

Nama :

Kelas :

Angka Giliran :

SULIT
4541/3
Kimia
Kertas 3
September
2015
1½ jam



MAKTAB RENDAH SAINS MARA
PEPERIKSAAN SIJIL PENDIDIKAN MRSM 2015

KIMIA

Kertas 3

Satu jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Tuliskan **nama**, **kelas** dan **angka giliran** anda pada ruang yang disediakan.*
2. *Buku soalan ini adalah dalam dwibahasa.*
3. *Calon dikehendaki menjawab semua soalan*

<i>Untuk Kegunaan Pemeriksa</i>		
Soalan	Markah Penuh	Markah diperolehi
1	21	
2	12	
3	17	
Total	50	

Kertas soalan ini mengandungi 11 halaman bercetak

[Lihat sebelah

- 1 A student carried out an experiment to investigate the effect of temperature on the rate of reaction between excess zinc powder and 25 cm³ of 0.1 mol dm⁻³ hydrochloric acid.

The reaction is carried out at different temperatures; 25.0 °C, 40.0 °C, 50.0 °C and 60.0 °C. Time taken to collect 30.00 cm³ of hydrogen gas is recorded.


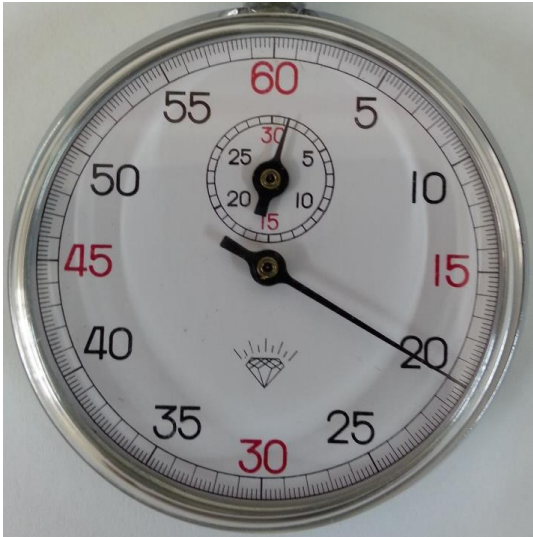
The stopwatch readings for each temperature are shown in Diagram 1.1.

Seorang pelajar menjalankan suatu eksperimen untuk mengkaji kesan suhu ke atas kadar tindak balas di antara serbuk zink berlebihan dengan 25 cm³ asid hidroklorik 0.1 mol dm⁻³.

Tindak balas dijalankan pada suhu yang berbeza; 25.0 °C, 40.0 °C, 50.0 °C and 60.0 °C.

Masa yang diambil untuk mengumpul 30.00 cm³ gas hidrogen dicatatkan.

Bacaan jam randik bagi setiap suhu ditunjukkan dalam Rajah 1.1.

Temperature/°C <i>Suhu/°C</i>	Stop watch reading <i>Bacaan jam randik</i>	Time taken / s <i>Masa yang diambil/s</i>
25.0		
30.0		

