



PEPERIKSAAN PERCUBAAN SPM 2026 TINGKATAN 5

PEPERIKSAAN PERCUBAAN SPM 2026

KIMIA

Kertas 2

Ogos 2026

2 ½ jam

4541/2

Dua jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

Arahan:

1. Tuliskan Nama dan Tingkatan pada ruang yang disediakan.
2. Jawab semua soalan pada **Bahagian A**. Tuliskan jawapan anda dalam ruang yang disediakan.
3. Jawab **satu** soalan daripada **Bahagian B**.
4. Jawab semua soalan pada **Bahagian C**.
5. Anda diminta menjawab dengan lebih terperinci untuk Bahagian B dan Bahagian C. Jawapan mestilah jelas dan logik. Persamaan, gambar rajah, jadual, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda boleh digunakan.
6. Penggunaan kalkulator saintifik yang tidak boleh diprogramkan adalah dibenarkan.

Untuk Kegunaan Pemeriksa			
Bahagian	Soalan	Markah penuh	Markah diperoleh
A	1	5	
	2	5	
	3	6	
	4	7	
	5	8	
	6	9	
	7	10	
	8	10	
B	9	20	
	10	20	
C	11	20	
Jumlah			

NAMA : _____

TINGKATAN: _____

Bahagian A
Section A

[20 markah]
[20 marks]

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

- 1 Rajah 1 menunjukkan formula molekul bagi dua jenis agen pencuci, sabun dan Q.
Diagram 1 shows the molecular formula of two types of cleaning agent, soap and Q.

$\text{CH}_3(\text{CH}_2)_{10}\text{COO}^- \text{Na}^+$	$\text{CH}_3(\text{CH}_2)_{11}\text{OSO}_3^- \text{Na}^+$
Agen pencuci sabun <i>Cleaning agent soap</i>	Agen pencuci Q <i>Cleaning agent Q</i>

Rajah 1
Diagram 1

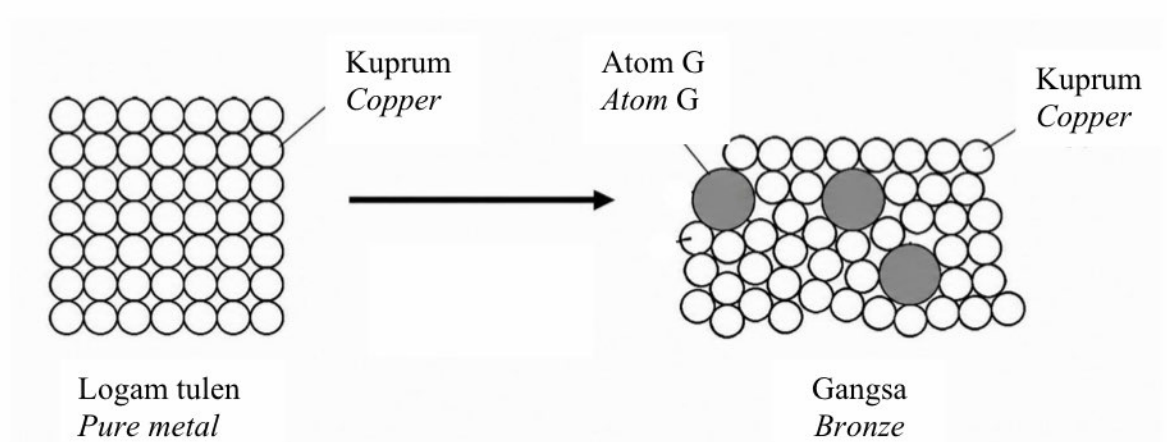
- (a) Nyatakan nama proses pembentukan sabun.
State the name of the process of soap formation.
-
- [1 markah]
[1 mark]
- (b) Nyatakan alkali yang digunakan dalam kedua-dua agen pencuci itu.
State the alkali used in both cleaning agents.
-
- [1 markah]
[1 mark]
- (c) Apakah nama bahagian dalam struktur sabun yang larut dalam air?
What is the name of the part of the soap structure that is soluble in water?
-
- [1 markah]
[1 mark]

- (d) Nyatakan keberkesanan agen pencuci Q dalam air laut. Berikan satu sebab.
State the effectiveness of cleaning agent Q in seawater. Give a reason.

.....

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

- 2 Rajah 2 menunjukkan proses penukaran logam tulen kepada gangsa.
Diagram 2 shows the process changing of pure metal to bronze.



Rajah 2
 Diagram 2

- (a) Apakah istilah yang digunakan untuk campuran dua atau lebih unsur yang mana unsur utamanya ialah logam?
What is the term used for mixture of two or more elements where the main element is metal?

.....
 [1 markah]
 [1 mark]

- (b) Nyatakan satu sifat bagi logam tulen.
State one property of pure metal.

.....
 [1 markah]
 [1 mark]

- (c) Nyatakan nama bagi atom G.

State the name of atom G.

.....

[1 markah]

[1 mark]

- (d) Bandingkan kekerasan kuprum tulen dan gangsa.

Compare the hardness of pure copper and bronze.

.....

[1 markah]

[1 mark]

- (e) Nyatakan satu kegunaan gangsa dalam kehidupan harian.

State one use of bronze in daily life.

.....

[1 markah]

[1 mark]

- 3 Jadual 3 menunjukkan maklumat tentang isotop-isotop silikon.
Table 3 shows an information about isotopes of silicon.

Isotop <i>Isotope</i>	Kelimpahan semulajadi (%) <i>Natural abundance (%)</i>	Nombor proton <i>Proton number</i>
Silikon-28 <i>Silicon-28</i>	92.23	14
Silikon-29 <i>Silicon-29</i>	4.67	14
Silikon-30 <i>Silicon-30</i>	3.10	14

Jadual 3
Table 3

- (a) Apakah yang dimaksudkan dengan nombor proton?
What is the meaning of proton number?

