

Name: .....

Class: .....

**CONFIDENTIAL**

**4541/3**

**Chemistry**

**Paper 3**

**August**

**2019**

**1½ hours**



**MAKTAB RENDAH SAINS MARA  
PEPERIKSAAN SIJIL PENDIDIKAN MRSM 2019**

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**CHEMISTRY**

Paper 3

One hour and thirty minutes

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**DO NOT OPEN THIS QUESTION BOOKLET UNTIL BEING TOLD TO DO SO**

1. Write down your name and class in the space provided  
*Tuliskan nama dan kelas anda pada ruang yang disediakan.*
2. The question booklet is bilingual.  
*Buku soalan ini adalah dalam dwibahasa.*
3. Candidates are required to answer all questions.  
*Calon dikehendaki menjawab semua soalan*

<i>For Examiner's Use</i>		
Question	Full Mark	Mark
1	33	
2	17	
Total	50	

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This question booklet contains 8 printed pages including the front page.

**[See Next Page**

- 1 A student carried out an experiment to study the effect of catalyst on the rate of reaction between magnesium and dilute hydrochloric acid.

*Seorang murid telah menjalankan satu eksperimen untuk mengkaji kesan mangkin ke atas kadar tindak balas antara magnesium dengan asid hidroklorik cair.*

Diagram 1 shows the reading of the electronic balance for the mass of the reaction mixture at 0 s, 60 s, 120 s and 180 s in Set I.

*Rajah 1 menunjukkan bacaan penimbang elektronik bagi jisim campuran tindak balas pada masa 0 s, 60 s, 120 s dan 180 s dalam Set I.*