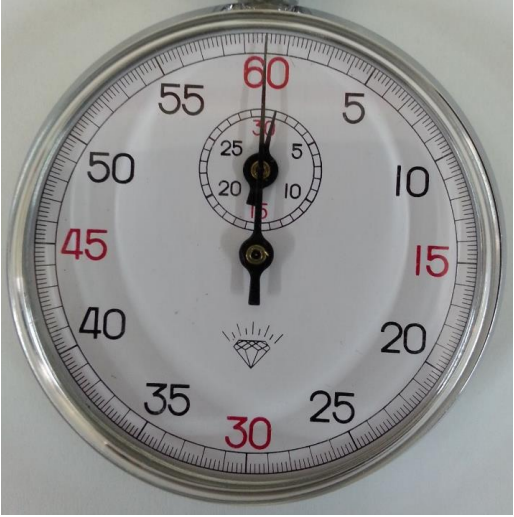
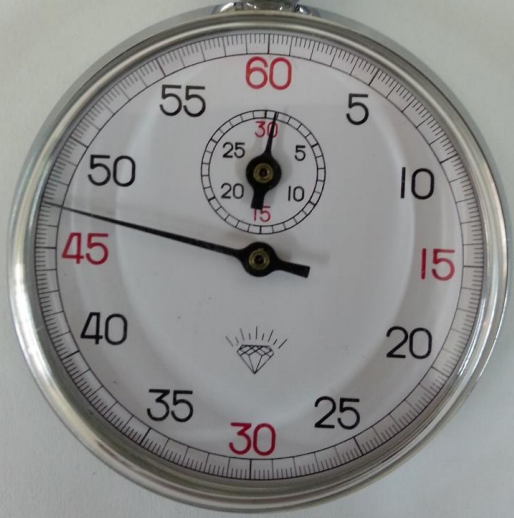
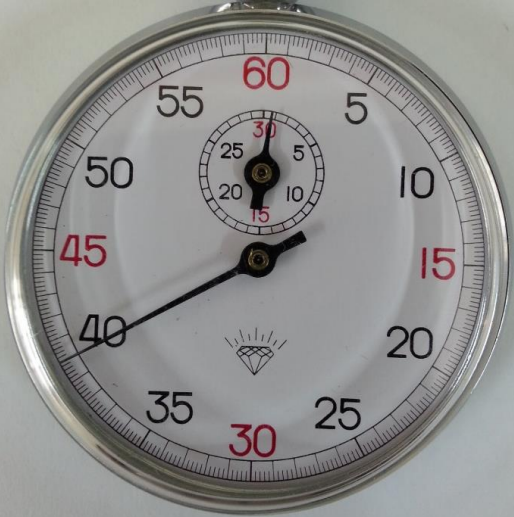
Temperature/ ⁰ C <i>Suhu⁰C</i>	Stop watch reading <i>Bacaan jam randik</i>	Time taken / s <i>Masa yang diambil/s</i>
40.0	 A circular stopwatch with a white face and silver casing. The main dial has markings from 0 to 60 in increments of 5, with red numbers at 15, 30, 45, and 60. The sub-dial has markings from 0 to 5 in increments of 1, with red numbers at 15, 30, and 45. The main hand points to 40.0 and the sub-dial hand points to 0.0.	
50.0	 A circular stopwatch with a white face and silver casing. The main dial has markings from 0 to 60 in increments of 5, with red numbers at 15, 30, 45, and 60. The sub-dial has markings from 0 to 5 in increments of 1, with red numbers at 15, 30, and 45. The main hand points to 50.0 and the sub-dial hand points to 0.0.	
60.0	 A circular stopwatch with a white face and silver casing. The main dial has markings from 0 to 60 in increments of 5, with red numbers at 15, 30, 45, and 60. The sub-dial has markings from 0 to 5 in increments of 1, with red numbers at 15, 30, and 45. The main hand points to 60.0 and the sub-dial hand points to 0.0.	

Diagram 1.1
Rajah 1.1

For
Examiner's
Use

1(a)

- (a) Record the time for each temperature in Diagram 1.1.
Rekodkan masa bagi setiap suhu pada Rajah 1.1.

[3 marks]
[3 markah]

- (b) Tabulate the reading of temperature, time and 1/ time in the space provided.
Jadualkan bacaan suhu, masa dan 1/masa di dalam ruangan yang disediakan.