.....
 [1 markah]
 [1 mark]

- (b) Nyatakan bilangan neutron bagi Silikon-30.
State the number of neutrons of Silicon-30.

.....
 [1 markah]
 [1 mark]

- (c) Lukis struktur atom bagi isotop Silikon-29.
Draw the atomic structure of isotope of Silicon-29.

[2 markah]

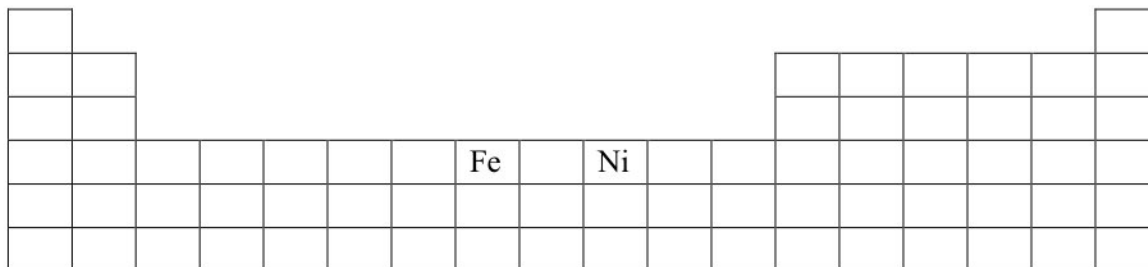
[2 marks]

- (d) Hitung jisim atom relatif bagi silikon.
Calculate the relative atomic mass of silicon.

[2 markah]

[2 marks]

- Diagram 4.1 shows part of Periodic Table of Elements. Both elements located between Group 3 to Group 12 in the Periodic Table of Elements.



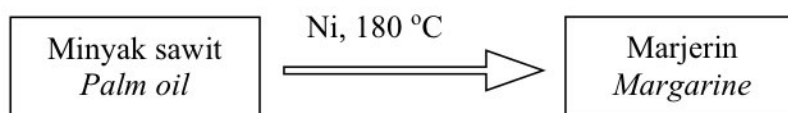
Rajah 4.1
Diagram 4.1

- What is the name of group of elements located between Group 3 to Group 12 in the Periodic Table of Elements?*

[1 markah]

[1 mark]

- Diagram 4.2 shows a use of one of the elements in Diagram 4.1.



Rajah 4.2
Diagram4.2

State the function of nickel in the process.

[1 markah]

[1 mark]

- (c) Ferum dalam Rajah 4.1 boleh bertindak balas dengan gas klorin untuk menghasilkan satu sebatian.

Iron in Diagram 4.1 can react with chlorine gas to form a compound.

- (i) Nyatakan warna bagi sebatian yang terhasil.

State the colour of the compound formed.

.....

[1 markah]

[1 mark]

- (ii) Tulis persamaan kimia bagi tindak balas itu.

Write the chemical equation for the reaction.

.....

[2 markah]

[2 marks]

- (iii) 0.1 mol ferum bertindak balas dengan gas klorin berlebihan menghasilkan satu sebatian. Hitung jisim sebatian itu.

0.1 mol of iron reacts with excess chlorine gas to form a compound.

Calculate the mass of the compound.

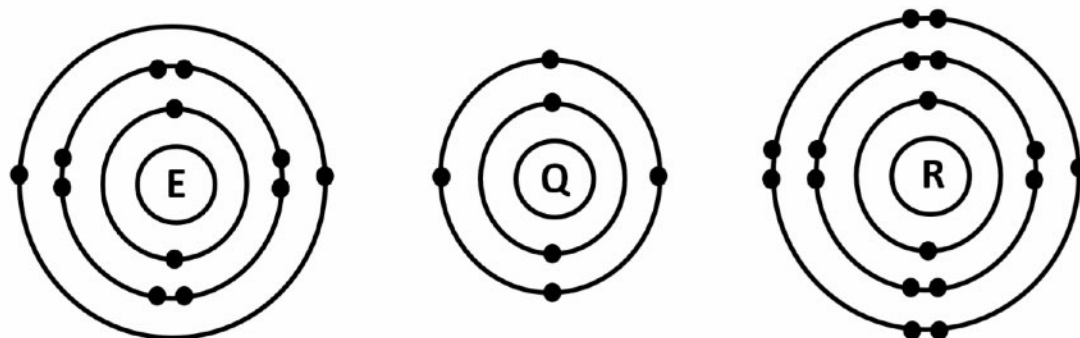
[Jisim atom relatif: Cl = 35.5, Fe = 56]

[Relative atomic mass: Cl = 35.5, Fe = 56]

[2 markah]

[2 marks]

- 5 (a) Rajah 5.1 menunjukkan susunan elektron bagi atom unsur E, Q dan R.
Diagram 5.1 shows the electron arrangement of atoms of element E, Q and R.



Rajah 5
Diagram 5

Unsur R bertindak balas dengan unsur E menghasilkan sebatian J.

Unsur R juga boleh bertindak balas dengan unsur Q untuk menghasilkan sebatian Z.

Element R reacts with element E to form compound J.

Element R also can react with element Q to form compound Z.

- (i) Apakah tujuan pembentukan sebatian?
What is the purpose of compound formation?

.....
 [1 markah]
 [1 mark]

- (ii) Nyatakan jenis ikatan bagi sebatian J.
State the type of bond of compound J.

.....
 [1 markah]
 [1 mark]

- (iii) Tulis persamaan kimia bagi pembentukan sebatian J.
Write the chemical equation of the formation of compound J.

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

- (iv) Lukis gambar rajah susunan elektron bagi sebatian Z.
Draw the electron arrangement of compound Z.

[2 markah]
 [2 marks]

- (b) Jadual 5 menunjukkan takat lebur dan takat didih bagi kedua-dua sebatian J dan sebatian Z.

Table 5 shows the melting point and boiling point of both compounds J and Z.

