

SULIT

NO. KAD  
PENGENALAN

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ANGKA GILIRAN

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**SOALAN PRAKTIS BESTARI  
PROJEK JAWAB UNTUK JAYA (JUJ) 2019**



**SIJIL PELAJARAN MALAYSIA  
CHEMISTRY  
Kertas 2 Set 2**

**4541/2**

2½ jam

Dua jam tiga puluh minit

**JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU**

1. Tulis nombor kad pengenalan dan angka giliran anda pada petak yang disediakan.
2. Kertas soalan ini adalah dalam dwibahasa.
3. Soalan dalam bahasa Inggeris mendahului soalan yang sepadan dalam Bahasa Melayu.
4. Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam Bahasa Inggeris atau Bahasa Melayu.
5. Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini.

Kegunaan Pemeriksa			
Kod Pemeriksa			
Bahagian	Soalan	Markah Penuh	Markah Diperoleh
A	1	9	
	2	9	
	3	10	
	4	10	
	5	11	
	6	11	
B	7	20	
	8	20	
C	9	20	
	10	20	
Jumlah		100	

**Section A**  
**Bahagian A**

[60 marks]

[60 markah]

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

- 1** Diagram 1 shows the position of eight elements in the Periodic Table. A, D, E, G, J, L, M and T are not the actual symbols of the elements.

*Rajah 1 menunjukkan kedudukan lapan unsur dalam Jadual Berkala. A, D, E, G, J, L, M dan T bukan merupakan simbol sebenar unsur.*

1	2											13	14	15	16	17	18
																	A
D																	
E	G											J				L	
M							T										

Diagram 1 / *Rajah 1*

- (a) E, G, J and L are located in the same period.  
*E, G, J dan L terletak dalam kala yang sama.*

- (i) What is the meaning of period?  
*Apakah maksud kala?*

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

- (ii) Which period are the elements placed?  
*Kala yang manakah unsur itu terletak?*

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

- (b) Which element is a noble gas?  
*Unsur yang manakah adalah gas adi?*

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

- (c) Which element is a transition element?

*Unsur yang manakah adalah unsur peralihan?*

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

- (d) State **one** special characteristic of transition element.

*Nyatakan **satu** ciri istimewa unsur peralihan.*

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

- (e) D, E and M are placed in the same group, which is group 1.

*D, E dan M terletak dalam kumpulan yang sama, iaitu kumpulan 1.*

- (i) Arrange the group 1 elements according to the atomic size in descending order.

*Susun unsur kumpulan 1 berdasarkan saiz atom dalam tertib menurun.*

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

- (ii) Explain your answer in (e)(i).

*Terangkan jawapan anda di (e)(i).*

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

- (iii) Group 1 elements react with oxygen to form a compound.

What is the type of compound formed?

*Unsur kumpulan 1 bertindak balas dengan oksigen membentuk satu sebatian.*

*Apakah jenis sebatian yang terbentuk itu?*

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

2. Table 2 shows the number of protons, neutrons and electrons present in atom Q and atom X.

The letters used are not the actual symbols of the atoms.

Jadual 2 menunjukkan bilangan proton, neutron dan elektron dalam atom Q dan atom X.

Huruf yang digunakan bukan simbol sebenar bagi atom-atom itu

Atom <i>Atom</i>	Number of protons <i>Bilangan proton</i>	Number of neutrons <i>Bilangan neutron</i>	Number of electrons <i>Bilangan elektron</i>
Q	11	12	11
X	17	18	17

Table 2/ Jadual 2

- (a) (i) State the term for 'the total number of protons and neutrons' in an atom.

*Nyatakan istilah 'jumlah bilangan proton dan neutron' dalam satu atom.*

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

- (ii) Name the two subatomic particles present in the nucleus of an atom.

*Namakan **dua** zarah sub-atom yang terdapat dalam nukleus suatu atom*

1. ....

2. ....

[2 marks/ 2 markah]

- (iii) Draw the electron arrangement of Q ion.

*Lukis susunan elektron bagi ion Q.*

[1 mark/ 1 markah]

- (b) (i) Atom Y is an isotope of atom X. State the number of protons in atom Y.

*Atom Y ialah 4isotop bagi atom X. Nyatakan bilangan proton dalam atom Y*

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

- (ii) Atom X and atom Y shows the same chemical properties. State **one** reason.

*Atom X dan atom Y menunjukkan sifat kimia yang sama. Nyatakan **satu** sebab*

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

- (c) (i) Element X has a boiling point of  $-34.0^{\circ}\text{C}$ . Predict the physical state of element X at room temperature.

*Unsur X mempunyai takat didih  $-34.6^{\circ}\text{C}$  dan takat lebur  $-100.98^{\circ}\text{C}$ . Nyatakan keadaan fizikal bagi unsur X pada suhu bilik.*

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

- (ii) Based on the kinetic theory of matter, describe the arrangement and movement of particles of element X at room temperature.

*Berdasarkan teori kinetik jirim, huraikan susunan dan pergerakan zarah bagi unsur X pada suhu bilik.*

Arrangement of particles : .....  
*Susunan zarah*

Movement of particles : .....  
*Pergerakan zarah*

[2 marks/ 2 markah]