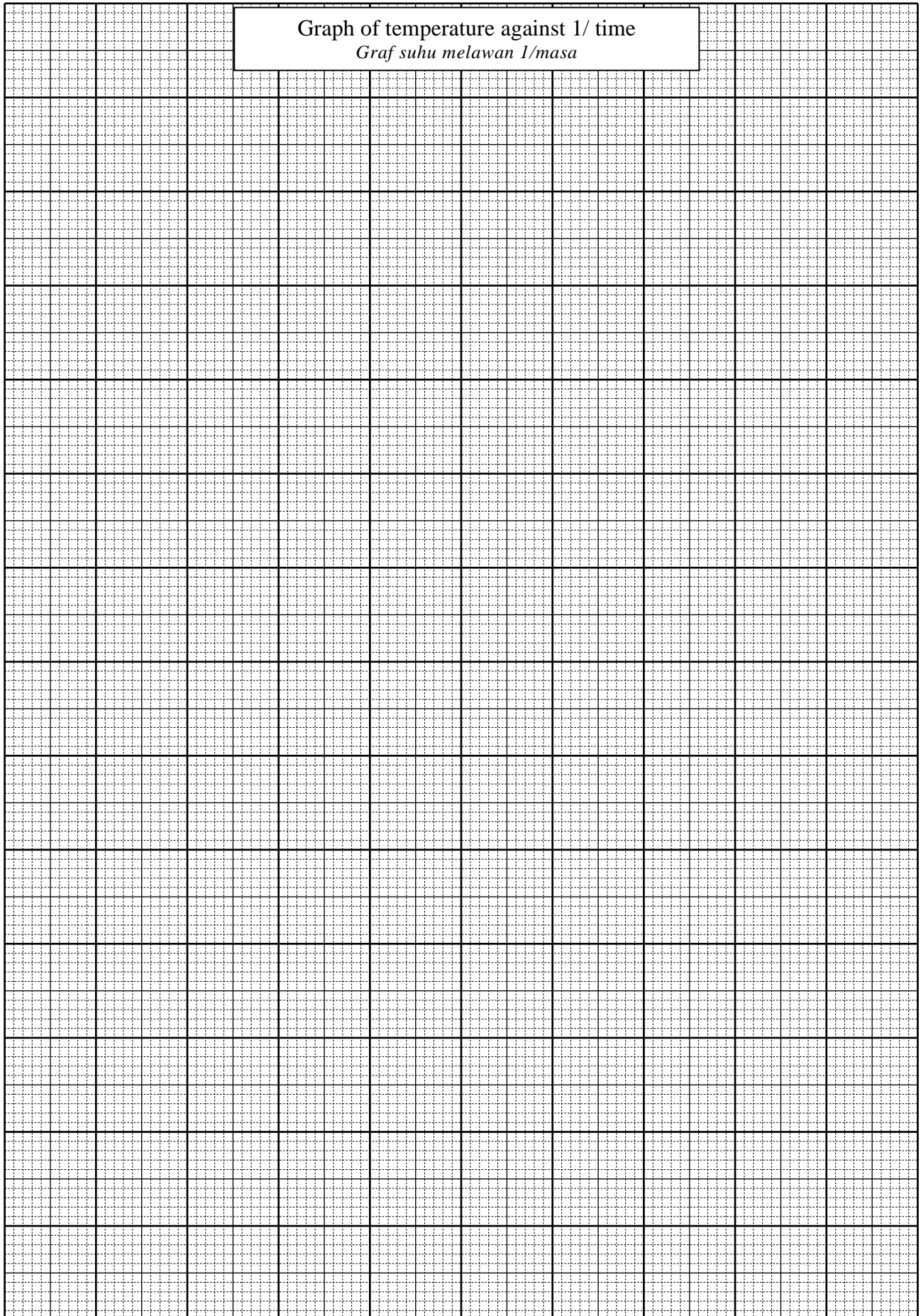
1(b)

[3 marks]
[3 markah]

1(c)(i)

- (c) (i) Draw a graph of temperature against 1/ time on the graph paper.
Lukiskan graf suhu melawan 1/masa pada kertas graf.

[3 marks]
[3 markah]



For
Examiner's
Use

(ii) State the relationship between temperature and the rate of reaction.

Nyatakan perhubungan antara suhu dan kadar tindak balas .

.....
.....

[3 marks]
[3 markah]

1(c)(ii)

(iii) Predict the time taken for collecting 30.00 cm³ of hydrogen gas when the experiment was carried out at 45.0 °C.

Show on the graph how you determine the answer.

Ramalkan masa yang diambil untuk mengumpul 30.00 cm³ gas hidrogen pada 45.0 °C. Tunjukkan pada graf bagaimana anda memperolehi jawapan.

.....
.....

[3 marks]
[3 markah]

1(c)(iii)

(d) 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(d)

(e) The experiment at 30.0 °C is repeated by using zinc strip to replace the zinc powder. The time taken for the reaction to be completed is longer. Explain why.

Eksperimen pada suhu 30.0 °C diulangi dengan menggunakan kepingan zink untuk menggantikan serbuk zink. Masa yang diambil untuk tindak balas lengkap adalah lebih panjang .Terangkan mengapa.