Sebatian Compound	Takat lebur (°C) Melting point (°C)	Takat didih (°C) Boiling point (°C)
J	714.0	1412.0
Z	− 23.0	76.7

Jadual 5
 Table 5

Berdasarkan Jadual 5, terangkan perbezaan takat lebur dan takat didih bagi kedua-dua sebatian itu.

Based on Table 5, explain the differences of the melting point and boiling point of both compounds.

.....

.....

.....

.....

[2 markah]
 [2 marks]

- 6 Jadual 6 menunjukkan maklumat bagi eksperimen yang dijalankan untuk mengkaji faktor yang mempengaruhi kadar tindak balas.

Table 6 shows the information of experiment conducted to study the factor affecting the rate of reaction.

Set	Bahan tindak balas <i>Reactants</i>	Suhu/ $^{\circ}\text{C}$ <i>Temperature/ $^{\circ}\text{C}$</i>	Masa yang diambil untuk mengumpul 40 cm ³ gas (s) <i>Time taken to collect 40 cm³ of gas (s)</i>
I	Ketulan kalsium karbonat berlebihan + 50 cm ³ asid hidroklorik 0.5 mol dm ⁻³ <i>Excess granulated calcium carbonate + 50 cm³ of 0.5 mol dm⁻³ hydrochloric acid</i>	30.0	35
II	Ketulan kalsium karbonat berlebihan + 50 cm ³ asid hidroklorik 0.5 mol dm ⁻³ <i>Excess granulated calcium carbonate + 50 cm³ of 0.5 mol dm⁻³ hydrochloric acid</i>	40.0	25

Jadual 6

Table 6

- (a) Nyatakan satu faktor yang mempengaruhi kadar tindak balas.

State one factor that affects the rate of reaction.

.....

[1 markah]

[1 mark]

(b) Berdasarkan Jadual 6:

Based on Table 6:

- (i) Tuliskan persamaan kimia bagi tindak balas yang berlaku dalam Set I.
Write a chemical equation for the reaction occur in Set I.

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

- (ii) Hitung kadar tindak balas purata bagi Set I dan Set II.
Calculate the average rate of reaction of Set I and II.

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

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

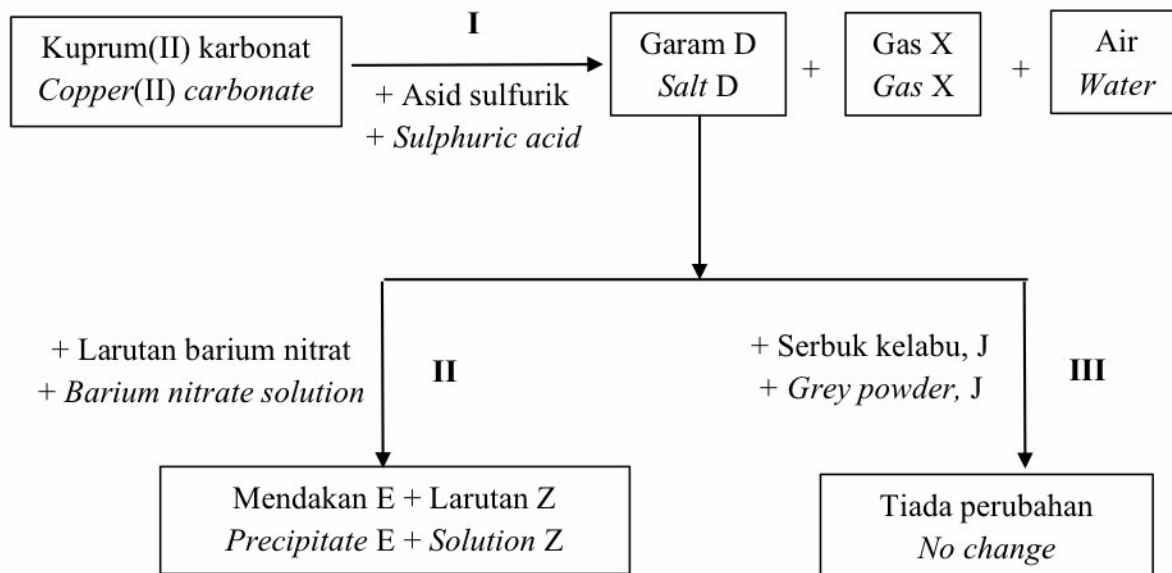
.....
[1 markah]
[1 mark]

- (iv) Terangkan jawapan anda di **b(iii)** berdasarkan teori perlanggaran.
*Explain your answer in **b(iii)** based on collision theory.*

.....
.....
.....
.....
.....
[3 markah]
[3 marks]

- 7 Rajah 7.1 menunjukkan carta alir yang melibatkan tindak balas bagi garam kuprum(II) karbonat.

Diagram 7.1 shows the flow chart involving reactions of copper(II) carbonate salt.



Rajah 7.1
Diagram 7.1

- (a) Nyatakan keterlarutan bagi garam kuprum(II) karbonat.
State the solubility of copper(II) carbonate salt.

.....
[1 markah]
[1 mark]

- (b) Tindak balas II ialah tindak balas penguraian ganda dua. Nyatakan nama bagi larutan Z.
Reaction II is double decomposition reaction. State the name of solution Z.

.....
[1 markah]
[1 mark]



- (c) Kenal pasti garam D, gas X dan mendakan E.

Identify salt D, gas X and precipitate E.

Garam D :
Salt D

Gas X :
Gas X

Mendakan E :
Precipitate E

[3 markah]

[3 marks]

- (d) Cadangkan satu modifikasi yang boleh dilakukan supaya mendakan perang terbentuk apabila tindak balas III diulang.

Terangkan jawapan anda.

Suggest a modification that can be done so that brown precipitate is formed when reaction III is repeated.

Explain your answer.