3 Diagram 3 shows the pH value of acid in beaker I, II and III.

Rajah 3 menunjukkan nilai pH bagi asid di dalam bikar I, II dan III

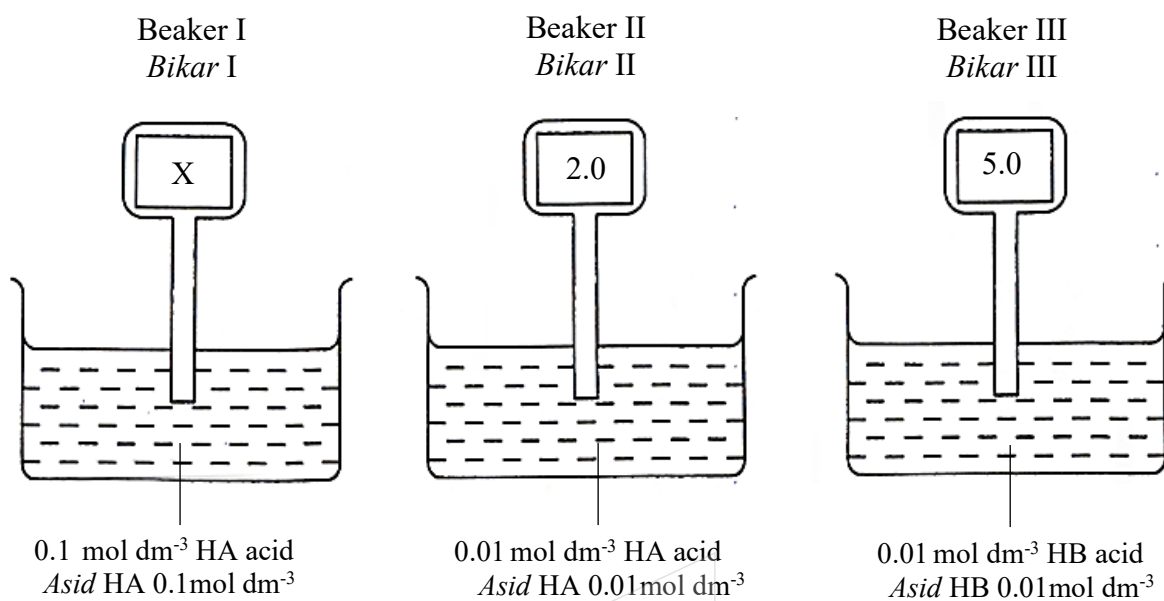


Diagram 3/ Rajah 3

- (a) State the meaning of acid.  
*Nyatakan maksud bagi asid.*

[1 mark/ 1 markah]

- (b) What is the value of X for HA acid in beaker I.  
*Apakah nilai bagi X pada asid HA dalam bikar I.*

[1 mark/ 1 markah]

- (c) HA acid and HB acid are monoprotic acid.  
*Asid HA dan asid HB adalah asid monoprotik.*

- (i) What is meant by monoprotic acid.  
*Apakah yang dimaksudkan dengan asid monoprotik.*

[1 mark/ 1 markah]

- (ii) Suggest the name of HA acid and HB acid.  
*Cadangkan nama bagi asid HA dan asid HB.*

HA acid : .....  
*Asid HA*

HB acid : .....  
*Asid HB*

[2 marks/ 2 markah]

- (iii) Explain why the pH value of HB acid in beaker III is higher than HB acid in beaker II.  
*Terangkan mengapa nilai pH bagi asid HB dalam bikar III adalah lebih tinggi berbanding asid HB dalam bikar II.*

.....

.....

[2 marks/ 2 markah]

- (d) Chemical reaction below shows the reaction between HA acid and sodium hydroxide solution.  
*Persamaan kimia di bawah menunjukkan tindak balas di antara asid HA dan natrium hidroksida.*



20 cm<sup>3</sup> of HA acid in beaker I is needed to neutralise 25 cm<sup>3</sup> of sodium hydroxide solution.  
Calculate the concentration of sodium hydroxide used.

20 cm<sup>3</sup> asid HA di dalam bikar I diperlukan untuk meneutralkan 25 cm<sup>3</sup> larutan natrium hidroksida. Hitungkan kepekatan natrium hidroksida yang digunakan.

[3 marks/ 3 markah]

4. In an experiment to investigate the rate of reaction, 50.0 cm<sup>3</sup> of 0.2 mol dm<sup>-3</sup> sodium thiosulphate solution and 5.0 cm<sup>3</sup> of 1.0 mol dm<sup>-3</sup> of sulphuric acid, are used. The sulphur formed can be used to measure the rate of reaction.

*Dalam satu eksperimen untuk mengkaji kadar tindak balas, 50.0 cm<sup>3</sup> larutan natrium tiosulfat 0.2 mol dm<sup>-3</sup> dan 5.0 cm<sup>3</sup> asid sulfurik 1.0 mol dm<sup>-3</sup>, digunakan. Sulfur yang terbentuk boleh digunakan untuk mengukur kadar tindak balas itu.*

The equation for the reaction is given below.

*Persamaan tindak balas itu diberi di bawah.*



- (a) What is the colour of sulphur?

*Apakah warna sulfur?*

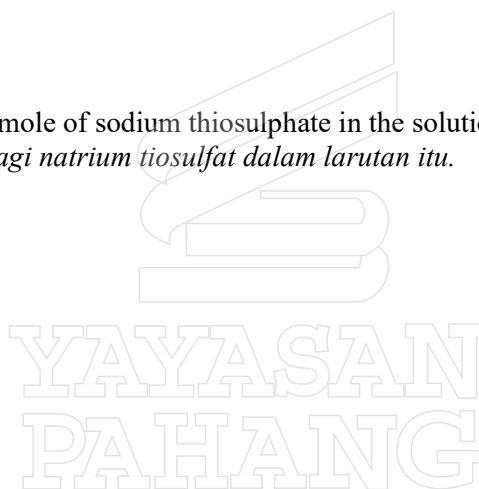
.....  
[1 mark/ 1 markah]

- (b) Calculate:

*Hitung*

- (i) The number of mole of sodium thiosulphate in the solution.

*Bilangan mol bagi natrium tiosulfat dalam larutan itu.*



[1 mark/1 markah]

- (ii) The number of mole of sulphuric acid.

*Bilangan mol bagi natrium tiosulfat dalam larutan itu.*

[1 mark/ 1 markah]



- (c) Based on the answers in 4(b)(i) and 4(b)(ii), name the reactant which determines the quantity of sulphur formed at the end of the reaction.

*Berdasarkan jawapan di 4(b)(i) dan 4(b)(ii), namakan bahan tindak balas yang menentukan kuantiti sulfur yang terbentuk pada akhir tindak balas itu.*

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

- (d) (i) State **three** factors that can affect the rate of reaction in this experiment.