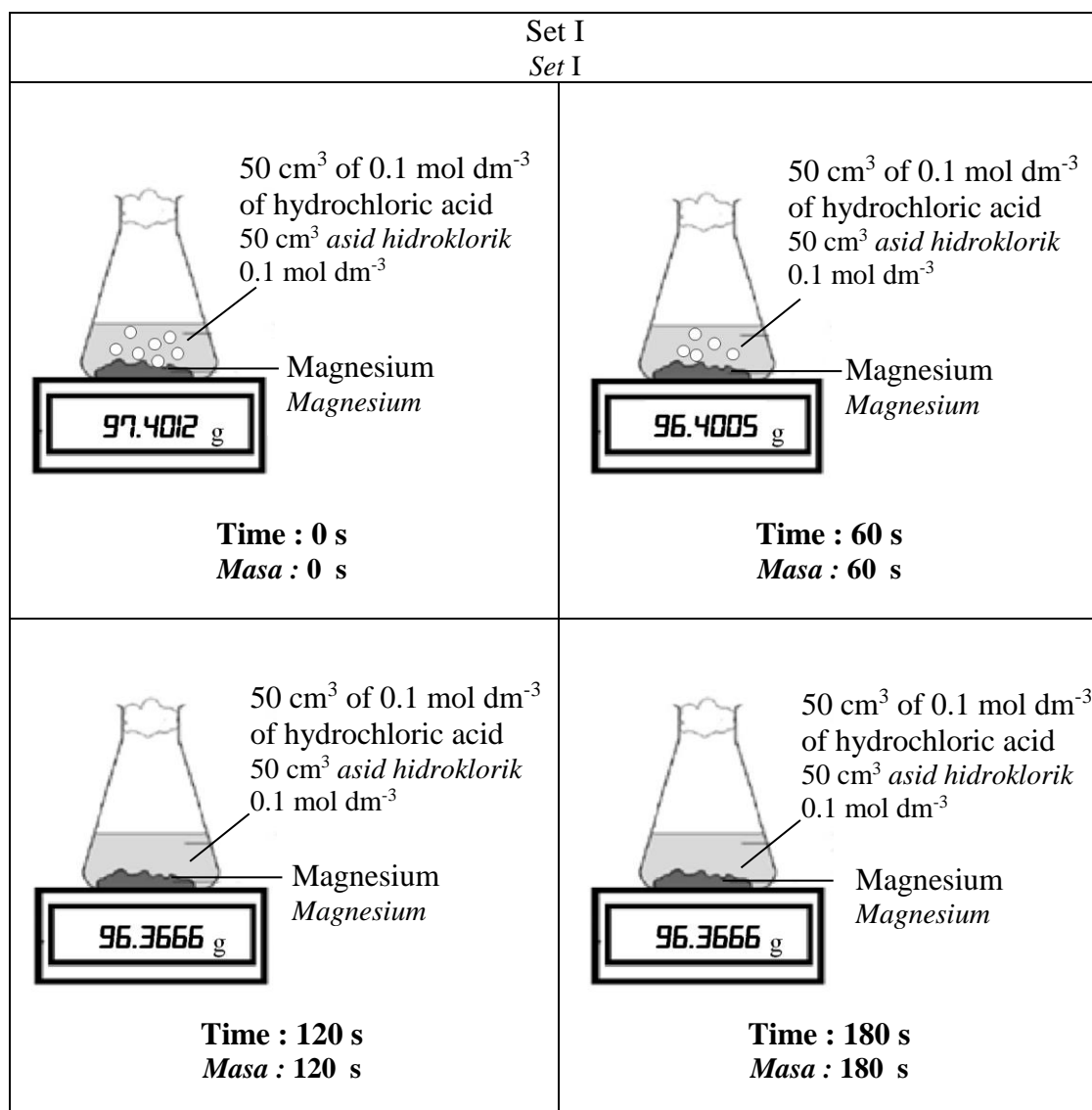


Diagram 1  
*Rajah 1*

- (a) Based on Diagram 1, complete Table 1 by recording the masses of reaction mixture, correct to two decimal places.

*Berdasarkan Rajah 1, lengkapkan Jadual 1 dengan merekodkan jisim campuran tindak balas betul kepada dua tempat perpuluhan.*

Time/s <i>Masa</i>	0	60	120	180
Mass of reaction mixture/g <i>Jisim campuran tindak balas</i>				

Table 1  
*Jadual 1*

[3 marks]  
[3 markah]

*For  
Examiner's  
Use*

1(a)

- (b) The experiment is repeated by adding copper(II) sulphate solution into the mixture of magnesium and hydrochloric acid in Set II.

*Eksperimen diulangi dengan menambahkan larutan kuprum(II) sulfat ke dalam campuran magnesium dan asid hidroklorik bagi Set II.*

For this experiment, state

*Bagi eksperimen ini, nyatakan*

- (i) the manipulated variable  
*pemboleh ubah dimanipulasikan*

.....

- (ii) the responding variable  
*pemboleh ubah bergerak balas*

.....

- (iii) the fixed variable  
*pemboleh ubah dimalarkan*

.....

[3 marks]  
[3 markah]

1(b)

- (c) State **one** hypothesis for this experiment.

*Nyatakan **satu** hipotesis bagi eksperimen ini.*

.....

.....

.....

[3 marks]  
[3 markah]

1(c)

For  
Examiner's  
Use

1(d)(i)

(d) (i) Based on Diagram 1, state **one** observation for this experiment.  
*Berdasarkan Rajah 1, nyatakan **satu** pemerhatian bagi eksperimen ini.*

.....

.....

[3 marks]  
[3 markah]

1(d)(ii)

(ii) Give the corresponding inference based on your answer in 1(d)(i).  
*Berikan inferens yang sepadan berdasarkan jawapan di 1(d)(i).*

.....

.....

[3 marks]  
[3 markah]

1(e)(i)

(e) (i) Based on Table 1, plot a graph of mass of reaction mixture against time on the graph paper on page 5.  
*Berdasarkan Jadual 1, lukis graf jisim campuran tindak balas melawan masa di atas kertas graf di halaman 5.*

[3 marks]  
[3 markah]

1(e)(ii)

(ii) Sketch the curve obtained for Set II on the same axis in (e)(i).  
*Lakarkan lengkung yang diperolehi bagi set II pada paksi yang sama di (e)(i).*

[3 marks]  
[3 markah]

1(f)