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

[3 markah]

[3 marks]

- (e) Sekumpulan murid menjalankan satu eksperimen lain bagi menghasilkan mendakan berwarna putih menggunakan larutan barium nitrat. Murid itu diberikan tiga bahan kimia berbeza seperti dalam Rajah 7.2.

A group of students conduct other experiment to form white precipitate using barium nitrate solution. The students are given three different chemical substances as in Diagram 7.2.

- Larutan ammonium karbonat
Ammonium carbonate solution
 - Larutan magnesium klorida
Magnesium chloride solution
 - Larutan kalium sulfat
Potassium sulphate solution

Rajah 7.2
Diagram 7.2

Larutan manakah yang perlu digunakan oleh murid itu?

Berikan satu sebab.

Which solution need to be used by the student?

Give one reason.

Larutan digunakan :

Solution used

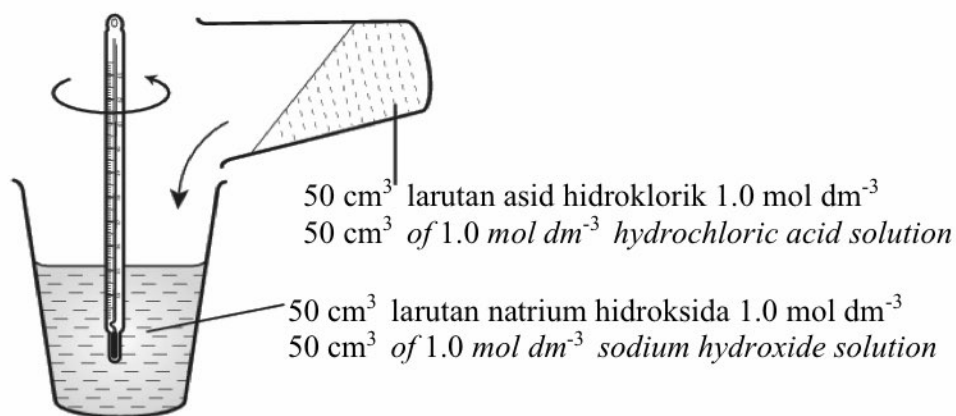
Sebab :

Reason

[2 markah]

[2 marks]

- 8 Rajah 8 menunjukkan susunan radas yang digunakan untuk menentukan haba peneutralan. Suhu campuran berubah daripada 28.5 °C ke 35.0 °C.
Diagram 8 shows apparatus set up used to determine heat of neutralisation. The temperature of the mixture changes from 28.5 °C to 35.0 °C.



Rajah 8
Diagram 8

- (a) Nyatakan jenis alkali bagi natrium hidroksida.
State the type of alkali of sodium hydroxide.

.....
[1 markah]
[1 mark]

- (b) Nyatakan jenis tindak balas dalam Rajah 8 berdasarkan perubahan haba.
State the type of reaction in Diagram 8 based on heat change.

.....
[1 markah]
[1 mark]



- (c) Hitung haba peneutralan dalam eksperimen ini.
[Muatan haba tentu larutan = $4.2 \text{ J g}^{-1} \text{ }^{\circ}\text{C}^{-1}$]
Calculate the heat of neutralisation in this experiment.
[*Specific heat of capacity of the solution = $4.2 \text{ J g}^{-1} \text{ }^{\circ}\text{C}^{-1}$*]

[3 markah]

[3 marks]

- (d) Lukis gambar rajah aras tenaga bagi tindak balas ini.
Draw an energy level diagram for this reaction.

[3 markah]

[3 marks]

- (e) Haba peneutralan apabila asid hidroklorik digantikan dengan cuka dengan isi padu dan kepekatan yang sama adalah lebih rendah. Wajarkan pernyataan tersebut. Berikan satu sebab.

The heat of neutralisation when hydrochloric acid replaced with vinegar with the same volume and concentration is lower. Justify the statement. Give one reason.

.....

.....

.....

[2 markah]

[2 marks]

Bahagian B
Section B

[20 markah]
[20 marks]

Jawab mana – mana satu soalan dalam bahagian ini.

Answer any one of questions in this section.

- 9 Jadual 9 menunjukkan maklumat tentang satu eksperimen yang dijalankan untuk mengkaji faktor-faktor yang mempengaruhi kadar tindak balas. Asid-asid yang digunakan mempunyai darjah pengionan yang tinggi dalam air.

Table 9 shows the information about an experiment conducted to study the factors that affecting the rate of reaction. Acids used have high degree of ionisation in water.

Set	Bahan tindak balas <i>Reactants</i>
I	50 cm ³ asid monoprotik X 1.0 mol dm ⁻³ + 3g ketulan magnesium <i>50 cm³ of 1.0 mol dm⁻³ monoprotic acid X + 3g magnesium granule</i>
II	50 cm ³ asid monoprotik X 1.0 mol dm ⁻³ + 3g serbuk magnesium <i>50 cm³ of 1.0 mol dm⁻³ monoprotic acid X + 3g magnesium powder</i>
III	50 cm ³ asid diprotik M 1.0 mol dm ⁻³ + 3g serbuk magnesium <i>50 cm³ of 1.0 mol dm⁻³ diprotic acid M + 3g magnesium powder</i>

Jadual 9

Table 9

- (a) Nyatakan maksud kadar tindak balas dan cadangkan nama bagi asid X dan asid M.

State the meaning of the rate of reaction and suggest the names for acid X and acid M.

[3 markah]

[3 marks]



(b) Berdasarkan Jadual 9:

Based on Table 9:

- (i) Tulis persamaan kimia bagi tindak balas dalam set I.
Hitungkan isi padu maksimum gas yang dibebaskan.
[Jisim atom relatif bagi Mg = 24]
[1 mol sebarang gas menempati 24 dm³ pada keadaan bilik]
Write the chemical equation for the reaction in set I.
Calculate the maximum volume of gas released.
[Relative atomic mass of Mg = 24]
[1 mol of any gas occupies 24 dm³ at room conditions]

[6 markah]

[6 marks]

- (ii) Bandingkan kadar tindak balas antara Set I dan Set II
Terangkan jawapan anda menggunakan teori perlanggaran.
Compare the rate of reaction between Set I and II
Explain your answers using the collision theory.