*Nyatakan tiga faktor yang boleh mempengaruhi kadar tindak balas itu dalam eksperimen ini.*

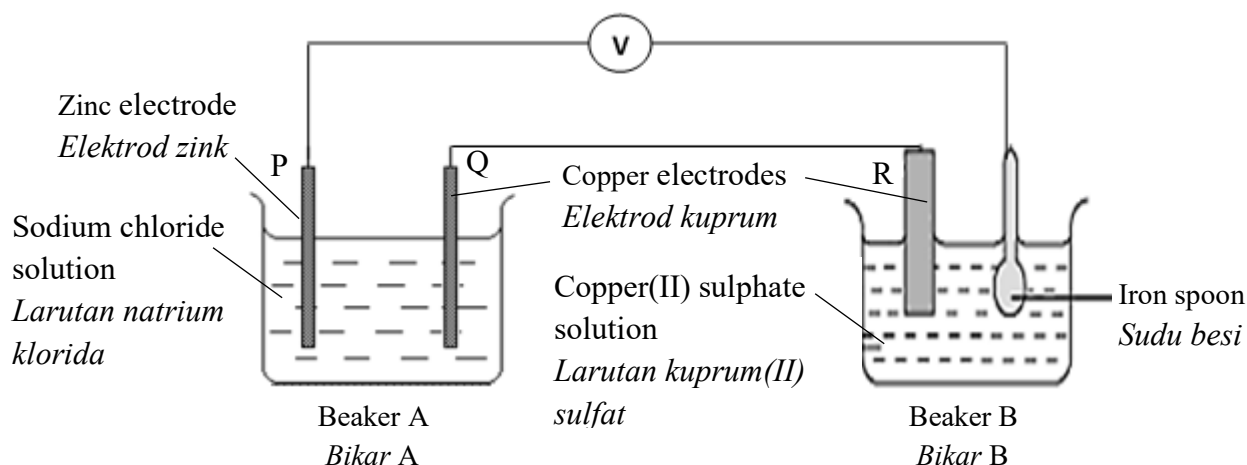
1. ....  
2. ....  
3. ....  
[3 marks/ 3 markah]

- (ii) Using the collision theory, explain how any **one** of the factors in 4(d)(i) increases the rate of reaction.

*Menggunakan teori perlanggaran, jelaskan bagaimana mana-mana satu daripada faktor di 4(d)(i) meningkatkan kadar tindak balas itu*

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

- 5 Diagram 5 shows the apparatus set-up used by a student to electroplate iron spoon.  
*Rajah 5 menunjukkan susunan radas yang digunakan oleh seorang murid untuk menyadur sudu besi*



- (a) State the type of cell in beaker A.  
 Nyatakan jenis sel dalam bikar A.

[1 mark / 1 markah]

- (b) The experiment is carried out for 30 minutes,  
 Eksperimen itu dijalankan selama 30 minit,

- (i) state the observation at electrode Q?  
 nyatakan pemerhatian pada elektrod Q?

[1 mark / 1 markah]

- (ii) write half equation for the reaction occur in (b)(i).  
 tulis setengah persamaan bagi tindak balas yang berlaku di (b)(i).

[2 marks / 2 markah]

- (iii) describe a confirmation test to verify the product formed at electrode Q.  
 huraikan satu ujian kimia untuk menentusahkan hasil yang terbentuk di elektrod Q.

[2 marks / 2 markah]

- (c) Draw the direction of electron flow on Diagram 5.

*Lukis arah pengaliran elektron di Rajah 5.*

[1 mark / 1 markah]

- (d) The rate of electroplating can be increased when higher voltage is used. What should be done in the experiment if the student wishes to electroplate iron spoon in Beaker B faster, without changing the concentration and volume of solutions used? Give a reason to your answer.

*Kadar penyaduran dapat ditingkatkan apabila voltan yang digunakan adalah lebih tinggi. Apakah yang perlu dilakukan dalam eksperimen itu jika murid itu ingin menyadur kunci besi di Bikar B dengan lebih cepat, tanpa mengubah kepekatan dan isi padu larutan-larutan yang digunakan? Berikan satu sebab kepada jawapan anda.*

.....

.....

.....

[2 marks / 2 markah]

- (e) Write half equation for the reaction occur at electrode R.

*Tulis setengah persamaan bagi tindak balas yang berlaku di elektrod R.*

.....

[2 marks / 2 markah]

YAYASAN  
PAHANG

- 6 Diagram 6 shows a flow chart of zinc salts.  
*Rajah 6 menunjukkan carta alir bagi garam zink.*

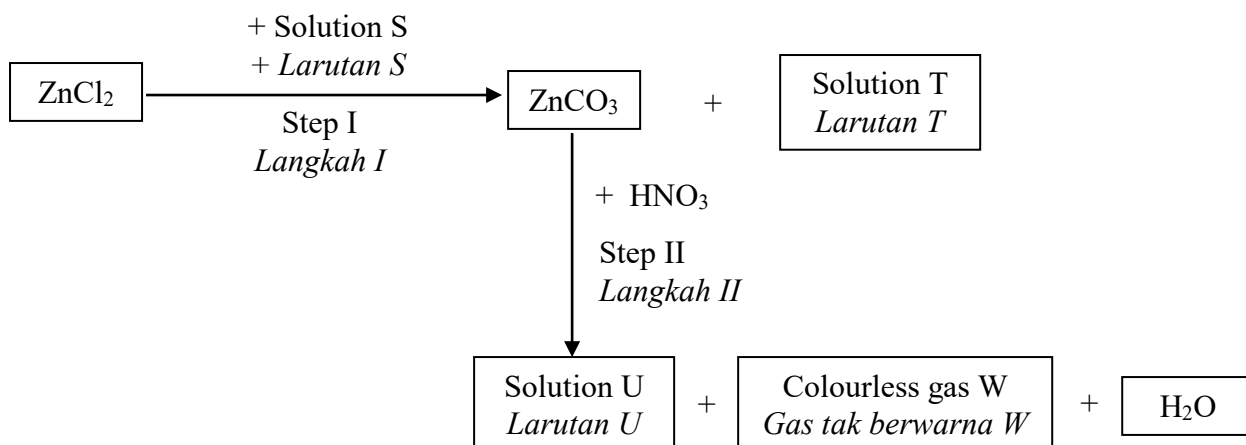


Diagram 6 / *Rajah 6*

- (a) State the solubility zinc chloride salt.  
*Nyatakan keterlarutan garam zink klorida.*

[1 mark / 1 markah]

- (b) Based on Diagram 6,  
*Berdasarkan Rajah 6,*

- (i) identify.  
*kenal pasti*

Solution S : .....  
*Larutan S*

Solution T : .....  
*Larutan T*

Solution U : .....  
*Larutan U*

[3 marks / 3 markah]

- (ii) State the type of reaction for Step I.  
*Nyatakan jenis tindak balas bagi Langkah I.*

[1 mark / 1 markah]

- (iii) Write a balanced chemical equation for the reaction occur in Step I.  
*Tulis persamaan kimia seimbang bagi tindak balas yang berlaku di Langkah I.*

