NAMA : .....

TINGKATAN : .....

**SEKOLAH MENENGAH KEBANGSAAN SKUDAI**
**JOHOR BAHRU**

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# PEPERIKSAAN PERCUBAAN SPM 2023

# 4541/2

**CHEMISTRY**
**Kertas 2**
**Tingkatan 5**
**OKTOBER**
2½ jam

**Dua jam tiga puluh minit**

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**JANGAN BUKA KERTAS PEPERIKSAAN INI SEHINGGA DIBERITAHU**

1. *Tuliskan nama dan tingkatan pada ruang yang disediakan.*
2. *Kertas soalan ini adalah dalam dwibahasa.*
3. *Soalan dalam bahasa Melayu mendahului soalan yang sepadan dalam bahasa Inggeris.*
4. *Kertas peperiksaan ini mengandungi tiga bahagian :* ***Bahagian* A**, ***Bahagian* B** *dan* ***Bahagian* C**.
5. *Jawab semua soalan dalam* ***Bahagian* A**. *Jawapan anda bagi* ***Bahagian* A** *hendaklah ditulis pada ruang yang disediakan dalam kertas peperiksaan ini.*
6. *Bagi* ***Bahagian* B**, *jawab* **Soalan 9** *atau* **Soalan 10**. Bagi **Bahagian C** jawab **Soalan 11.** *Jawapan anda bagi* ***Bahagian* B** *dan* **C** *hendaklah ditulis dalam helaian tambahan yang dibekalkan.*
7. *Anda dibenarkan menggunakan kalkulator saintifik.*

| *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** | | | |

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**Kertas soalan ini mengandungi 30 halaman bercetak**

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

[60 markah]
[60 *marks*]

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

1 Topi keledar dan kanta kamera diperbuat daripada bahan komposit.
*Helmet and camera lens are made up of composite material.*

(a) (i) Apakah maksud bahan komposit?
*What is the meaning of composite material?*

…….

…….
[1 markah]
[*1 mark*]

(ii) Apakah bahan komposit dalam:
*What is the composite in?*

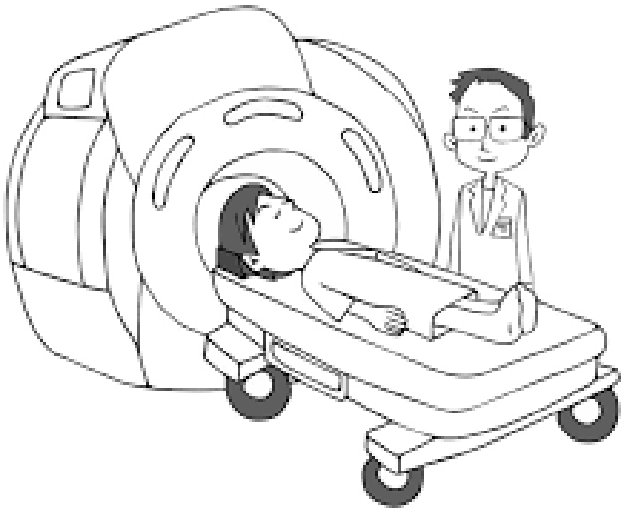
Topi keledar:
*Helmet*:

……

Kanta kamera:
*Camera lens*:

……
[2 markah]
[*2 marks*]

b) Rajah 1 menunjukkan alat pengimejan resonans magnetik (MRI) yang digunakan di hospital. Alat ini diperbuat daripada bahan komposit.
*Diagram 1 shows the magnetic resonance imaging* (MRI) *equipment used in hospital. This tool is made of composite material.*



Rajah 2
*Diagram 2*

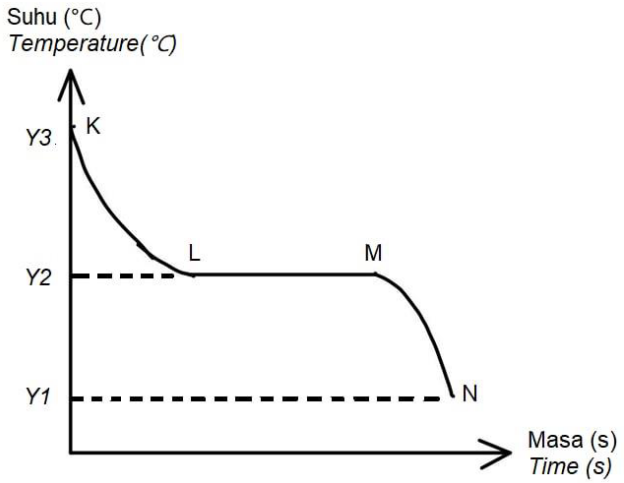
(i) Namakan bahan komposit dalam alat itu.
*Name the composite material in the device.*

……..
[1 markah]
[*1 mark*]

(ii) Nyatakan sebab bahan komposit itu digunakan.
*State the reason this composite material is being used.*

……..
[1 markah]
[*1 mark*]

2 Rajah 2 menunjukkan graf suhu melawan masa bagi penyejukkan naftalena.
*Diagram 2 shows a graph of temperature against time for the cooling of naphthalene.*




Rajah 2
*Diagram 2*

Berdasarkan Rajah 2,
*Based on Diagram 2,*

(a) (i) Apakah maksud takat beku?
*What is the meaning of freezing point?*

……

[1 markah]
[*1 mark*]

(ii) Berapakah takat beku bagi naftalena?
*What is the freezing point of naphthalene?*

……

[1 markah]
[*1 mark*]

(iii) Mengapakah suhu dari L ke M tidak berubah?
*Why the temperature from L to M remains unchanged?*

……

……

[1 markah]
[*1 mark*]

(b) (i) Keadaan zarah pada M ke N adalah pepejal. Lukiskan susunan zarah itu.
*The state of particles at M to N is solid. Draw the arrangement of particles.*

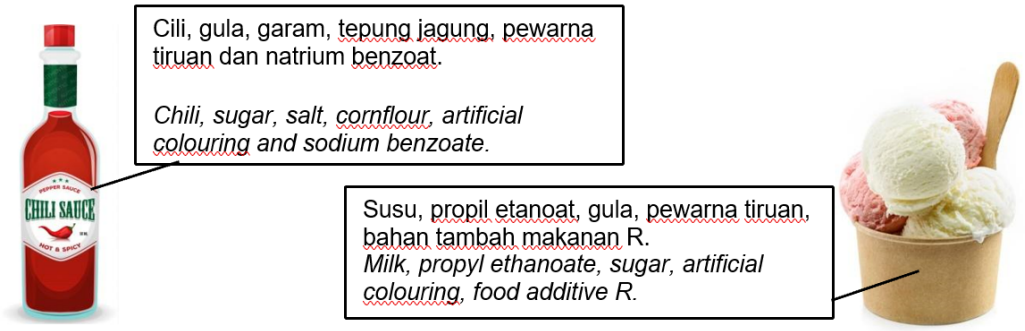
[1 markah]
[*1 mark*]

(ii) Nyatakan jenis zarah bagi naftalena.
*State the type of particles of naphthalene.*

.....