[5 markah]

[5 marks]

- (iii) Lakarkan graf isi padu gas melawan masa bagi Set I, Set II dan Set III pada paksi yang sama.
Sketch the graph of volume of gas against time for Set I, II and III on the same axis.

[4 markah]

[4 marks]

- (c) Seorang murid menambahkan satu spatula serbuk kuprum(II) sulfat ke dalam campuran Set III. Bandingkan kadar tindak balas antara Set III dengan tindak balas yang ditambahkan dengan serbuk kuprum(II) sulfat itu dan berikan satu sebab.

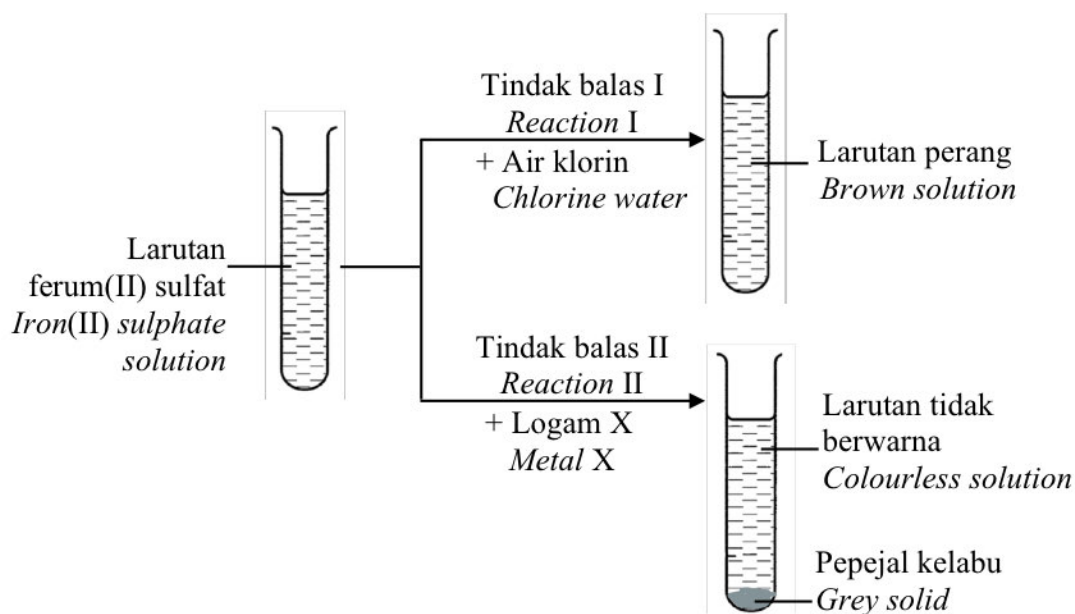
A student added one spatula of copper(II) sulphate powder into the mixture of Set III.
Compare the rate of reaction between Set III and the reaction where copper(II) sulphate is added and give a reason.

[2 markah]

[2 marks]

- 10 (a) Rajah 10 menunjukkan dua tindak balas redoks yang melibatkan larutan ferum(II) sulfat.

Diagram 10 shows two redox reactions that involves iron(II) sulphate solution.



Rajah 10
Diagram 10

- (i) Nyatakan maksud tindak balas redoks.
Apakah warna bagi larutan ferum(II) sulfat?
State the meaning of redox reaction.
What is the colour of iron(II) sulphate?

[2 markah]
[2 marks]

Berdasarkan Rajah 10,
Based on Diagram 10,

- (ii) kenal pasti ion yang hadir dalam larutan perang bagi tindak balas I dan logam X yang digunakan dalam Tindak balas II.
identify the ion present in the brown solution of reaction I metal X that is used in reaction II.

[2 markah]
[2 marks]

- (iii) Bandingkan perbezaan pemerhatian yang diperolehi dalam Tindak balas I dan Tindak balas II berdasarkan aspek berikut:

Compare the difference in observations obtained in Reaction I and Reaction II based on the following aspects:

- Peranan larutan ferum(II) sulfat
Role of iron(II) sulphate
- Perubahan nombor pengoksidaan ferum
Changes in oxidation number of iron

Kemudian, tuliskan setengah persamaan pengoksidaan, penurunan dan persamaan ion penuh bagi tindak balas I.

Hence, write the oxidation half equation, reduction half equation and full ionic equation for Reaction I.

[8 markah]

[8 marks]

- (b) Jadual 10.1 menunjukkan maklumat bagi dua sel elektrolisis.
Table 10.1 shows the informations about two electrolytic cells.

Set	Elektrolit <i>Electrolyte</i>	Elektrod <i>Electrode</i>		Pemerhatian di anod <i>Observation at anode</i>
		Katod <i>Cathode</i>	Anod <i>Anode</i>	
I	Larutan kalium klorida $0.0001 \text{ mol dm}^{-3}$ $0.0001 \text{ mol dm}^{-3}$ <i>potassium chloride solution</i>	Karbon <i>Carbon</i>	Karbon <i>Carbon</i>	Gelembung gas tidak berwarna terhasil <i>Colourless bubble gas formed.</i>
II	Larutan kalium klorida 1.0 mol dm^{-3} 1.0 mol dm^{-3} <i>potassium chloride solution</i>	Karbon <i>Carbon</i>	Karbon <i>Carbon</i>	Gas kuning kehijauan dibebaskan <i>Greenish yellow gas released</i>

Jadual 10.1

Table 10.1

Jadual 10.2 menunjukkan nilai E^0 bagi beberapa sel setengah.
Table 10.2 shows the E^0 value for a few half-cells.