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

- (iv) What is the mass of  $\text{ZnCO}_3$  produced when 0.1 mole  $\text{ZnCl}_2$  reacts with Solution S?  
[Molar mass  $\text{ZnCO}_3 = 125 \text{ gmol}^{-1}$ ]  
*Apakah jisim  $\text{ZnCO}_3$  yang dihasilkan apabila 0.1 mol  $\text{ZnCl}_2$  bertindak balas dengan Larutan S*  
[Jisim Molar  $\text{ZnCO}_3 = 125 \text{ gmol}^{-1}$ ]

[1 mark / 1 markah]

- (c) Draw a labelled diagram of apparatus set up to carry out experiment in Step II and show how colourless gas W is tested.  
*Lukis gambar rajah berlabel susunan radas untuk menjalankan eksperimen di Langkah II dan tunjukkan bagaimana gas tak berwarna W diuji.*

[3 marks / 3 markah]

**Section B**  
**Bahagian B**

[20 marks]

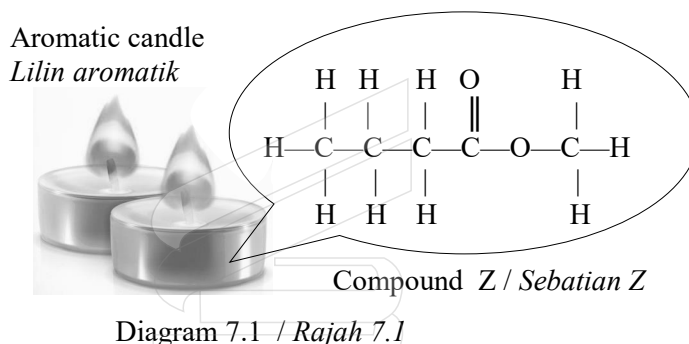
[20 markah]

Answer any **one** question from this section.

*Jawab mana-mana **satu** soalan daripada bahagian ini.*

- 7 (a) Diagram 7.1 shows the structural formula of compound Z as one of the substances added to aromatic candle. After 5 minutes the candles are lighted up, the surrounding area is filled with apple smell.

*Rajah 7.1 menunjukkan formula struktur bagi sebatian Z sebagai salah satu bahan yang ditambah dalam lilin aromatik. Selepas 5 minit lilin-lilin tersebut dinyalakan, kawasan persekitaran dipenuhi dengan bau epal.*



- (i) Based on diagram 7.1, state the homologous series and name of compound Z. What is the physical properties of compound Z which causes the odour of compound Z easily filled the surrounding area when the candles are lighted up. Give a reason to your answer.

*Berdasarkan rajah 7.1, nyatakan siri homolog dan nama sebatian Z. Apakah sifat fizik sebatian Z yang menyebabkan bau sebatian Z mudah memenuhi ruangan persekitaran apabila lilin dinyalakan. Berikan satu sebab kepada jawapan anda.*

[4 mark / 4 markah]

- (ii) Mr. Shukri found that compound Z can be prepared using alcohol X and carboxylic acid Y. Suggest alcohol X and carboxylic acid Y. Then write the chemical equation for the reaction to prepare compound Z. Calculate the mass of compound Z formed when Mr Shukri used 2 g of alcohol X to reacts with carboxylic acid Y.

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

*En. Shukri mendapati sebatian Z dapat disediakan menggunakan alkohol X dan asid karboksilik Y. Cadangkan alkohol X dan asid karboksilik Y. Seterusnya tuliskan persamaan kimia bagi tindak balas untuk menyediakan sebatian Z. Hitungkan jisim sebatian Z yang terhasil apabila En. Shukri menggunakan 2 g alkohol X ditindakbalaskan dengan asid karboksilik Y..*

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

[6 marks / 6 markah]

- (b) Diagram 7.2 shows the flow chart of a situation when latex collected from the rubber tree is used to produce type A rubber and type B rubber in laboratory.

*Rajah 7.2 menunjukkan carta alir situasi apabila lateks yang diambil daripada pokok getah digunakan untuk menghasilkan getah jenis A dan getah jenis B.*