[1 markah]
[*1 mark*]

3. Rajah 3 menunjukkan kandungan pada label sebotol sos cili dan aiskrim.
*Diagram 2shows the ingredients on a label of a bottle of chilli sauce and an ice-cream.*




Rajah 3
*Diagram 3*

(a) (i) Nyatakan jenis bahan tambah makanan bagi natrium benzoat dan fungsinya.
*State the type of food additive is sodium benzoate and what is its function.*
Jenis bahan tambah makanan: .....
*Type of food additive:*
Fungsi: .....
*Function:*

[2 markah]
[2 *marks*]

(ii) Apakah kesan pengambilan bahan tambah makanan natrium benzoat secara berlebihan dalam tempoh masa yang panjang?
*What is the effect of taking excessive food additive sodium benzoate for a long period of time?*

……

……

[1 markah]
[*1 mark*]

(iii) Bahan tambah makanan R memberikan tekstur yang seragam dan licin pada aiskrim. Nyatakan jenis bahan tambah R.
*Food additive R gives uniformed and smooth texture in ice-cream. State the type of food additive of R.*

……

……

[1 markah]
[*1 mark*]

(iv) Puan Azwa ingin menghasilkan suatu makanan pencuci mulut tanpa menggunakan pewarna sintetik. Cadangkan bahan yang perlu ditambah oleh Puan Azwa dalam makanan itu untuk mengantikan pewarna sintetik? Apakah kebaikan menggunakan bahan tersebut?
*Puan Azwa wants to prepare a desert without using synthetic dyes. Suggest an ingredient should Puan Azwa add into the desert without using synthetic dye? What is the benefit of using this ingredient?*

……

……

[2 markah]
[2 *marks*]

4. (a) Jadual 1 menunjukkan formula empirik dan formula molekul bagi tiga sebatian.
*Table 1 shows the empirical formulae and molecular formulae of three compounds*.

| **Sebatian** ***Compound*** | **Formula empirik** ***Empirical formula*** | **Formula molekul** ***Molecular formula*** |
|---|---|---|
| X | CH | $C_6H_6$ |
| Y | $C_2H_4O$ | |
| Z | $Cu(NO_3)_2$ | $Cu(NO_3)_2$ |

Jadual 1
*Table 2*

(i) Nyatakan maksud formula molekul.

*State the meaning of molecular formula.*

.....

.....

[1 markah]
[*1 mark*]

(ii) Jisim molekul relatif bagi sebatian Y ialah 88.
Tentukan formula molekul bagi sebatian Y
[Jisim atom relatif: C = 12, H = 1, O = 16]

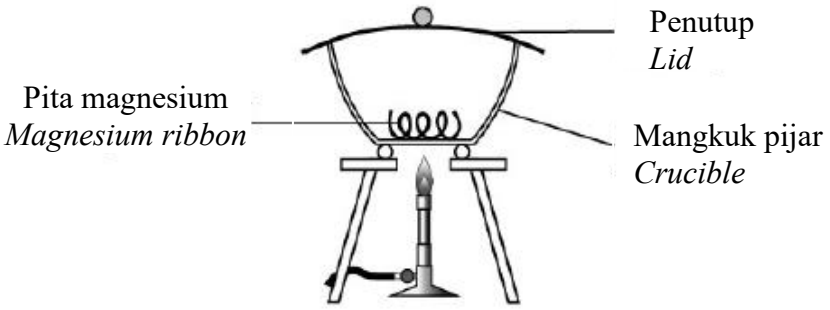
*Relative molecular mass of compound Y is 88.*
*Determine the molecular formula of compound Y.*
*[Relative atomic mass: C = 12, H = 1, O = 16]*

[2 markah]
[2 *marks*]

**[Lihat halaman sebelah**

(b) Rajah 4 menunjukkan susunan radas untuk menentukan formula empirik satu sebatian.
*Diagram 4 shows the set-up of the apparatus to determine the empirical formula of compound.*




Rajah 4
*Diagram 4*

(i) Bagaimanakah dapat menentukan tindak balas antara magnesium dengan oksigen telah lengkap?
*How to determine the reaction between magnesium with oxygen has completed?*

.....

[1 markah]
[*1 mark*]

Mengapakah penutup mangkuk pijar perlu dibuka sekali sekali semasa eksperimen dijalankan?
Why does the lid of the crucible need to be opened once during the experiment?

.....

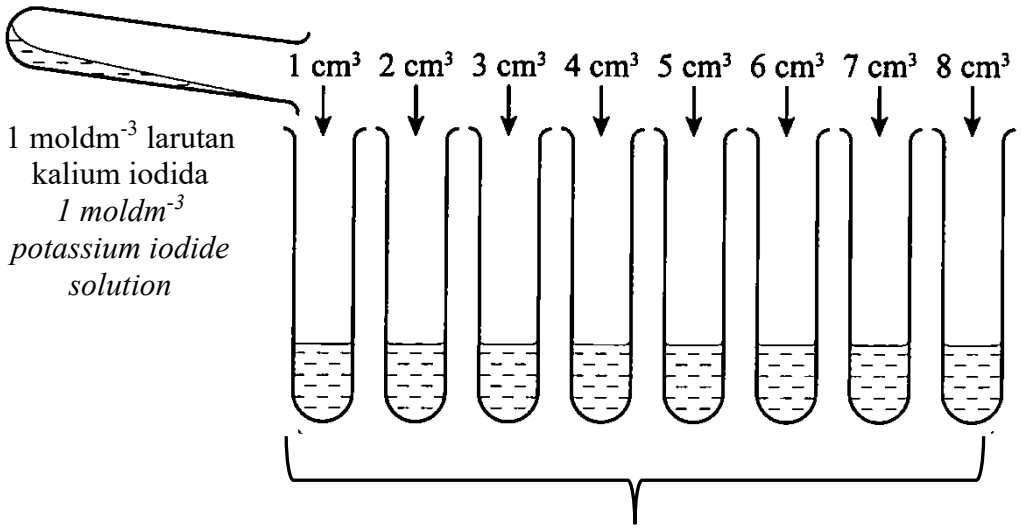
[1 markah]
[*1 mark*]

(ii) Tuliskan persamaan kimia bagi tindak balas ini.
*Write the chemical equation for this reaction.*

.....

[2 markah]
[2 *marks*]

5 Rajah 5 di bawah menunjukkan eksperimen yang telah dijalankan oleh Mee Ling di sekolahnya untuk membina persamaan ion garam yang tidak larut dengan menggunakan kaedah perubahan berterusan.
*Diagram 5 below is the experiment carried out by Mee Ling in her school to construct ionic equation of insoluble salt by using continuous variation method.*




Rajah 5
*Diagram 5*

*Berdasarkan maklumat di atas*.
Based on the information above.