Tindak balas sel setengah <i>Half-cell equation</i>	Nilai E^0 (V) <i>E^0 value (V)</i>
$K^+_{(ak/aq)} + e \rightleftharpoons K_{(p/s)}$	- 2.92
$2H^+_{(ak/aq)} + 2e \rightleftharpoons H_{2(g)}$	0.00
$O_{2(g)} + 2H_2O_{(ce/l)} + 4e \rightleftharpoons 4OH^-_{(ak/aq)}$	+0.40
$Cl_{2(g)} + 2e \rightleftharpoons 2Cl^-_{(ak/aq)}$	+1.36

Jadual 10.2

Table 10.2

- (i) Berdasarkan Jadual 10, terangkan mengapa terdapat perbezaan dalam pemerhatian di anod bagi Set I dan Set II.

Dalam penerangan anda, sertakan butiran berikut:

- Ion yang dipilih untuk dinyahcasakan
- Sebab bagi pemilihannya
- Hasil tindak balas di anod

Based on Table 10, explain why there are differences in the observation at anode for Cell I and II.

In your description, include the following aspects:

- *Ions selected to be discharged*
- *Reason of its selection*
- *Product formed at anode*

[6 markah]

[6 marks]

- (ii) Cadangkan satu pengubahsuaian yang boleh dilakukan pada Set II untuk menghasilkan gas kuning kehijauan yang lebih banyak di anod. Berikan satu alasan.

Suggest one modification that can be made to Set II to produce more greenish yellow gas at the anode. Give one reason.

[2 markah]

[2 marks]



SERTAI TELEGRAM @exercise_students

Bahagian C
Section C

[20 markah]

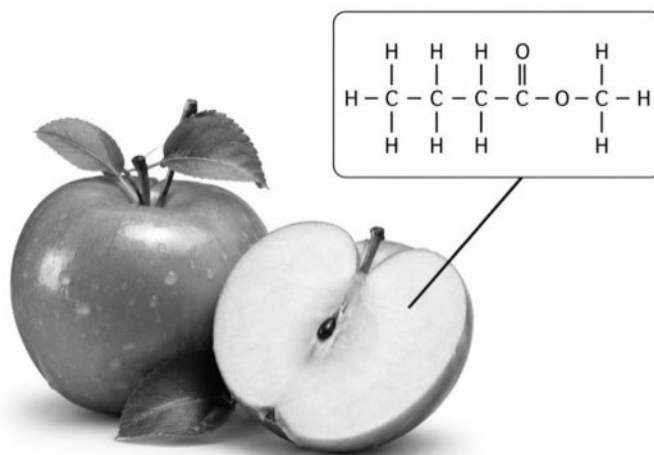
[20 marks]

Soalan ini mesti dijawab.

You must answer this question.

- 11 (a) Seorang pengusaha industri makanan ingin menghasilkan perisa epal tiruan bagi minuman dan gula-gula. Bau harum epal dapat dihasilkan apabila satu alkohol dan satu asid karboksilik bertindak balas melalui kaedah refluks dengan kehadiran mangkin. Rajah 11.1 menunjukkan struktur bagi sebatian berbau epal itu.

A food industry entrepreneur wants to produce an artificial apple flavour for drinks and candies. The fragrant apple scent can be produced when an alcohol and a carboxylic acid are reacted through a reflux method in the presence of a catalyst. Diagram 11.1 shows the structure of the apple scent compound.



Rajah 11.1

Diagram 11.1

- (i) Nyatakan formula am bagi alkohol.
Kenalpasti mangkin yang digunakan dalam pembentukan sebatian berbau epal dan nyatakan nama bagi sebatian berbau epal itu.

State the general formula of alcohol.

Identify the catalyst used in the formation of the apple scent compound and the name of the apple scent compound.

[3 markah]

[3 marks]

- (ii) Tulis persamaan kimia bagi pembentukan sebatian berbau epal. Kemudian, hitung jisim sebatian yang terhasil itu jika 0.05 mol alkohol digunakan.

[Jisim atom relatif: C = 12, O = 16, H = 1]

Write the chemical equation for the formation of the apple scent compound. Then, calculate the mass of the compound formed if 0.05 mol of alcohol is used.

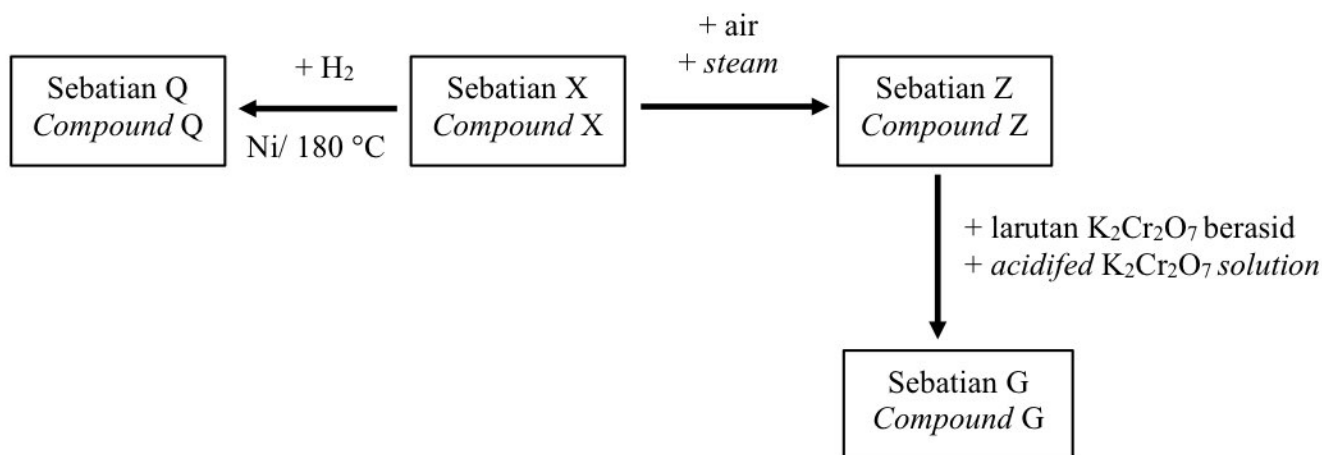
[Relative atomic mass: C = 12, O = 16, H = 1]

[4 markah]

[4 marks]

- (b) Rajah 11.2 menunjukkan carta alir penukaran bagi sebatian X. Sebatian X mempunyai formula am C_nH_{2n} dan mempunyai 5 atom karbon per molekul.