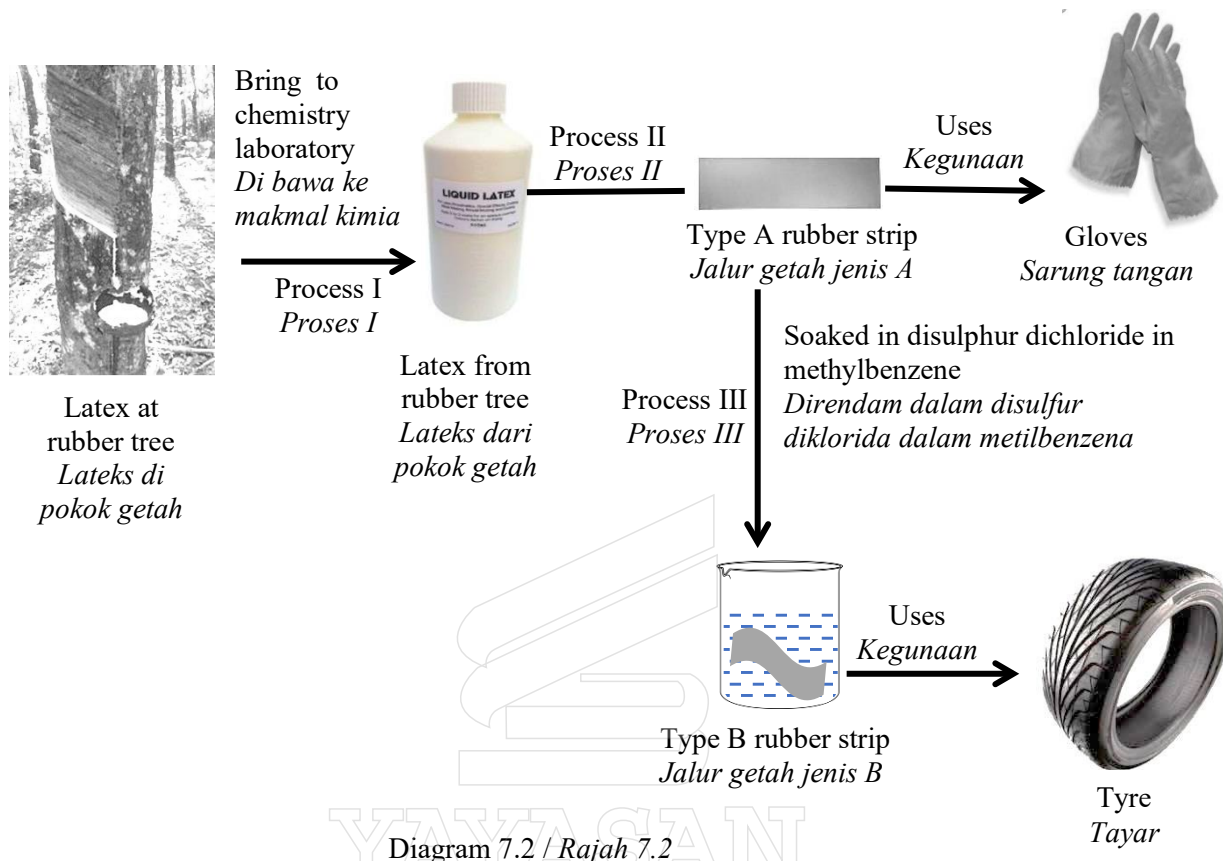


Diagram 7.2 / Rajah 7.2

Based on diagram 7.2,  
*Berdasarkan rajah 7.2,*

- (i) suggest a substance that should be added in Process I to ensure the latex remains as liquid form until it is taken to the chemistry laboratory. State the name of type A rubber and type B rubber.

*cadangkan satu bahan yang perlu ditambah dalam Proses I bagi memastikan lateks dapat dikekalkan dalam keadaan cecair sehingga dibawa ke makmal kimia. Nyatakan nama bagi getah jenis A dan getah jenis B.*

- (ii) compare type A rubber and type B rubber in terms of hardness, elasticity, resistance to heat and resistance to oxidation. Explain why type B rubber is more suitable to make tyre compare to type A rubber.

*bandingkan sifat fizik getah jenis A dan jenis B dari segi kekerasan, kekenyalan, kesan terhadap haba dan kesan terhadap pengoksidaan. Terangkan mengapa getah jenis B lebih sesuai untuk membuat tayar kereta berbanding getah jenis A.*

[10 marks / 10 markah]

- 8 (a) Diagram 8.1 shows conversation between four friends about the medicine they received from the same clinic.

*Rajah 8.1 menunjukkan perbualan empat orang rakan mengenai ubat yang diterima dari klinik yang sama..*

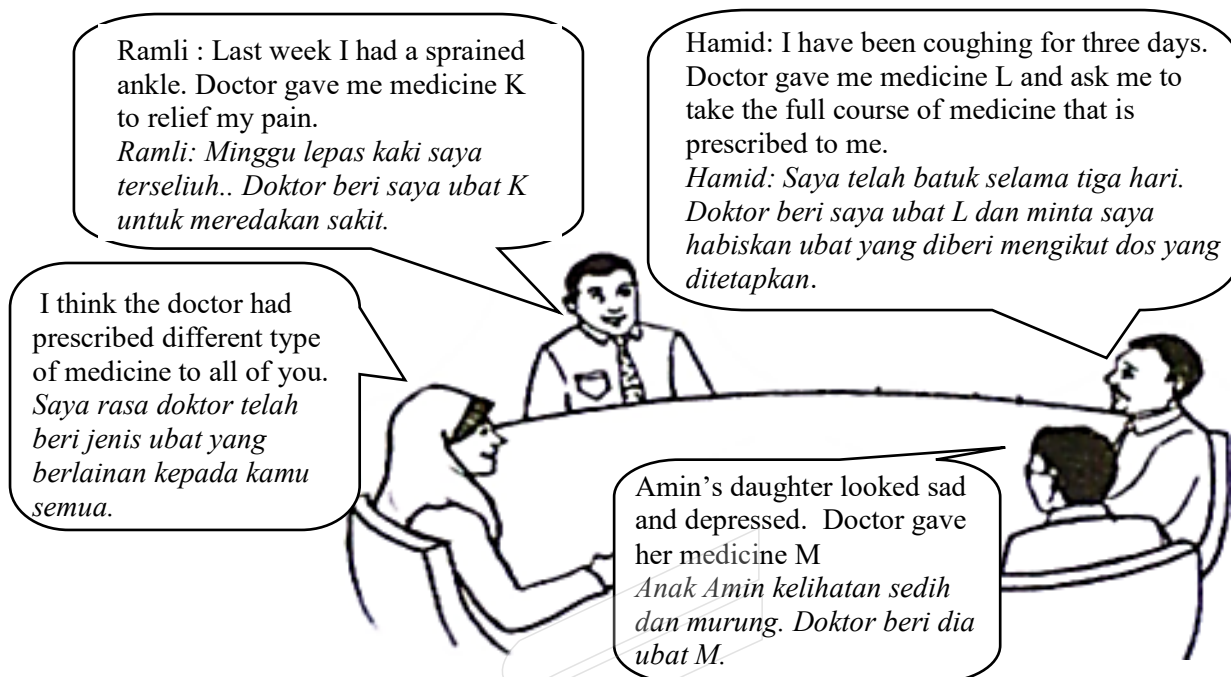


Diagram 8.1 / Rajah 8.1

Based on diagram 8.1, identify the type of medicines K, L and M. Suggest one example of medicine received by Ramli, Hamid and Amin's daughter.

*Berdasarkan rajah 8.1, kenal pasti jenis ubat K, L dan M. Cadangkan satu contoh ubat yang diterima oleh Ramli, Hamid dan anak perempuan Amin.*

[6 marks/6 markah]

- (b) Diagram 8.2 shows the informations for two types of plastic that is widely used in daily life.

*Rajah 8.2 menunjukkan maklumat-maklumat bagi dua jenis plastik yang digunakan secara meluas dalam kehidupan seharian. .*



<p>Plastic A Plastik A</p>  <ul style="list-style-type: none"> <li>Made from corn starch</li> <li>Can easily be decomposed by microorganism</li> </ul>	<p>Plastic B Plastik B</p>  <ul style="list-style-type: none"> <li>Made from petroleum fraction</li> <li>Difficult to be decomposed by microorganism</li> </ul>
-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Diagram 8.2 / Rajah 8.2

Choose which plastic that can cause an environmental pollution and explain your answer. Suggest a way to overcome the pollution issue.