(a) Berikan maksud garam.
*Give the meaning of salt.*

……

……

[1 markah]
[*1 mark*]

(b) Kirakan bilangan mol 5 $cm^3$ dari 0.5mod$m^{-3}$ larutan plumbum(II) nitrat.
*Calculate the number of mol 5 $cm^3$ of 0.5moldm$^{-3}$ lead (II) nitrate solution.*

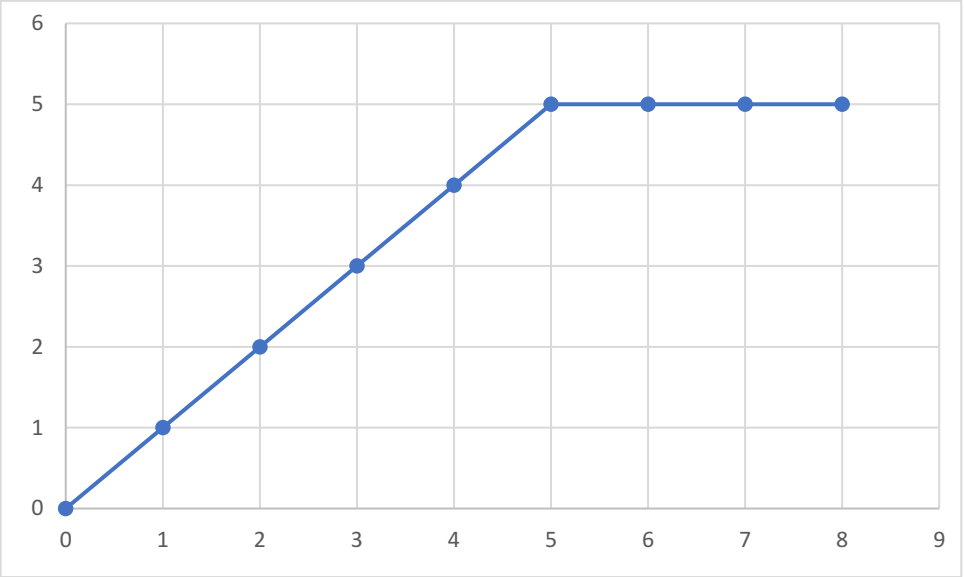
[1 markah]
[*1 mark*]

**[Lihat halaman sebelah**

(c) Graf di bawah menunjukkan ketinggian mendakan melawan isipadu larutan kalium iodida yang telah dimasukkan.
*Graph below show the height of precipitate against volume of potassium iodide solution that added.*

Ketinggian mendakan
*Height of precipitate*(cm)




Isipadu larutan kalium iodida
*Volume of potassium iodide solution*($cm^3$)

(i) Apakah isipadu larutan kalium iodide yang diperlukan untuk tindak balas yang lengkap Larutan plumbum(II) nitrat?
*What is volume of potassium iodide solution needed for complete reaction with lead(II) nitrate solution?*

……..

[1 markah]
[*1 mark*]

(i) Kirakan bilangan mol larutan kalium iodide yang telah bertindakbalas dengan 0.5 $moldm^{-3}$ larutan plumbum(II) nitrat. Kemudian kirakan bilangan mol ion iodide, $I^-$ yang bertindakbalas lengkap dengan 1 mol ion plumbum, $Pb^{2+}$
*Calculate number of mole of potassium iodide that reacted with 0.5 $moldm^{-3}$ lead(II) nitrate solution. Then calculate number of mole iodide ion,$I^-$ that completely reacted with 1 mol lead ion, $Pb^{2+}$*

[3 markah]
[*3 marks*]

(e) State the one similarities and differences of lead(II) Iodide and lead(II) Chloride.
*Nyatakan satu persamaan dan perbezaan plumbum(II) iodide dan plumbum(II) klorida.*

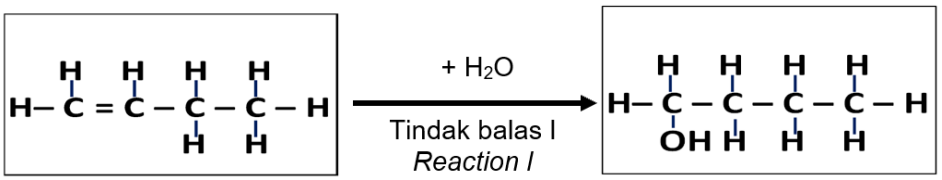
……

……

……
[2markah]
[*2 marks*]

6. Rajah 6 menunjukkan penukaran bagi beberapa sebatian organik.
*Diagram 6 shows the conversions of several organic compounds.*




Sebatian A
*Compound A*

Rajah 6
*Diagram 6*

Berdasarkan rajah,
*Based on diagram,*

(a) Sebatian A mempunyai tiga isomer. Lukis satu isomer bagi sebatian A selain struktur di atas. Namakan isomer tersebut.
*Compound A has three isomers. Draw one of the isomer other than above structural. Name the isomer.*

[2markah]
[*2 marks*]

(b) (i) Namakan tindak balas l.

*Name the reaction l.*

.....

[1markah]
[ *mark*]

(ii) Apakah keadaan yang diperlukan untuk tindak balas l berlaku?
*What conditions are needed in reaction ll?*

.....

[1markah]
[ *1mark*]

(iii) Tuliskan persamaan kimia bagi pembakaran sebatian B di dalam udara.
*Write the chemical equation for combustion of compound B in the air*

.....

[2markah]
[*2 marks*]

(c) Huraikan satu ujian kimia untuk membezakan antara sebatian A dan sebatian B.
*Describe a chemical test to differentiate between compound A and compound B?*

.....

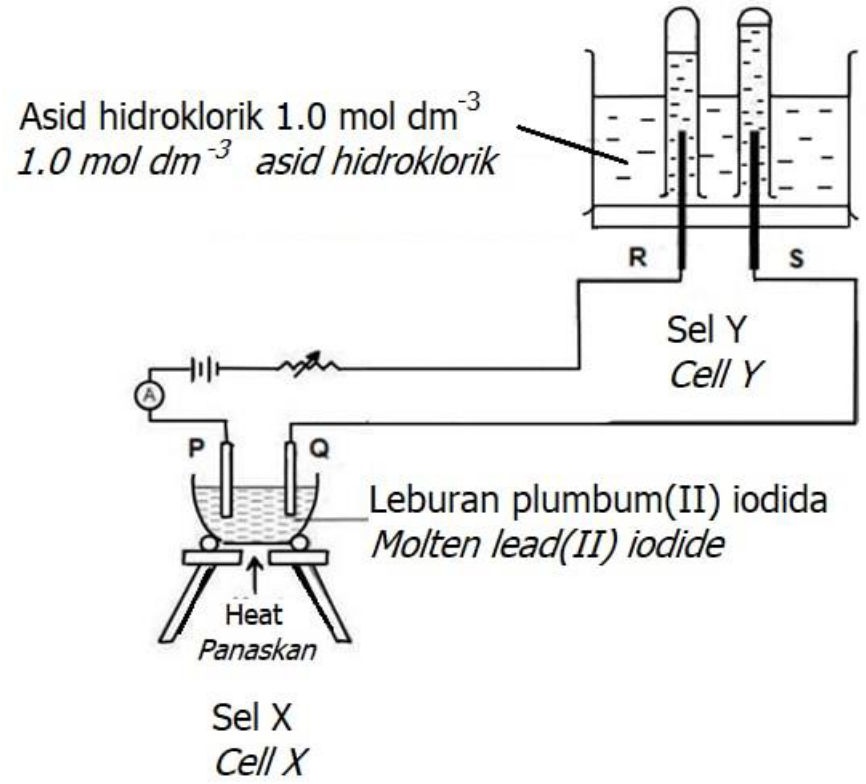
.....