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

[3 marks]
[3 markah]

1(e)

Total 1

21

2 Table 2.1 shows the results for displacement reaction to construct the Electrochemical Series.

Jadual 2.1 menunjukkan keputusan tindak balas penyerasan bagi membina Siri Elektrokimia.

Metal Logam	Experiment I <i>Eksperimen I</i>	Experiment II <i>Eksperimen II</i>	Experiment III <i>Experiment II</i>
	Copper(II) nitrate <i>Kuprum(II) nitrat</i>	Zinc nitrate <i>Zink nitrat</i>	Silver nitrate <i>Argentum nitrat</i>
Copper <i>Kuprum</i>		No change <i>Tiada perubahan</i>	Shiny grey solid is formed <i>Pepejal kelabu berkilat terbentuk</i>
Zinc <i>Zink</i>	Brown solid is formed <i>Pepejal perang terbentuk</i>		Shiny grey solid is formed <i>Pepejal kelabu berkilat terbentuk</i>
Silver <i>Argentum</i>	No change <i>Tiada perubahan</i>	No change <i>Tiada perubahan</i>	

Table 2.1
Jadual 2.1

(a) State the variables involved in Experiment III.
Nyatakan pembolehubah yang terlibat dalam Eksperimen III.

Manipulated variable
Pembolehubah dimanipulasikan:

.....

Responding variable
Pembolehubah bergerak balas:

.....

Fixed variable
Pembolehubah dimalarkan:

.....

[3marks]
[3markah]

2(a)

(b) State one hypothesis based on the results in Experiment III.
Nyatakan satu hipotesis berdasarkan keputusan di dalam Eksperimen III.

.....

.....

.....

[3marks]
[3 markah]

2(b)

For
Examiner's
Use

2(c)

- (c) Based on the results in Table 2.1, arrange the metals in ascending order in the Electrochemical Series.
Berdasarkan keputusan di Jadual 2.1, susun semua logam dalam tertib menaik bagi Siri Elektrokimia.

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

- (d) Classify the following metals into metals which are more electropositive and less electropositive than lead.
Kelaskan logam-logam berikut kepada logam yang lebih elektropositif dan logam kurang elektropositif dari plumbum.

- | | | |
|---------------------------------|-----------------------------|---------------------------------|
| • Magnesium
<i>Magnesium</i> | • Zinc
<i>Zink</i> | • Aluminium
<i>Aluminium</i> |
| • Copper
<i>Kuprum</i> | • Silver
<i>Argentum</i> | • Iron
<i>Ferum</i> |

Metals which are more electropositive than lead <i>Logam yang lebih elektropositif daripada plumbum</i>	Metals which are less electropositive than lead <i>Logam yang kurang elektropositif daripada plumbum</i>

2(d)

[3marks]
[3 markah]

Total 2

	12
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- 3 Diagram 3.1 shows a conversation between two students after attending a school activity near the beach.

Rajah 3.1 menunjukkan perbualan antara dua orang pelajar selepas menghadiri aktiviti sekolah berdekatan dengan pantai.

