejari kentang <i>Fries</i>	Baji kentang <i>Wedges</i>
Gambar <i>Picture</i>		

Jadual / Table 10.1

Merujuk kepada Jadual 10.1, situasi manakah kentang akan masak terlebih dahulu?

Nyatakan faktor yang mempengaruhinya dan terangkan bagaimana faktor itu menyebabkan kentang cepat masak.

Refer to table 10.1, which situation will the potatoes cook first? State the factor that influence it and explain how those factor cause potatoes to ripen quickly.

[4 marks]

- (b) Seorang pelajar menjalankan tiga set eksperimen untuk mengkaji faktor yang mempengaruhi kadar tindak balas. Masa yang diambil untuk mengumpul 40 cm³ gas hidrogen direkodkan dalam Jadual 10.2
A student carried out three sets of experiment to investigate the factors that affect the rate of reaction. The time taken to collect 40 cm³ of hydrogen gas is recorded in Table 10.2.

Set	Bahan tindak balas <i>Reactants</i>	Suhu campuran (°C) <i>Temperature of the mixture (°C)</i>	Masa yang diambil untuk mengumpul 40 cm ³ gas hidrogen (s) <i>Time taken to collect 40 cm³ of hydrogen gas (s)</i>
I	25 cm ³ asid nitrik 0.2 mol dm ⁻³ + serbuk zink berlebihan <i>25 cm³ of 0.2 mol dm⁻³ nitric acid + excess zinc powder</i>	30	90
II	25 cm ³ asid nitrik 0.2 mol dm ⁻³ + serbuk zink berlebihan <i>25 cm³ of 0.4 mol dm⁻³ nitric acid + excess zinc powder</i>	40	55
III	25 cm ³ asid nitrik 0.2 mol dm ⁻³ + serbuk zink berlebihan + mangkin X <i>25 cm³ of 0.2 mol dm⁻³ nitric acid + excess zinc powder + catalyst X</i>	30	30

Jadual / Table 10.2

- (i) Zink bertindak balas dengan asid nitrik menghasilkan zink nitrat dan gas hidrogen. Cadangkan mangkin X. Seterusnya, tulis persamaan kimia yang seimbang bagi tindak balas itu dan hitung isipadu maksimum gas hidrogen yang dihasilkan dalam set I.
 [Jisim atom relatif: Zn = 65; 1 mol bagi sebarang gas menempati 24 dm³ mol⁻¹ pada keadaan bilik]
Zinc reacts with nitric acid to produce zinc nitrate and hydrogen gas. Suggest catalyst X. Hence, write a balanced chemical equation for the reaction and calculate the maximum volume of hydrogen gas produced in set I.
 [Relative atomic mass: Zn = 65; 1 mol of any gas occupies 24 dm³ mol⁻¹ at room conditions]

[6 marks]

- (ii) Berdasarkan Jadual 4, bandingkan kadar tindak balas
Based on Table 4, compare the rate of reaction
- Antara set I dengan set II
Between set I and set II
 - Antara set I dengan set III
Between set I and set III

Dengan merujuk kepada teori perlanggaran, terangkan jawapan anda.
By referring to collision theory, explain your answer.

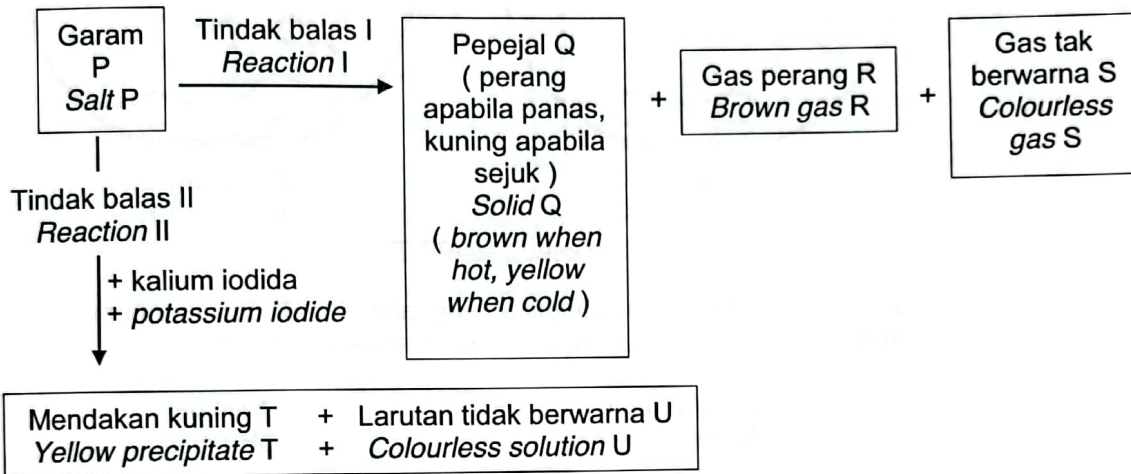
[10 marks]