.....
.
.....

[3markah]
*[3 marks*]

7 Rajah 7.1 menunjukkan susunan radas bagi sel X dan sel Y menggunakan elektrod karbon P, Q, R dan S.
*Diagram 7.1 shows apparatus set-up for cell X and Y using carbon electrodes P, Q, R and S.*




Rajah 7.1
*Diagram 7.1*

(a) Berdasarkan Rajah 7.1,
*Based on Diagram 7.1,*

(i) Tuliskan formula ion bagi semua ion yang hadir dalam leburan plumbum (II) iodida.
*Write ionic formulae for all the ions present in molten lead (II) iodide.*

……

[1 markah]
[*1 mark*]

(ii) Nyatakan katod bagi sel Y.
*State the cathodes for cell Y.*

……

[1 markah]
[*1 mark*]

(iii) Tuliskan setengah persamaan bagi tindak balas yang berlaku di elektrod P dan elektrod Q di sel X.
*Write half equation for the reaction occur at electrode P and Q in cell X.*

Elektrod P: …….
*Electrode P:*

Elektrod Q: …….
*Electrode Q:*

[2 markah]
[*2 marks*]

(iv) Tulis persamaan kimia apabila hasil di elektrod S bertindak balas dengan air.
*Write chemical equation when product at electrode S reacts with water.*

……

[1 markah]
[1 *mark*]

(v) Larutan yang terhasil di 7 (a) (iv) diuji dengan satu ujian X. Nyatakan ujian X dan pemerhatian itu.
*The solution formed in 7 (a) (iv) is tested with X test. State the X test and its observation.*

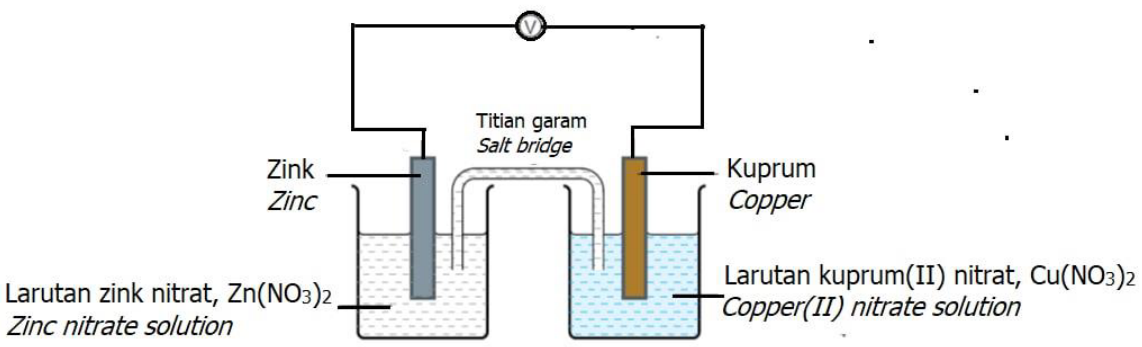
……

……

……

[2 markah]
[2 *marks*]

(b) Rajah 7.2 menunjukkan susunan radas bagi satu sel kimia.
*Diagram 7.2 shows an apparatus setup for a chemical cell.*




Rajah 7.2
*Diagram 7.2*

Nilai keupayaan elektrod piawai sel setengah adalah seperti berikut.
*Standard electrode potential for half-cell as follows.*

| | |
|---|---|
| $Zn^{2+}$ (ak/aq) + 2e | Zn(p/s) E° = -0.76 V |
| $Cu^{2+}$ (ak/aq) + 2e | Cu(p/s) E° = +0.34 V |

Berdasarkan Rajah 7.2,
*Based on Diagram 7.2,*

(i) hitung voltan sel itu.
*calculate the voltage of the cell.*

……

[1 markah]
[*1 mark*]

(iii) Anda dibekalkan sebiji buah tomato, wayar penyambung, LED, satu kepingan magnesium dan satu kepingan plumbum. Bagaimanakah anda merekacipta satu sel kimia ringkas.
*You are provided with a tomato, connecting wire, LED, a magnesium plate and a plumbum plate. How you can create a simple chemical cell.*

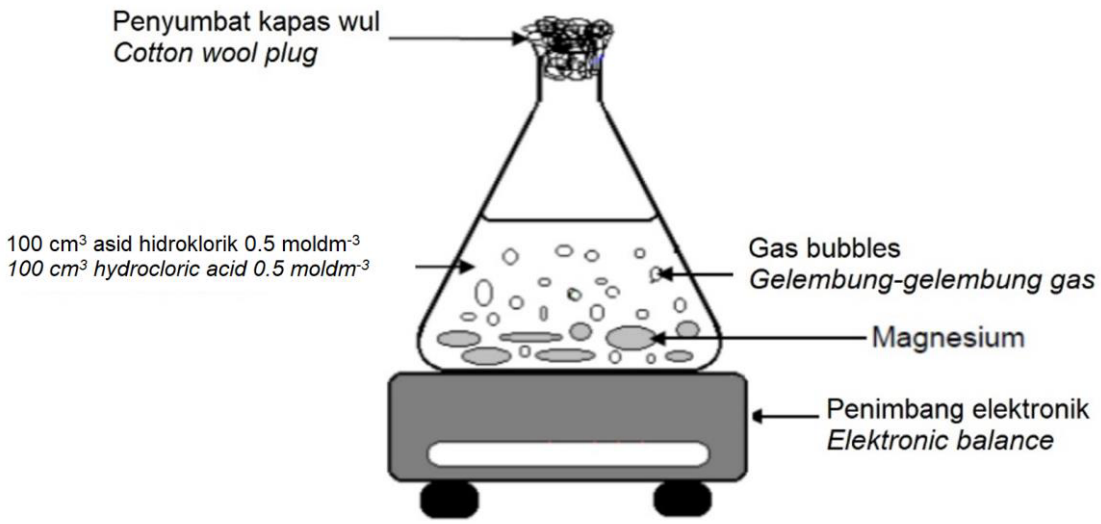
……

……

……

[2 markah]
[*2 marks*]

8 Rajah 8.1 menunjukkan susunan alat radas bagi mengkaji kadar tindak balas iaitu pengurangan jisim magnesium terhadap masa.
*Diagram 8.1 shows the arrangement of the apparatus to study the rate of reaction which is the reduction of the mass of magnesium over time.*




Rajah 8.1
*Diagram 8.1*

Berikut adalah persamaan kimia bagi tindak balas itu:
T*he following is the chemical equation for the reaction:*

$$Mg(p) + 2HCl(ak) \rightarrow MgCl_2(ak) + H_2(g)$$
$$Mg(p) + 2HCl(aq) \rightarrow MgCl_2(aq) + H_2(g)$$

Berdasarkan rajah,
*Based on diagram,*

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

…….

[1 markah]
[*1 mark*]

(ii) Apakah kebesan asid yang bertindak balas ini?
*What is the basicity of this acid?*

…….