Diagram 11.2 shows the schematic diagram of the conversion of compound X. Compound X has general formula of C_nH_{2n} and has 5 carbon atoms per molecule.



Rajah 11.2
Diagram 11.2

Berdasarkan Jadual 11.2:
Based on Diagram 11.2:

- (i) Kenalpasti sebatian G, sebatian X, sebatian Q dan sebatian Z. Nyatakan perubahan warna kepada larutan $K_2Cr_2O_7$ berasid.
Identify compound G, X, Q and Z. State the colour change on acidified $K_2Cr_2O_7$ solution.

[5 markah]

[5 marks]

- (ii) Kejelagaan nyalaan semasa pembakaran dipengaruhi oleh bilangan atom karbon per molekul bagi sesuatu sebatian. Dengan menggunakan sebatian Q dan satu lagi sebatian lain daripada siri homolog yang sama dengan sebatian Q, huraikan satu eksperimen untuk mengkaji hubungan antara bilangan atom karbon per molekul dengan kuantiti jelaga yang dihasilkan.

Dalam huraian anda, sertakan butiran berikut.

- Nama sebatian lain yang digunakan
- Prosedur
- Jangkaan hubungan antara bilangan atom karbon per molekul dengan kuantiti jelaga yang dihasilkan
- Pengiraan bagi membuktikan kuantiti jelaga yang dihasilkan bagi sebatian Q dan satu lagi sebatian yang digunakan
[Jisim atom relatif; C = 12, H = 1]

Sootiness of flame during combustion is affected by the number of carbon atom per molecule of the compound. By using compound Q and another one compound from the same homologous series as compound Q, describe an experiment to study the relationship between the number of carbon atoms per molecule with the quantity of soot produced.

In your description, include the following aspects:

- *Name of the other compound used*
- *Procedure*
- *Expected relationship between the number of carbon atoms per molecule with the quantity of the soot produced*
- *Calculation to verify the quantity of the soot produced of compound Q and other compound used*
[Relative atomic mass; C = 12, H = 1]

[8 markah]

[8 marks]

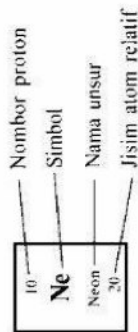
KERTAS SOALAN TAMAT



SERTAI TELEGRAM @exercise_students

JADUAL BERKALA UNSUR

1 H Hydrogen 1																	2 He Helium 4
3 Li Lithium 7	4 Be Beryllium 9															9 F Fluorine 19	10 Ne Neon 20
11 Na Natrium 23	12 Mg Magnesium 24															17 Cl Klorin 35	18 Ar Argon 40
19 K Kalium 39	20 Ca Kalsium 40	21 Sc Skandium 45	22 Ti Titanium 48	23 V Vanadium 51	24 Cr Kromium 52	25 Mn Mangan 55	26 Fe Besi 56	27 Co Kobalt 59	28 Ni Nikel 59	29 Cu Kuprum 64	30 Zn Zink 65	31 Ga Gallium 70	32 Ge Germanium 73	33 As Arsenik 75	34 Se Selenium 79	35 Br Bromin 80	36 Kr Krypton 84
37 Rb Rubidium 86	38 Sr Strontium 88	39 Y Itrium 89	40 Zr Zirkonium 91	41 Nb Niobium 93	42 Mo Molibdenum 96	43 Tc Teknetium 98	44 Ru Rutenium 101	45 Rh Rodium 103	46 Pd Paladium 106	47 Ag Argentum 108	48 Cd Kadmium 112	49 In Indium 115	50 Sn Stannum 119	51 Sb Antimoni 122	52 Te Telurium 128	53 I Iodin 127	54 Xe Xenon 131
55 Cs Sesium 133	56 Ba Barium 137	57 La Lantanum 139	58 Ce Seriun 140	59 Pr Praseodimium 141	60 Nd Neodimium 144	61 Pm Prometium 147	62 Sm Samarium 150	63 Eu Europium 152	64 Gd Gadolium 157	65 Tb Terbium 159	66 Dy Dysprosium 163	67 Ho Holmium 165	68 Er Erbium 167	69 Tm Thulium 169	70 Yb Ytterbium 173	71 Lu Lutetium 175	
87 Fr Fransium 223	88 Ra Radium 226	89 Ac Aktinium 227	90 Th Torium 232	91 Pa Protaktinium 231	92 U Uranium 238	93 Np Neptunium 237	94 Pu Plutonium 244	95 Am Amerisium 243	96 Cm Kuriun 247	97 Bk Berkelium 247	98 Cf Kalifornium 249	99 Es Einsteinium 254	100 Fm Fermium 253	101 Md Mendelevium 256	102 No Nobelium 254	103 Lr Lawrensium 257	