*Pilih plastik yang manakah boleh menyebabkan pencemaran alam sekitar dan terangkan jawapan anda. Cadangkan satu cara untuk mengatasi isu pencemaran itu.*

[4 marks/4 markah]



- (c) Diagram 8.3 shows the production of two types of fertiliser  
*Rajah 8.3 menunjukkan penghasilan dua jenis baja..*

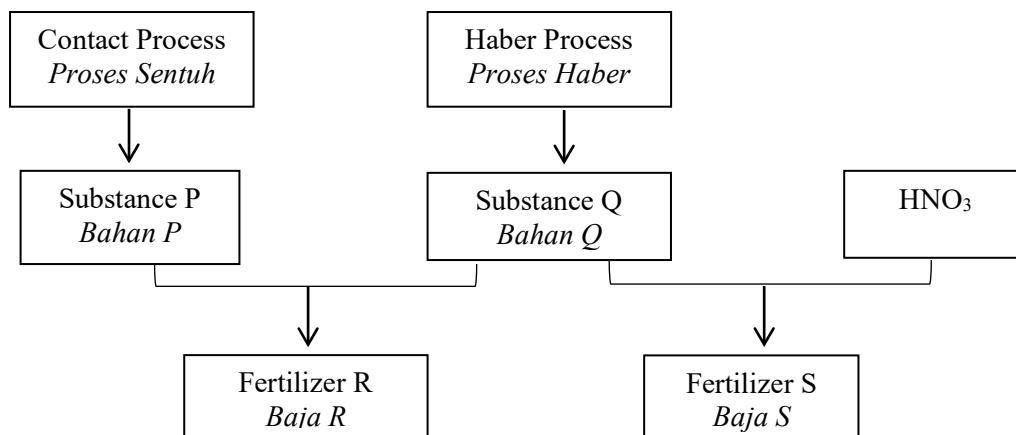


Diagram 8.3 /Rajah 8.3.

- (i) Based on diagram 8.3, identify Substance P, Substance Q, Fertilizer R and Fertilizer S. Write the chemical equation for the formation of Fertilizer R or Fertilizer S.  
*Berdasarkan rajah 8.3, kenal pasti Bahan P, Bahan Q, Baja R dan Baja S. Tuliskan persamaan kimia bagi pembentukan Baja R atau Baja S.*

[ 6 Marks /6 markah]

- (ii) Between Fertilizer R and Fertilizer S, which fertilizer is more suitable to be used to increase the fertility of soil. Explain why?

[Relative atomic mass : H=1; N=14; O=16; S=32]

*Antara Baja R dan Baja S, baja yang manakah lebih sesuai digunakan untuk meningkatkan kesuburan tanah. Terangkan mengapa?*

*[Jisim atom relative : H=1; N=14; O=16; S=32]*

[ 4 marks/4 markah]

**Section C**  
**Bahagian C**

[20 marks]

[20 markah]

Answer any **one** question from this section.

*Jawab mana-mana **satu** soalan daripada bahagian ini.*

9. Table 8 shows thermochemical equations of Experiment 1 and Experiment 2.  
*Jadual 8 menunjukkan persamaan termokimia bagi Eksperimen 1 dan Eksperimen 2.*

Experiment <i>Eksperimen</i>	Thermochemical Equation <i>Persamaan Termokimia</i>
1	$\text{NaOH} + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O} \quad \Delta H = -57.3 \text{ kJmol}^{-1}$
2	$\text{NaOH} + \text{CH}_3\text{COOH} \rightarrow \text{CH}_3\text{COONa} + \text{H}_2\text{O} \quad \Delta H = -51.5 \text{ kJmol}^{-1}$

Table 8

- (a) Based on Table 8,  
*Berdasarkan Jadual 8,*
- (i) state the type of reaction.  
*nyatakan jenis tindak balas* [1 mark/1 markah]
- (ii) Explain the difference of the heat of neutralization for the reactions in Experiment 1 and Experiment 2.  
*Jelaskan perbezaan haba peneutralan bagi tindak balas–tindak balas dalam Eksperimen 1 dan Eksperimen 2.* [5 marks/5 markah]
- (b) In Experiment 1, 50 cm<sup>3</sup> of 1.0 moldm<sup>-3</sup> sodium hydroxide solution is reacted with 50 cm<sup>3</sup> of 1.0 moldm<sup>-3</sup> of hydrochloric acid solution.  
*Di dalam Eksperimen 1, 50 cm<sup>3</sup> larutan natrium hidroksida, 1.0 moldm<sup>-3</sup> ditindak balaskan dengan 50 cm<sup>3</sup> larutan asid hidroklorik, 1.0 moldm<sup>-3</sup>.*
- (i) Calculate the heat released in the reaction.  
*Kirakan haba yang terbebas dari tindak balas.* [3 marks/3 markah]

- (ii) What is the temperature change of the reaction mixture?  
[Specific heat capacity =  $4.2 \text{ J g}^{-1} \text{ }^{\circ}\text{C}^{-1}$ , density of solution =  $1 \text{ g cm}^{-3}$ ]  
*Berapakah perubahan suhu campuran tindak balas?*  
[Muatan haba tentu larutan =  $4.2 \text{ J g}^{-1} \text{ }^{\circ}\text{C}^{-1}$ , ketumpatan larutan =  $1 \text{ g cm}^{-3}$ ]

[3 marks/3 markah]

- (c) You are provided with  $1.0 \text{ mol dm}^{-3}$  of silver nitrate solution and magnesium powder. Describe one experiment to determine the heat of displacement of silver by magnesium.

Your answer should consist of the following:

- Procedure of the experiment
- The method to calculate the heat of displacement

*Anda di bekalkan dengan  $1.0 \text{ mol dm}^{-3}$  larutan argentum nitrat dan serbuk magnesium.*

*Huraikan satu eksperimen untuk menentukan haba penyesaran argentum oleh magnesium.*

*Jawapan anda perlu mengandungi perkara berikut :*

- *Prosedur eksperimen*
- *Kaedah untuk menghitung haba penyesaran.*

[8 marks/8 markah]

YAYASAN  
PAHANG

- 10 (a) A student intends to change the colour of  $1.0 \text{ mol dm}^{-3}$  iron(II) sulphate solution from green to brown. Suggest a suitable method to help the student. Write the half equation to explain the changes.