[1 markah]
[*1 mark*]

(b) Jadual menunjukkan keputusan eksperimen tersebut.
*The table shows the results of the experiment.*

| | | | | | |
|---|---|---|---|---|---|
| Bacaan penimbang elektronik(g) | 243.0 | 241.38 | 240.57 | 240.57 | 240.57 |
| Masa(s) | 0 | 30 | 60 | 90 | 120 |

(i) Kira bilangan mol yang terdapat dalam 0.24g Mg.
*Calculate the number of moles present in 0.24g of Mg.*
[Jisim atom relatif: Mg =24]
*[Relative atomic mass: Mg=24]*

[1 markah]
[*1 mark*]

(ii) Hitungkan kadar tindak balas purata dalam minit pertama.
Calculate the average rate of reaction rate in the first minute.

[2 markah]
[2 *marks*]

(c) Jika experiment ini diulangi dengan menggantikan kepada 100 $cm^3$ larutan asid hidroklorik 1 $moldm^{-3}$. Bandingkan kadar tindak balas bagi kedua-dua eksperimen ini.
*If this experiment is repeated by replacing to 100 $cm^3$ hydrochloric acid solution 1 $moldm^{-3}$. Compare the reaction rates for the two experiments.*
……

……

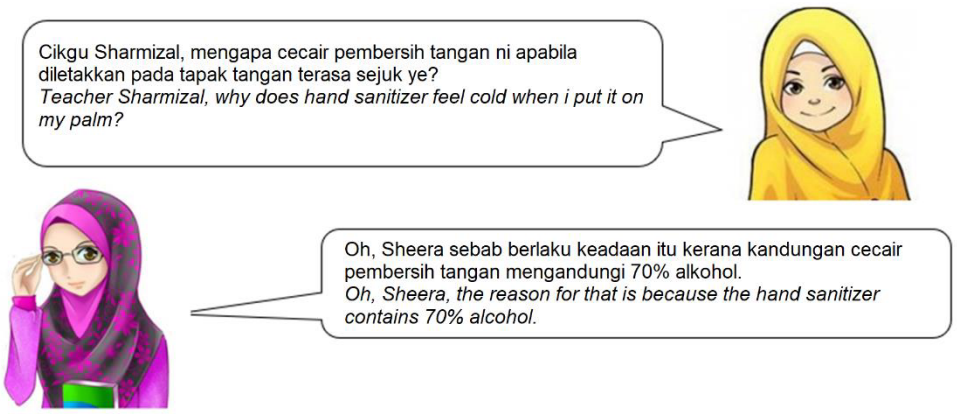
……
[2 markah]

**[Lihat halaman sebelah**

*[2 marks]*

(d) Rajah 8.2 di bawah menunjukkan perbualan seorang murid kepada gurunya di SMK Skudai.
*Diagram 8.2 below shows a student's conversation with his teacher at SMK Skudai.*




Wajarkan penggunaan alkohol di dalam cecair pembersih tangan. Huraikan jawapan anda.
*Justify the use of alcohol in hand sanitizers. Explain your answer.*

[3 markah]
*[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) Jadual 9 menunjukkan keputusan eksperimen bagi menentukan haba pemendakan bagi dua jenis tindak balas yang menggunakan larutan natrium karbonat, $Na_2CO_3$.
*Table 9 shows the experimental results to determine the heat of precipitation for two types of reactions that use sodium carbonate solution, $Na_2CO_3$.*

| Set | Tindak balas<br>*Reaction* | Suhu awal larutan<br>*Initial Temperature of solution*<br>(°C) | Perbezaan suhu selepas dicampurkan<br>*Temperature difference after mixing*<br>(°C) |
|---|---|---|---|
| I | 100 $cm^3$ larutan natrium karbonat 0.1 mol $dm^{-3}$ + 100 $cm^3$ larutan kuprum(II) sulfat 0.1 mol $dm^{-3}$ menghasilkan **pepejal hijau Y** dan larutan natrium sulfat.<br>*100 $cm^3$ of 0.1 mol $dm^{-3}$ sodium carbonate solution + 100 $cm^3$ of 0.1 mol $dm^{-3}$ copper(II) sulphate solution produces **green solid Y** and sodium sulfate solution.* | 29.0 | Berlaku kenaikan suhu sebanyak 4°C<br>*There is a temperature increase of 4°C* |
| II | 100 $cm^3$ larutan natrium karbonat 0.1 mol $dm^{-3}$ + 100 $cm^3$ larutan magnesium nitrat 0.1 mol $dm^{-3}$ menghasilkan magnesium karbonat dan **larutan tidak berwarna Z.**<br>*100 $cm^3$ of 0.1 mol $dm^{-3}$ sodium carbonate solution + 100 $cm^3$ of 0.1 mol $dm^{-3}$ magnesium nitrate solution produces magnesium carbonate and a **colourless solution Z.*** | 29.0 | Berlaku penurunan suhu sebanyak 3°C<br>*There is a temperature decrease of 3°C* |

Jadual 9.1
*Table 9.1*

(i) Apakah yang dimaksudkan dengan haba pemendakan dan warna kuprum(II) sulfat?
*What is meant by heat of precipitation and colour of copper(II) sulfate?*

[2 markah]
[2 *marks*]

(ii) Cadangkan pepejal hijau Y dan larutan tidak berwarna Z.
*Suggest a green solid Y and a colourless solution Z.*

[2 markah]
[2 *marks*]

(iii) Hitung haba pemendakan bagi set I dan set II.
*Calculate the heat of precipitation for set I and set II.*
[Muatan haba tentu larutan, c = 4.2 J $g^{-1}$ $°C^{-1}$; ketumpatan larutan = 1 g $cm^{-3}$]
[*Specific heat capacity of solution, c = 4.2 J* $g^{-1}$ $°C^{-1}$*; density solution = 1 g* $cm^{-3}$]

[6 markah]
*[6 marks]*

(b) Jadual 9.2 menunjukkan maklumat tentang dua jenis asid yang bertindak balas dengan larutan alkali bagi penentuan haba peneutralan di makmal.
*Table 9.2 shows information about two types of acids that react with alkaline solutions to determine the heat of neutralization in the laboratory.*

| | Asid X<br>*Acid X* | Asid Y<br>*Acid Y* |
|---|---|---|
| Formula kimia<br>*Chemical formula* | $CH_3COOH$ | HCl |
| Haba peneutralan<br>*Heat of neutralization* | $\Delta H$ = -57 kJ $mol^{-1}$ | $\Delta H$ = -53 kJ $mol^{-1}$ |

Table 9.2
*Table 9.2*

(ii) Nyatakan 1 persamaan di antara asid X dan asid Y. Selepas itu terangkan perbezaan haba peneutralan kedua-dua asid tersebut.
*State 1 similarty between acid X and acid Y. After that explain the difference in the heat of neutralization of the two acids.*

[10 markah]
*[10 marks]*

**10.** (a) Rajah 10.1 menunjukkan formula struktur ubat yang digunakan untuk melegakan sakit demam.
*Diagram 10.1 shows the structural formula of the medicine used to relieve fever.pain.*