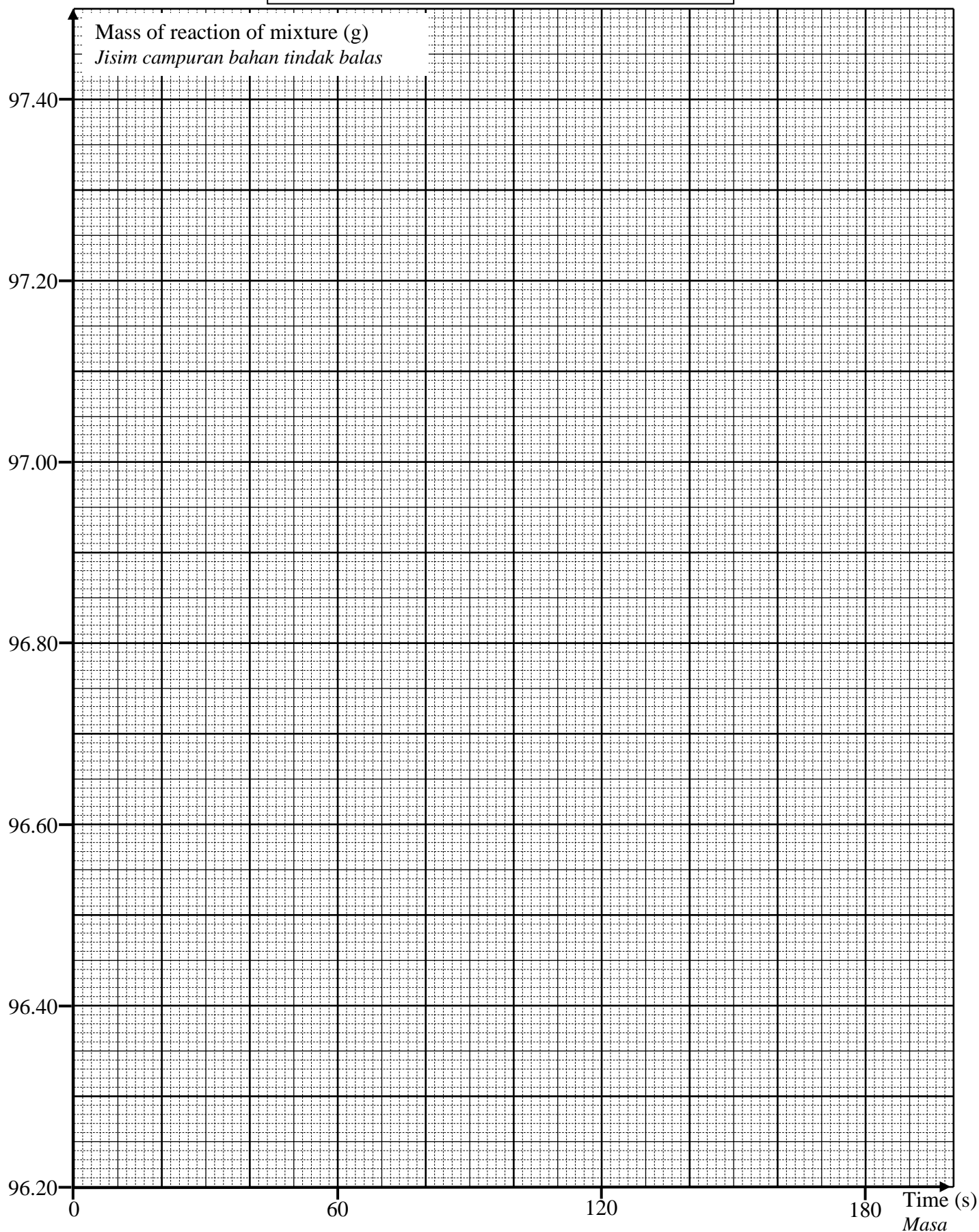
(f) Based on experiment Set I, state how the mass of reaction mixture changes with time.  
*Berdasarkan eksperimen Set I, nyatakan bagaimana jisim campuran tindak balas berubah dengan masa.*

.....

.....

[3 marks]  
[3 markah]

Graph of mass of reaction mixture against time  
*Graf jisim campuran tindak balas melawan masa*



[Lihat halaman sebelah

For  
Examiner's  
Use

- (g) State the operational definition for the rate of reaction in this experiment.  
*Nyatakan definisi secara operasi bagi kadar tindak balas dalam eksperimen ini.*

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

[3 marks]  
[3 markah]

1(g)

- (h) Referring to your graph, how do the rate of reaction in Set I and Set II differ?  
Give your reason.  
*Merujuk pada graf anda, bagaimanakah kadar tindak balas dalam Set I dan Set II berbeza?  
Berikan alasan anda.*

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

[3 marks]  
[3 markah]

1(h)

- (i) The chemical equation for the reaction in Set I and Set II can be written as follows:  
*Persamaan kimia bagi tindak balas Set I dan Set II boleh ditulis seperti berikut:*



Classify the substances into elements and compounds.  
*Kelaskan bahan-bahan ini kepada unsur dan sebatian.*

[3marks]  
[3markah]

1(i)

**Total A1**

33

- 2 The following conversation is about an experiment to differentiate the electrical conductivity between two compounds.

*Perbualan berikut adalah berkaitan satu eksperimen untuk membezakan kekonduksian elektrik bagi dua sebatian.*