THE PERIODIC TABLE OF ELEMENTS

1 H Hydrogen 1																	2 He Helium 4	
3 Li Lithium 7	4 Be Beryllium 9																	10 Ne Neon 20
11 Na Sodium 23	12 Mg Magnesium 24																	18 Ar Argon 40
19 K Potassium 39	20 Ca Calcium 40	21 Sc Scandium 45	22 Ti Titanium 48	23 V Vanadium 51	24 Cr Chromium 52	25 Mn Manganese 55	26 Fe Iron 56	27 Co Cobalt 59	28 Ni Nickel 59	29 Cu Copper 64	30 Zn Zinc 65	31 Ga Gallium 70	32 Ge Germanium 73	33 As Arsenic 75	34 Se Selenium 79	35 Br Bromine 80	36 Kr Krypton 84	
37 Rb Rubidium 86	38 Sr Strontium 88	39 Y Yttrium 89	40 Zr Zirconium 91	41 Nb Niobium 93	42 Mo Molybdenum 96	43 Tc Technetium 98	44 Ru Ruthenium 101	45 Rh Rhodium 103	46 Pd Palladium 106	47 Ag Silver 108	48 Cd Cadmium 112	49 In Indium 115	50 Sn Tin 119	51 Sb Antimony 122	52 Te Tellurium 128	53 I Iodine 127	54 Xe Xenon 131	
55 Cs Cesium 133	56 Ba Barium 137	57 La Lanthanum 139	58 Ce Cerium 140	59 Pr Praseodymium 141	60 Nd Neodymium 144	61 Pm Promethium 147	62 Sm Samarium 150	63 Eu Europium 152	64 Gd Gadolinium 157	65 Tb Terbium 159	66 Dy Dysprosium 163	67 Ho Holmium 165	68 Er Erbium 167	69 Tm Thulium 169	70 Yb Ytterbium 173	71 Lu Lutetium 175		
87 Fr Francium 223	88 Ra Radium 226	89 Ac Actinium 227	90 Th Thorium 232	91 Pa Protactinium 231	92 U Uranium 238	93 Np Neptunium 237	94 Pu Plutonium 244	95 Am Americium 243	96 Cm Curium 247	97 Bk Berkelium 247	98 Cf Californium 250	99 Es Einsteinium 254	100 Fm Fermium 253	101 Md Mendelevium 256	102 No Nobelium 254	103 Lr Lawrencium 257		
107 Uuh Ununilium 257	108 Uuo Ununium 265	109 Uue Ununennium 266	110 Uuh Ununilium 263	111 Uhp Ununpentium 260	112 Uhl Ununilium 263	113 Uhs Ununseptium 262	114 Uho Ununium 265	115 Uhu Ununium 265	116 Uhu Ununium 265	117 Uhu Ununium 265	118 Uhu Ununium 265	119 Uhu Ununium 265	120 Uhu Ununium 265	121 Uhu Ununium 265	122 Uhu Ununium 265	123 Uhu Ununium 265		

Proton number

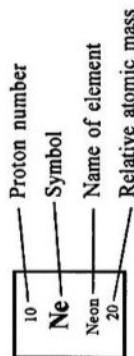
Symbol

Name of element

Relative atomic mass

10	Ne	Neon	20
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5	B	Boron	11
6	C	Carbon	12
7	N	Nitrogen	14
8	O	Oxygen	16
9	F	Flourine	19
10	He	Helium	4
11	Na	Sodium	23
12	Mg	Magnesium	24
13	Al	Aluminium	27
14	Si	Silicon	28
15	P	Phosphorus	31
16	S	Sulphur	32
17	Cl	Chlorine	35
18	Ar	Argon	40
19	K	Potassium	39
20	Ca	Calcium	40
21	Sc	Scandium	45
22	Ti	Titanium	48
23	V	Vanadium	51
24	Cr	Chromium	52
25	Mn	Manganese	55
26	Fe	Iron	56
27	Co	Cobalt	59
28	Ni	Nickel	59
29	Cu	Copper	64
30	Zn	Zinc	65
31	Ga	Gallium	70
32	Ge	Germanium	73
33	As	Arsenic	75
34	Se	Selenium	79
35	Br	Bromine	80
36	Kr	Krypton	84
37	Rb	Rubidium	86
38	Sr	Strontium	88
39	Y	Yttrium	89
40	Zr	Zirconium	91
41	Nb	Niobium	93
42	Mo	Molybdenum	96
43	Tc	Technetium	98
44	Ru	Ruthenium	101
45	Rh	Rhodium	103
46	Pd	Palladium	106
47	Ag	Silver	108
48	Cd	Cadmium	112
49	In	Indium	115
50	Sn	Tin	119
51	Sb	Antimony	122
52	Te	Tellurium	128
53	I	Iodine	127
54	Xe	Xenon	131
55	Cs	Cesium	133
56	Ba	Barium	137
57	La	Lanthanum	139
58	Ce	Cerium	140
59	Pr	Praseodymium	141
60	Nd	Neodymium	144
61	Pm	Promethium	147
62	Sm	Samarium	150
63	Eu	Europium	152
64	Gd	Gadolinium	157
65	Tb	Terbium	159
66	Dy	Dysprosium	163
67	Ho	Holmium	165
68	Er	Erbium	167
69	Tm	Thulium	169
70	Yb	Ytterbium	173
71	Lu	Lutetium	175
72	Uuh	Ununilium	257
73	Uuo	Ununium	265
74	Uue	Ununennium	266
75	Uuh	Ununilium	263
76	Uhp	Ununpentium	260
77	Uhl	Ununilium	263
78	Uhs	Ununseptium	262
79	Uho	Ununium	265
80	Uhu	Ununium	265
81	Uhu	Ununium	265
82	Uhu	Ununium	265
83	Uhu	Ununium	265
84	Uhu	Ununium	265
85	Uhu	Ununium	265
86	Uhu	Ununium	265
87	Fr	Francium	223
88	Ra	Radium	226
89	Ac	Actinium	227
90	Th	Thorium	232
91	Pa	Protactinium	231
92	U	Uranium	238
93	Np	Neptunium	237
94	Pu	Plutonium	244
95	Am	Americium	243
96	Cm	Curium	247
97	Bk	Berkelium	247
98	Cf	Californium	250
99	Es	Einsteinium	254
100	Fm	Fermium	253
101	Md	Mendelevium	256
102	No	Nobelium	254
103	Lr	Lawrencium	257



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