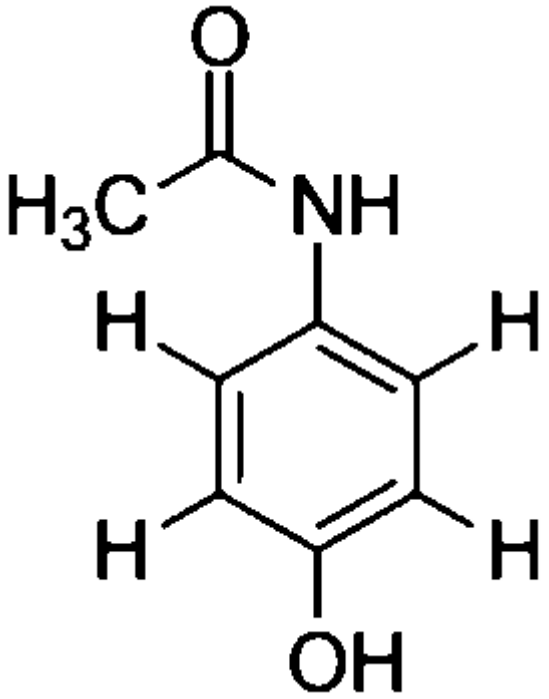



Diagram 10.1
*Rajah 10.1*

Ubat tersebut dibuat daripada sebatian kimia parasetamol, $C_8H_9NO_2$
*The medicine is made from a chemical compound paracetamol, $C_8H_9NO_2$*
Berdasarkan rajah,
*Based on diagram.*

(i) Ikatan yang terbentuk dalam parasetomol adalah kovalen. Apakah yang berlaku kepada elektron semasa pembentukkan ikatan tersebut?
*The bonds formed in paracetomol are covalent. What happens to the electrons during the formation of the bond?*

[1 markah]
*[1 mark]*

(ii) Apakah yang dimaksudkan dengan ikatan ganda dua yang terdapat dalam sebatian ubat ini?
*What is the meaning of the double bond found in this medicine compound?*

[1 markah]
*[1 mark]*

**[Lihat halaman sebelah**
 

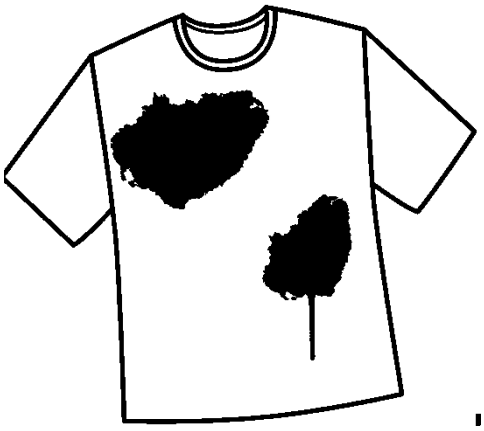
(iii) Nyatakan jenis ubat dan arahan penggunaanya.
*State the type of medicine and its instructions for use.*

[2 markah]
*[2marks]*

(iii) Kirakan bilangan atom yang terdapat dalam 30.2g parasetamol, $C_8H_9NO_2$
*Calculate the number of atoms present in 30.2g of paracetamol, $C_8H_9NO_2$*
[Jisim atom relatif: C = 12, H = 1, N = 14, O = 16]
*[Relative atomic mass: C = 12, H = 1, N = 14, O = 16]*
[Pemalar Avogadro = $6.02 \times 10^{23}$]
*[Avogadro's constant = $6.02 \times 10^{23}$]*

[3 markah]
*[3 marks]*

(b) (i) Rajah 10.2 menunjukkan keadaan baju Ali selepas mengecat pagar besi rumah rakannya supaya tidak berkarat.
*Diagram 10.2 shows the state of Ali's shirt after painting the iron fence of his friend's house so that it does not rust.*



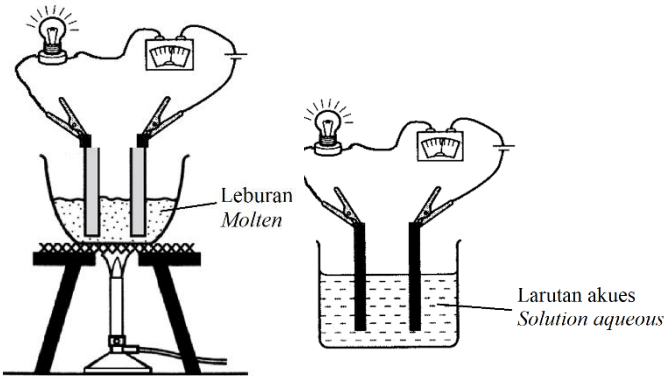
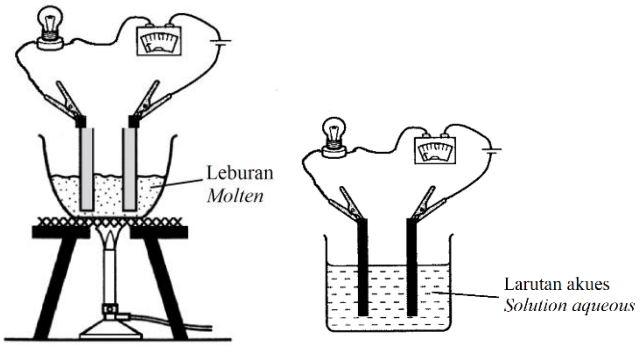
Jika anda adalah rakan kepada Ali, bagaimanakah anda dapat memberi penyelesaian kepada masalah ini agar Ali tidak dimarahi oleh ibunya tentang keadaan bajunya?
*If you are Ali's friend, how can you give a solution to this problem* so that Ali is not scolded by his mother about the condition of his clothes?

[3 markah]
*[3 marks]*

**[Lihat halaman sebelah**

(c) Jadual 10 menunjukkan sifat-sifat sebatian W dan Z.
*Table 10 shows the properties of compound W and Z.*

| **Sebatian** ***Compound*** | **Pemerhatian pada bulb** ***Observation on bulb*** |
|---|---|
| W<br>Larut dalam air<br>*Soluble in water* |  |
| Z<br>Larut dalam tetraklorometana<br>*Soluble in tetrachloromethane* |  |

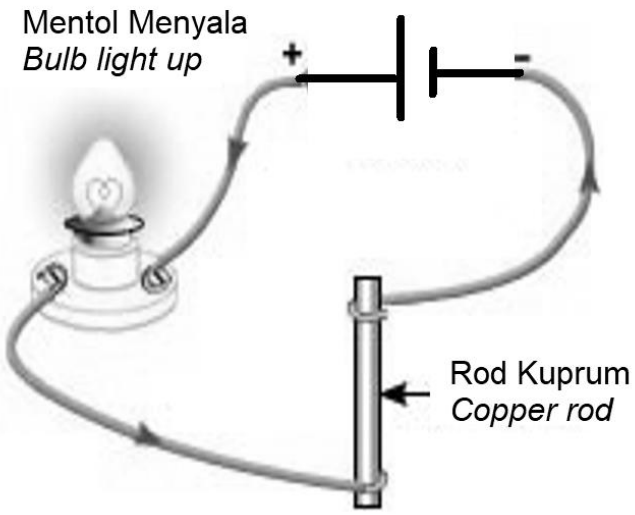
Jadual 10
*Table 10*

Berdasarkan Jadual 7, nyatakan jenis sebatian W dan Z.
Terangkan perbezaan kekonduksian elektrik sebatian W dan Z.
*Based on Table 7, state type of compound W and Z.*
*Explain the difference in electrical conductivity of compound W and Z.*