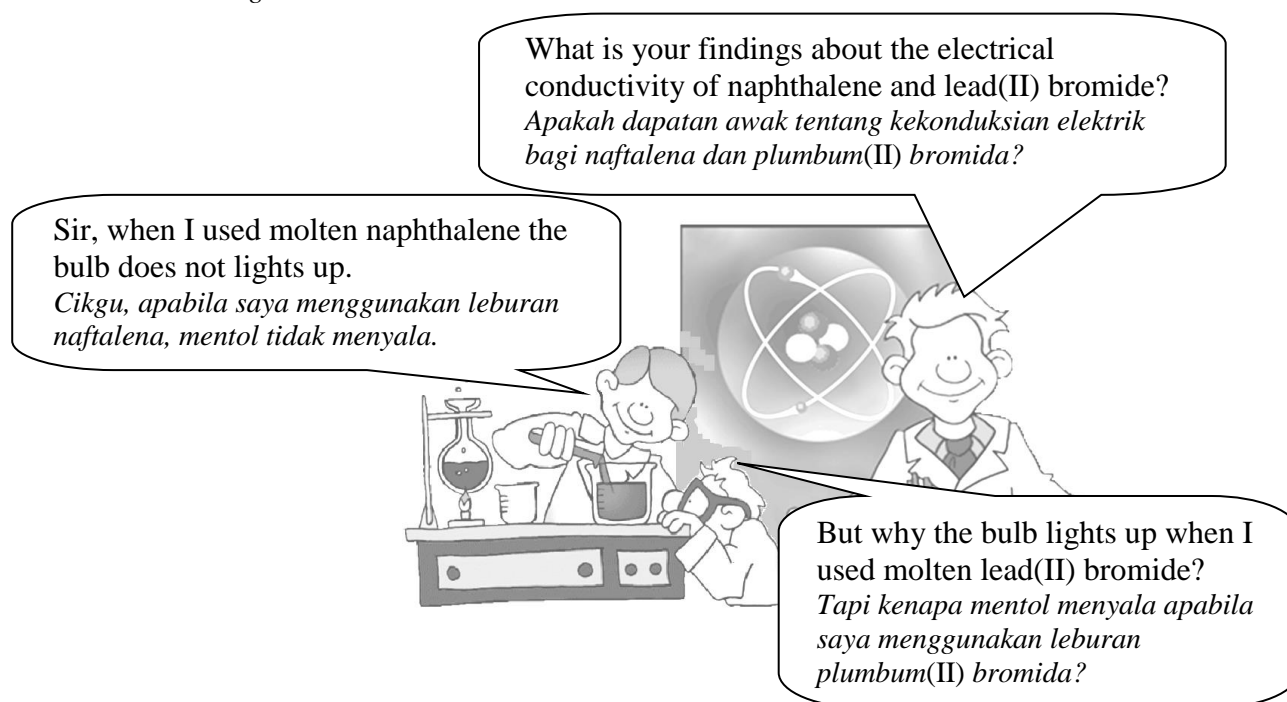


Diagram 2

*Rajah 2*

As a student, plan a laboratory experiment to prove the result obtained by these students are correct.

*Sebagai seorang murid, rancang satu eksperimen makmal untuk membuktikan keputusan yang diperolehi oleh kedua-dua orang murid itu adalah betul.*

Your planning should include the following aspects:

*Perancangan anda hendaklah mengandungi aspek-aspek berikut:*

- Problem statement  
*Pernyataan masalah*
- All the variables  
*Semua pemboleh ubah*
- Statement of the hypothesis  
*Pernyataan hipotesis*
- List of materials and apparatus  
*Senarai bahan dan radas*
- Procedure for the experiment  
*Prosedur eksperimen*
- Tabulation of data  
*Penjadualan data*

[17 marks]

[17 markah]

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

[Lihat halaman sebelah  
**SULIT**

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

1. This question paper consists of two questions: **Question 1** and **Question 2**.  
*Kertas peperiksaan ini mengandungi dua soalan: Soalan 1 dan Soalan 2.*
2. Answer **all** questions. Write your answer for **Question 1** in the spaces provided in this question paper.  
*Jawab semua soalan. Jawapan anda bagi Soalan 1 hendaklah ditulis pada ruang yang disediakan dalam kertas peperiksaan ini.*
3. Write your answers for **Question 2** on the ‘helaian tambahan’ provided by the invigilators. You may use equations, diagrams, tables, graphs and other suitable methods to explain your answers.  
*Tulis jawapan anda bagi Soalan 2 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. Show your working, it may help you to get marks.  
*Tunjukkan kerja mengira, ini membantu anda mendapatkan markah.*
5. The diagrams in the questions are not drawn to scale unless stated.  
*Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.*
6. The marks allocated for each question or sub-part of a question are shown in brackets.  
*Markah yang diperuntukkan bagi setiap soalan atau ceraihan soalan ditunjukkan dalam kurungan.*
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. You may use a scientific calculator.  
*Anda dibenarkan menggunakan kalkulator saintifik.*
9. You are advised to spend 45 minutes to answer **Question 1** and 45 minutes for **Question 2**.  
*Anda dinasihati supaya mengambil masa 45 minit untuk menjawab Soalan 1 dan 45 minit untuk Soalan 2.*
10. Tie the helaian tambahan together with this question paper and hand in to the invigilator at the end of the examination.  
*Ikut helaian tambahan bersama-sama kertas peperiksaan ini dan serahkan kepada pengawas peperiksaan pada akhir peperiksaan.*