*Seorang pelajar ingin mengubah warna larutan ferum(II) sulfat  $1.0 \text{ mol dm}^{-3}$  dari hijau kepada perang. Cadangkan satu kaedah sesuai bagi membantu pelajar itu.*

*Tuliskan persamaan setengah bagi menerangkan perubahan itu.*

[4 marks/4 markah]

- (b) Table 10 shows the results of experiment, Set I and Set II to study the effects of metal X and Y on the displacement of copper.  
*Jadual 10 menunjukkan keputusan eksperimen, Set I dan Set II bagi mengkaji kesan logam X dan logam Y ke atas penyesaran kuprum.*

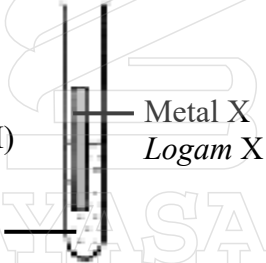
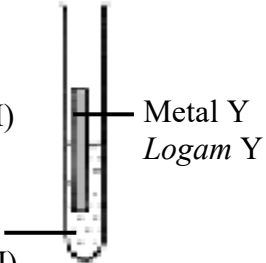
Experiment <i>Eksperimen</i>	Set up of apparatus <i>Susunan radas</i>	Observation <i>Pemerhatian</i>
Set I	 <p>Copper(II) sulphate solution <i>Larutan kuprum(II) sulfat</i></p> <p>Metal X <i>Logam X</i></p>	<ul style="list-style-type: none"> <li>• Brown solid is deposited. <i>Pepejal perang diendapkan.</i></li> <li>• Metal X dissolved. <i>Logam X melarut.</i></li> <li>• The blue colour of solution fades. <i>Warna biru larutan pudar.</i></li> </ul>
Set II	 <p>Copper(II) sulphate Solution <i>Larutan kuprum(II) sulfat</i></p> <p>Metal Y <i>Logam Y</i></p>	<ul style="list-style-type: none"> <li>• No change. <i>Tiada perubahan</i></li> </ul>

Table 10  
*Jadual 10*

Based on Table 10,  
*Berdasarkan Jadual 10,*

- (i) explain the different in observations in Set I and II.  
*terangkan perbezaan pemerhatian dalam Set I dan Set II.* [5 marks/5 markah]
- (ii) arrange in ascending order metals X, Y and copper in electrochemical series.  
*susunkan dalam urutan menaik logam X, Y dan kuprum dalam siri elektrokimia.* [1 mark/1 markah]
- (c) Diagram 10 shows the order of metals P, Q, R and S in the electrochemical series.  
*Rajah 10 menunjukkan susunan logam-logam P, Q, R dan S dalam siri elektrokimia.*

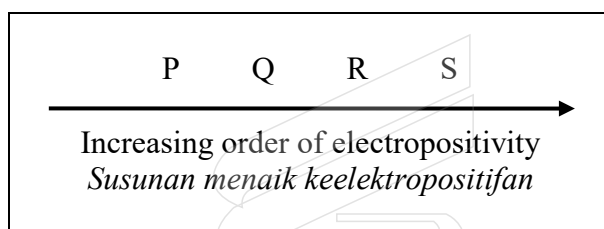


Diagram 10  
*Rajah 10*

Describe an experiment to show the order of these metals in the electrochemical series. Your description must include all the apparatus and materials used, observation and a conclusion.

*Huraikan satu eksperimen untuk menunjukkan susunan logam-logam ini dalam siri elektrokimia. Huraian anda mesti mengandungi semua alat radas dan bahan kimia yang digunakan, pemerhatian dan kesimpulan.*

[10 marks/ 10 markah]