[5 markah]
*[5marks]*

(d) Rajah 10.3 menunjukkan susunan alat radas eksperimen Jadual 10 yang telah diubahsuai bagi mengkaji kekonduksian elektrik satu logam.
*Diagram 10.3 shows the arrangement of the experimental apparatus of table 10 that has been modified to study the electrical conductivity of a metal.*




Rajah 10.3
*Diagram 10.3*

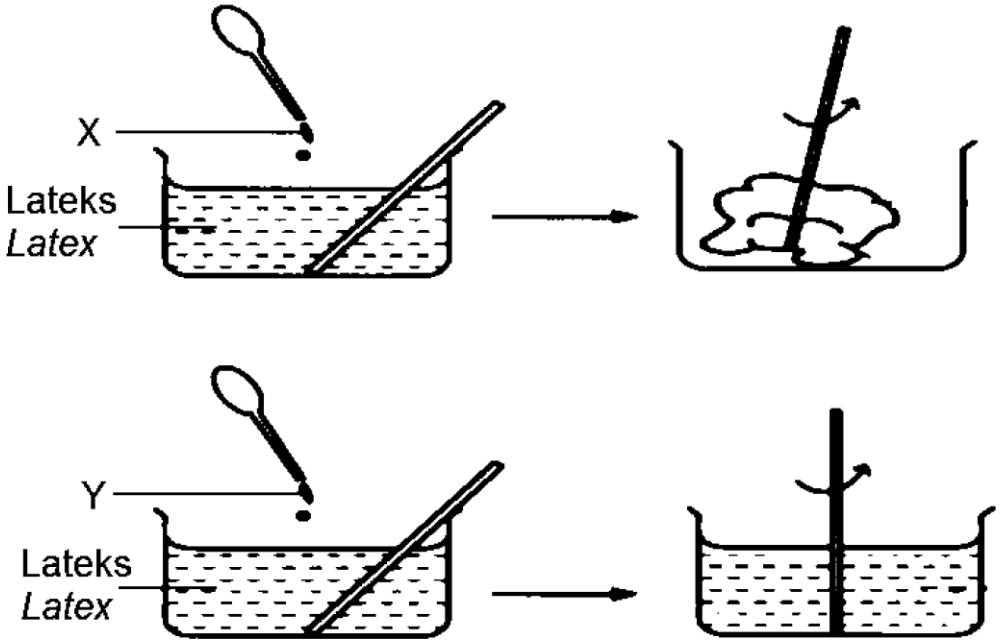
Terangkan bagaimana logam kuprum dalam keadaan pepejal boleh mengkonduksikan elektrik?
*Explain how copper metal in its solid state can conduct electricity?*

[5 markah]
*[5marks]*

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

[20 markah]
[20 *marks*]

11 Rajah 11.1 menunjukkan pemerhatian bagi lateks setelah ditambahkan bahan X dan bahan Y.
Diagram 11.1 shows the observation of latex after adding substance X and Y.




Rajah 11.1
Diagram 11.1

(a) Lateks adalah polimer semulajadi.
Apakah maksud polimer?
*Latex is a natural polymer.*
*What is the meaning of polymer?*

[1 markah]
*[1 mark]*

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

(i) Kenal pasti X dan Y.
*Identify X and Y.*

[2 markah]
*[2 marks]*

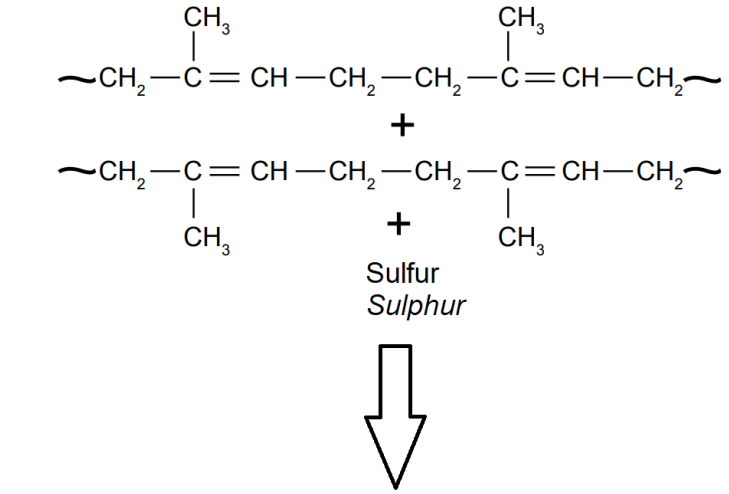
(ii) Nyatakan perbezaan pemerhatian terhadap lateks oleh bahan X dan bahan Y.
Terangkan jawapan anda.
*State the difference in observations of latex by substance X and substance Y.*
*Explain your answer.*

[5 markah]
*[5 marks]*

**[Lihat halaman sebelah**

(iii) Rajah 11.2 menunjukkan proses pemvulkunan polimer lateks agar lebih elastik dan tidak mudah teroksida.
*Diagram 11.2 shows the vulcanization process of latex polymer to make it more elastic and not easy to oxidize.*



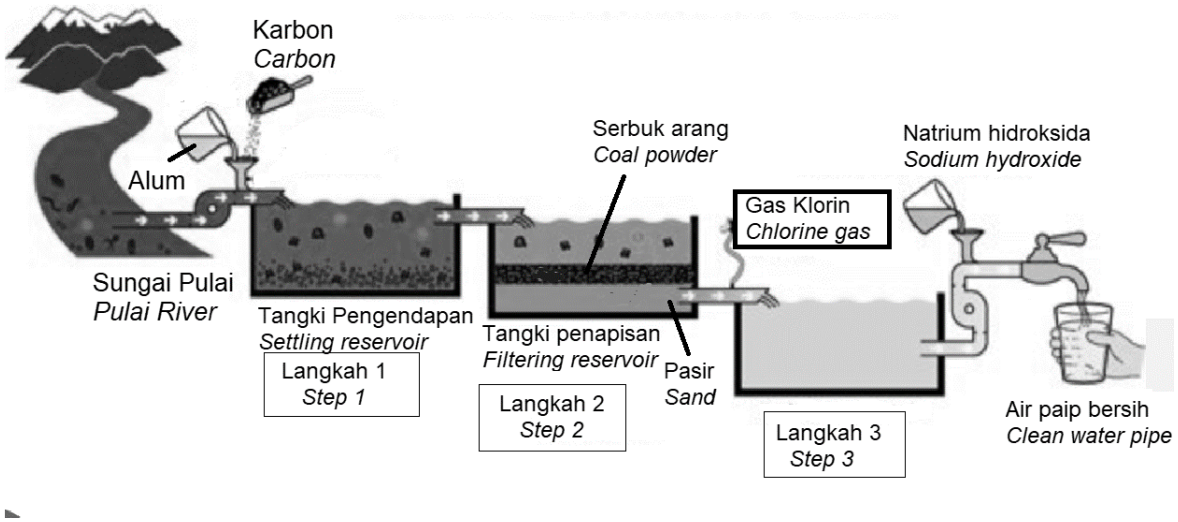

Lukis dan labelkan formula struktur polimer lateks ini.
*Draw and label the structural formula of this latex polymer.*