Bahagian C
Section C

[20 markah]
[20 marks]

Jawab **semua** soalan dalam bahagian ini.
*Answer **all** questions in this section.*

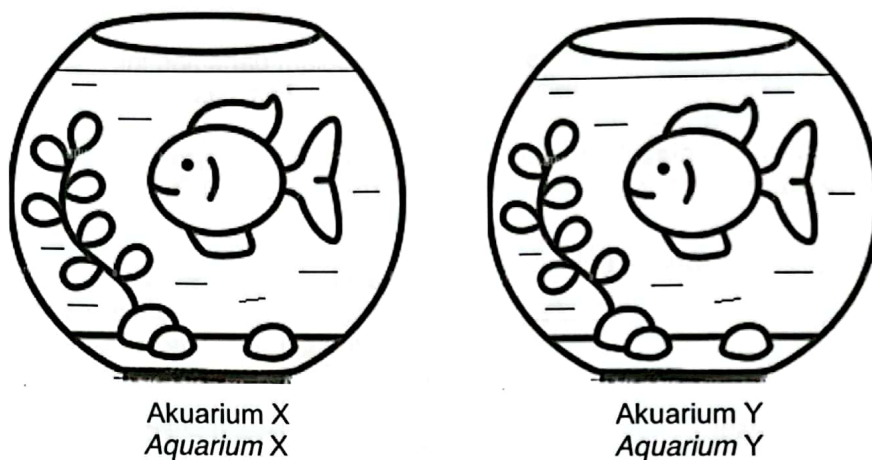
- 11 Rajah 11 menunjukkan peta alir bagi tindak balas garam P.
Diagram 11 shows a flow map for the reaction of salt P.



Rajah / Diagram 11

- (a) (i) Kenal pasti bahan P, Q, R, S dan T.
Identify substance P, Q, R, S and T. [5 marks]
- (ii) Tulis persamaan kimia bagi tindak balas yang berlaku dalam tindak balas II.
Write a chemical equation for the reaction that occurs in reaction II. [2 marks]
- (iii) Sekiranya 0.1 mol larutan kalium iodide digunakan, kira jisim mendakan kuning T yang terbentuk.
[Jisim molar mendakan kuning T: 461 gmol⁻¹]
If 0.1 mol of potassium iodide solution used, calculate the mass of yellow precipitate T. [Molar mass of yellow precipitate T: 461 gmol⁻¹] [2 marks]
- (b) (i) Nyatakan nama garam U dan sifat keterlarutan garam U dalam air.
State the name of salt U and the solubility properties of salt U in water. [2 marks]
- (ii) Huraikan dengan ringkas bagaimana untuk mendapatkan garam T yang kering.
Describe briefly how to obtain dried salt T. [3 marks]

- (c) Rajah 11.2 menunjukkan situasi dua buah akuarium yang mempunyai nilai pH air yang berbeza.
Diagram 11.2 shows a situation of two aquariums which has different pH value of water.



Rajah / Diagram 11.2

Jadual 11 menunjukkan nilai pH air bagi akuarium X dan akuarium Y.
Table 11 shows the pH value of water in aquarium X and Y.

Akuarium <i>Aquarium</i>	Nilai pH <i>pH value</i>
X	3
Y	6

Jadual / Table 11

- (i) Nyatakan maksud asid.
State the meaning of acid.
- [1 mark]
- (ii) Berdasarkan Rajah 11.2, pilih akuarium manakah yang menyebabkan ikan akan mati selepas beberapa hari dan nyatakan sebabnya. Seterusnya cadangkan bagaimana untuk mengubah keadaan air dalam akuarium yang anda nyatakan supaya ikan akan terus hidup. Terangkan jawapan anda.

Based on Diagram 11.2, choose which aquarium will cause the fish died after a few days and state the reason. Next, suggest how to change the condition of water that you stated in order to make the fish alive. Explain your answer.

[5 marks]

END OF QUESTION PAPER