**END OF QUESTION PAPER**  
**KERTAS SOALAN TAMAT**

## THE PERIODIC TABLE OF ELEMENTS

<div>1</div> <div>H</div> <div>Hydrogen</div> <div>1</div>		<div>Proton number</div> <div>Symbol</div> <div>Name of element</div> <div>Relative atomic mass</div>																<div>2</div> <div>He</div> <div>Helium</div> <div>4</div>					
<div>3</div> <div>Li</div> <div>Lithium</div> <div>7</div>		<div>4</div> <div>Be</div> <div>Beryllium</div> <div>9</div>																		<div>9</div> <div>F</div> <div>Flourine</div> <div>19</div>		<div>10</div> <div>Ne</div> <div>Neon</div> <div>20</div>	
<div>11</div> <div>Na</div> <div>Sodium</div> <div>23</div>		<div>12</div> <div>Mg</div> <div>Magnesium</div> <div>24</div>																		<div>17</div> <div>Cl</div> <div>Chlorine</div> <div>35</div>		<div>18</div> <div>Ar</div> <div>Argon</div> <div>40</div>	
<div>19</div> <div>K</div> <div>Potassium</div> <div>39</div>		<div>20</div> <div>Ca</div> <div>Calcium</div> <div>40</div>		<div>21</div> <div>Sc</div> <div>Scandium</div> <div>45</div>	<div>22</div> <div>Ti</div> <div>Titanium</div> <div>48</div>	<div>23</div> <div>V</div> <div>Vanadium</div> <div>51</div>	<div>24</div> <div>Cr</div> <div>Chromium</div> <div>52</div>	<div>25</div> <div>Mn</div> <div>Manganese</div> <div>55</div>	<div>26</div> <div>Fe</div> <div>Iron</div> <div>56</div>	<div>27</div> <div>Co</div> <div>Cobalt</div> <div>59</div>	<div>28</div> <div>Ni</div> <div>Nickel</div> <div>59</div>	<div>29</div> <div>Cu</div> <div>Copper</div> <div>64</div>	<div>30</div> <div>Zn</div> <div>Zinc</div> <div>65</div>	<div>31</div> <div>Ga</div> <div>Gallium</div> <div>70</div>	<div>32</div> <div>Ge</div> <div>Germanium</div> <div>73</div>	<div>33</div> <div>As</div> <div>Arsenic</div> <div>75</div>	<div>34</div> <div>Se</div> <div>Selenium</div> <div>79</div>	<div>35</div> <div>Br</div> <div>Bromine</div> <div>80</div>	<div>36</div> <div>Kr</div> <div>Krypton</div> <div>84</div>				
<div>37</div> <div>Rb</div> <div>Rubidium</div> <div>86</div>		<div>38</div> <div>Sr</div> <div>Srtrontium</div> <div>88</div>		<div>39</div> <div>Y</div> <div>Yttrium</div> <div>89</div>	<div>40</div> <div>Zr</div> <div>Zirconium</div> <div>91</div>	<div>41</div> <div>Nb</div> <div>Niobium</div> <div>93</div>	<div>42</div> <div>Mo</div> <div>Molybdenum</div> <div>96</div>	<div>43</div> <div>Tc</div> <div>Technetium</div> <div>98</div>	<div>44</div> <div>Ru</div> <div>Ruthenium</div> <div>101</div>	<div>45</div> <div>Rh</div> <div>Rhodium</div> <div>103</div>	<div>46</div> <div>Pd</div> <div>Palladium</div> <div>106</div>	<div>47</div> <div>Ag</div> <div>Silver</div> <div>108</div>	<div>48</div> <div>In</div> <div>Indium</div> <div>115</div>	<div>50</div> <div>Sn</div> <div>Tin</div> <div>119</div>	<div>51</div> <div>Sb</div> <div>Antimony</div> <div>122</div>	<div>52</div> <div>Te</div> <div>Tellurium</div> <div>128</div>	<div>53</div> <div>I</div> <div>Iodine</div> <div>127</div>	<div>54</div> <div>Xe</div> <div>Xenon</div> <div>131</div>	<div>86</div> <div></div> <div></div>				
<div>55</div> <div>Cs</div> <div>Cesium</div> <div>133</div>		<div>56</div> <div>Ba</div> <div>Barium</div> <div>137</div>		<div>57</div> <div>La</div> <div>Lanthanum</div> <div>139</div>	<div>72</div> <div>Hf</div> <div>Hafnium</div> <div>179</div>	<div>73</div> <div>Ta</div> <div>Tantalum</div> <div>181</div>	<div>74</div> <div>W</div> <div>Tungsten</div> <div>184</div>	<div>75</div> <div>Re</div> <div>Rhenium</div> <div>186</div>	<div>76</div> <div>Os</div> <div>Osmium</div> <div>190</div>	<div>77</div> <div>Ir</div> <div>Iridium</div> <div>192</div>	<div>78</div> <div>Pt</div> <div>Platinum</div> <div>195</div>	<div>79</div> <div>Au</div> <div>Gold</div> <div>197</div>	<div>80</div> <div>Hg</div> <div>Mercury</div> <div>201</div>	<div>82</div> <div>Pb</div> <div>Lead</div> <div>207</div>	<div>83</div> <div>Bi</div> <div>Bismuth</div> <div>209</div>	<div>84</div> <div>Po</div> <div>Polonium</div> <div>210</div>	<div>85</div> <div>At</div> <div>Astatine</div> <div>210</div>	<div>222</div> <div></div> <div></div>					
<div>87</div> <div>Fr</div> <div>Francium</div> <div>223</div>		<div>88</div> <div>Ra</div> <div>Radium</div> <div>226</div>		<div>89</div> <div>Ac</div> <div>Actinium</div> <div>227</div>	<div>104</div> <div>Unq</div> <div>Unnil-quadium</div> <div>257</div>	<div>105</div> <div>Unp</div> <div>Unnil-pentium</div> <div>260</div>	<div>106</div> <div>Unh</div> <div>Unnil-hexium</div> <div>263</div>	<div>107</div> <div>Uns</div> <div>Unnil-septium</div> <div>262</div>	<div>108</div> <div>Uno</div> <div>Unnil-octium</div> <div>266</div>	<div>109</div> <div>Une</div> <div>Unnil-ennium</div> <div>266</div>													
																		<div>68</div> <div>Er</div> <div>Erbium</div> <div>167</div>	<div>69</div> <div>Tm</div> <div>Thulium</div> <div>169</div>	<div>70</div> <div>Yb</div> <div>Ytterbium</div> <div>173</div>	<div>71</div> <div>Lu</div> <div>Lutetium</div> <div>175</div>		
																		<div>98</div> <div>Cf</div> <div>Californium</div> <div>249</div>	<div>99</div> <div>Es</div> <div>Einsteinium</div> <div>254</div>	<div>100</div> <div>Fm</div> <div>Fermium</div> <div>253</div>	<div>101</div> <div>Md</div> <div>Mendelevium</div> <div>256</div>	<div>102</div> <div>No</div> <div>Nobelium</div> <div>254</div>	<div>103</div> <div>Lr</div> <div>Lawrensium</div> <div>257</div>



**INFORMATION FOR CANDIDATES**  
**MAKLUMAT UNTUK CALON**

1. This question paper consists of three sections: **Section A**, **Section B** and **Section C**.  
*Kertas peperiksaan ini mengandungi tiga bahagian: **Bahagian A**, **Bahagian B** dan **Bahagian C**.*
2. Answer **all** questions in **Section A**. Write your answers for **Section A** in the spaces provided in this question paper.  
*Jawab **semua** soalan dalam **Bahagian A**. Jawapan anda bagi **Bahagian A** hendaklah ditulis pada ruang yang disediakan dalam kertas peperiksaan.*
3. Answer any **one** question from **Section B** and any **one** question from **Section C**. Write your answers for **Section B** and **Section C** on the 'helaian tambahan' provided by the invigilators. You may use equations, diagrams, tables, graphs and other suitable methods to explain your answers.  
*Jawab mana-mana **satu** soalan daripada **Bahagian B** dan mana-mana **satu** soalan daripada **Bahagian C**. Tulis jawapan anda bagi **Bahagian B** dan **Bahagian C** dalam helaian tambahan yang dibekalkan oleh pengawas peperiksaan. Anda boleh menggunakan persamaan, rajah, jadual, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda.*
4. The diagrams in the questions are not drawn to scale unless stated.  
*Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.*
5. Marks allocated for each question or sub-part of a question are shown in brackets.  
*Markah yang diperuntukkan bagi setiap soalan atau ceraian soalan ditunjukkan dalam kurungan.*
6. Show your working. It may help you to get marks.  
*Tunjukkan kerja mengira. Ini membantu anda mendapatkan markah.*
7. If you wish to change your answer, cross out the answer that you have done. Then write down the new answer.  
*Jika anda hendak menukar jawapan, batalkan jawapan yang telah dibuat. Kemudian tulis jawapan yang baharu.*
8. The Periodic Table of Elements is provided on pages 24 and 25.  
*Jadual Berkala Unsur disediakan di halaman 24 dan 25.*
9. You may use a scientific calculator.  
*Anda dibenarkan menggunakan kalkulator saintifik.*
10. You are advised to spend 90 minutes to answer questions in **Section A**, 30 minutes for **Section B** and 30 minutes for **Section C**.  
*Anda dinasihati supaya mengambil masa 90 minit untuk menjawab soalan dalam **Bahagian A**, 30 minit untuk **Bahagian B** dan 30 minit untuk **Bahagian C**.*
11. Detach **Section B** and **Section C** from this question paper. Tie the "helaian tambahan" together with this question paper and hand in to the invigilator at the end of the examination.  
*Ceraikan **Bahagian B** dan **Bahagian C** daripada kertas peperiksaan ini. Ikat helaian tambahan bersama-sama kertas peperiksaan ini dan serahkan kepada pengawas peperiksaan pada akhir peperiksaan.*