[2 markah]
*[2 marks]*

(iii) Hitung nilai pH bagi asid sulfurik berkepekatan 0.1 mol $dm^{-3}$
*Calculate the pH value of sulfuric acid with a concentration of 0.1 mol $dm^{-3}$*

[2 markah]
*[2 marks]*

(d) Rajah 11.3 menunjukkan langkah-langkah pembersihan air dalam loji rawatan air.
*Diagram 11.3 shows the water purification steps in a water treatment plant.*




Pada langkah 3, Gas klorin akan dipamkan ke dalam tangki air dan gas klorin melarut dan bertindak balas dengan air seperti yang diwakili oleh persamaan kimia berikut:
*In step 3, chlorine gas will be pumped into the tank and the chlorine gas will dissolve and react with water as shown in the following chemical equation:*

$$Cl_2(g) + H_2O(ce) \rightarrow HOCl(ak) + HCl(ak)$$
$$Cl_2(g) + H_2O(l) \rightarrow HOCl(aq) + HCl(aq)$$

Asid hidroklorik yang terdapat di dalam air paip perlu dineutralkan oleh larutan yang dinyatakan pada rajah langkah 3 sebelum dialirkan ke pengguna.
*Hydrochloric acid found in tap water needs to be neutralized by the solution specified in step 3 diagram before it is fed to the user.*
Dengan menggunakan pengetahuan kimia anda, huraikan cara untuk menentukan kepekatan asid hidroklorik di dalam air terawat tersebut di makmal dengan menggunakan bahan dan radas seperti larutan fenolhtalein, kelalang kon, buret dan lain-lain.
*Using your knowledge of chemistry, describe how to determine the hydrochloric acid concentration in the treated water in the laboratory using materials and apparatus such as phenolphthalein solution, conical flask, burette and others.*

[8 markah]
*[8 marks]*

**- END OF QUESTION PAPER-**
***- KERTAS PEPERIKSAAN TAMAT –***

# JADUAL BERKALA UNSUR

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | 2 He Helium 4 |
| 1 H Hidrogen 1 | | | | | | | | | | | 5 B Boron 11 | 6 C Karbon 12 | 7 N Nitrogen 14 | 8 O Oksigen 16 | 9 F Flourin 19 | 10 Ne Neon 20 |
| 3 Li Litium 7 | 4 Be Berilium 9 | | | | | | | | | | 13 Al Aluminum 27 | 14 Si Silikon 28 | 15 P Fosforus 31 | 16 S Sulfur 32 | 17 Cl Klorin 35 | 18 Ar Argon 40 |
| 11 Na Natrium 23 | 12 Mg Magnesium 24 | | | | | | | | | | 31 Ga Galium 70 | 32 Ge Germanium 73 | 33 As Arsenik 75 | 34 Se Selenium 79 | 35 Br Bromin 80 | 36 Kr Kripton 84 |
| 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 Ferum 56 | 27 Co Kobalt 59 | 28 Ni Nikel 59 | 29 Cu Kuprum 64 | 30 Zn Zink 65 | 48 Cd Kadmium 112 | 50 Sn Stanum 119 | 51 Sb Antimoni 122 | 52 Te Telurium 128 | 53 I Iodin 127 | 54 Xe Xenon 131 |
| 37 Rb Rubidium 86 | 38 Sr Strontrium 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 | 50 Sn Stanum 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 | 72 Hf Hafnium 179 | 73 Ta Tantalum 181 | 74 W Tungsten 184 | 75 Re Renium 186 | 76 Os Osmium 190 | 77 Ir Iridium 192 | 78 Pt Platinum 195 | 79 Au Aurum 197 | 80 Hg Merkuri 201 | 81 Tl Talium 204 | 82 Pb Plumbum 207 | 83 Bi Bismut 209 | 84 Po Polonium 210 | 85 At Astatin 210 | 86 Rn Radon 222 |
| 87 Fr Fransium 223 | 88 Ra Radium 226 | 89 Ac Aktinium 227 | 104 Unq Unnil-kuadium 257 | 105 Unp Unnil-pentium 260 | 106 Unh Unnilhek sium 263 | 107 Uns Unnilseptium 262 | 108 Uno Unniloktium 265 | 109 Une Unnilenium 266 | | | | | | | | | |

Nombor proton
Simbol
Nama unsur
Jisim atom relatif

10 Ne Neon 20

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 58 Ce Serium 140 | 59 Pr Praseo-dimium 141 | 60 Nd Neodimium 144 | 61 Pm Prometium 147 | 62 Sm Samarium 150 | 63 Eu Europium 152 | 64 Gd Gadolinium 157 | 65 Tb Terbium 159 | 66 Dy Disprosium 163 | 67 Ho Holmium 165 | 68 Er Erbium 167 | 69 Tm Tulium 169 | 70 Yb Iterbium 173 | 71 Lu Lutetium 175 |
| 90 Th Torium 232 | 91 Pa Proaktinium 231 | 92 U Uranium 238 | 93 Np Neptunium 237 | 94 Pu Plutonium 244 | 95 Am Amerisium 243 | 96 Cm Kurium 247 | 97 Bk Berkelium 247 | 98 Cf Kalifornium 249 | 99 Es Einsteinium 254 | 100 Fm Fermium 253 | 101 Md Mendele-vium 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 | | | | | | | | | | | 5 B Boron 11 | 6 C Carbon 12 | 7 N Nitrogen 14 | 8 O Oxygen 16 | 9 F Flourine 19 | 10 Ne Neon 20 |
| 11 Na Sodium 23 | 12 Mg Magnesium 24 | | | | | | | | | | | 13 Al Aluminum 27 | 14 Si Silicon 28 | 15 P Phosphorus 31 | 16 S Sulfur 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 | 72 Hf Hafnium 179 | 73 Ta Tantalum 181 | 74 W Tungsten 184 | 75 Re Rhenium 186 | 76 Os Osmium 190 | 77 Ir Iridium 192 | 78 Pt Platinum 195 | 79 Au Gold 197 | 80 Hg Mercury 201 | 81 Tl Thallium 204 | 82 Pb Lead 207 | 83 Bi Bismuth 209 | 84 Po Polonium 210 | 85 At Astatine 210 | 86 Rn Radon 222 |
| 87 Fr Francium 223 | 88 Ra Radium 226 | 89 Ac Actinium 227 | 104 Unq Unnil-quadium 257 | 105 Unp Unnil-pentium 260 | 106 Unh Unnil-hexium 263 | 107 Uns Unnilseptium 262 | 108 Uno Unniloctium 265 | 109 Une Unnilennium 266 | | | | | | | | | |

10 Ne Neon 20 — Proton number, Symbol, Name of element, Relative atomic mass

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 58 Ce Cerium 140 | 59 Pr Praseo-dymium 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 |
| 90 Th Thorium 232 | 91 Pa Proactinium 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 249 | 99 Es Ein-steinium 254 | 100 Fm Fermium 253 | 101 Md Mendele-vium 256 | 102 No Nobelium 254 | 103 Lr Lawrensium 257 |