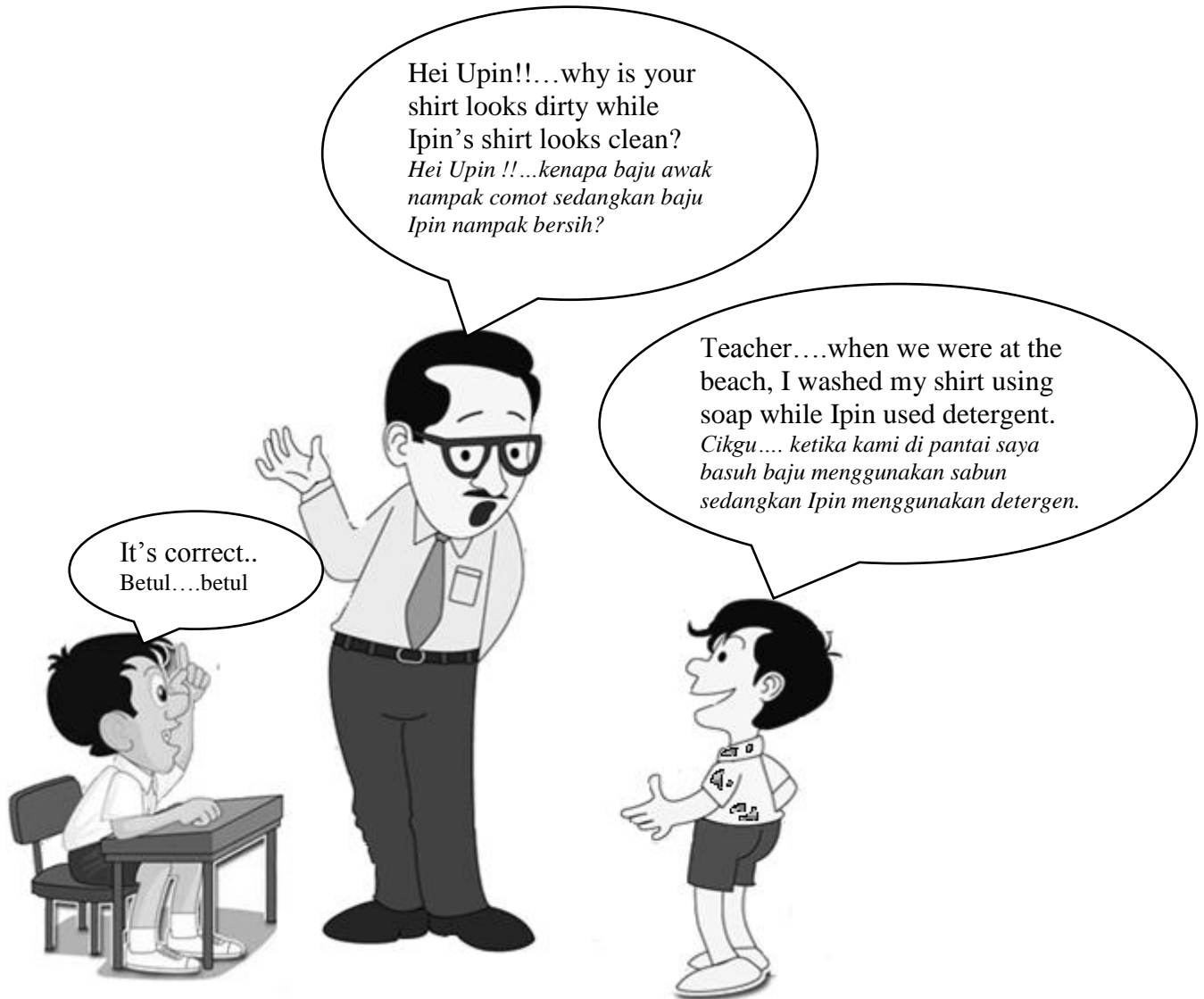


Diagram 3.1
Rajah 3.1

Referring to the above conversation, plan a laboratory experiment to compare the effectiveness of soap and detergent in sea water.

Merujuk kepada perbualan di atas, rancang satu eksperimen untuk membandingkan keberkesanan sabun dan detergen dalam air laut.

You are provided with apparatus and materials such as beakers and two pieces of cloth with the same oily stains.

Anda dibekalkan dengan radas dan bahan seperti bikar dan dua keping kain dengan kesan kotoran minyak yang sama.

Your planning should include the following:

Perancangan anda haruslah mengandungi perkara-perkara berikut :

- (a) Statement of problem
Pernyataan masalah
- (b) All the variables
Semua pembolehubah
- (c) Statement of hypothesis
Pernyataan hipotesis
- (d) List of substances and apparatus
Senarai bahan dan alat radas
- (e) Procedure of the experiment
Prosedur eksperimen
- (f) Tabulation of data
Penjadualan data

[17 marks]
[17 markah]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

INFORMATION FOR CANDIDATES
MAKLUMAT UNTUK CALON

1. This question paper consists of three questions; **Question 1, Question 2 and Question 3.**
Kertas soalan ini mengandungi tiga soalan; Soalan 1, Soalan 2 dan Soalan 3.
2. Answer all the questions. Write your answers for **Question 1 and Question 2** in the spaces provided in this question paper.
Jawab semua soalan. Jawapan anda bagi Soalan 1 dan Soalan 2 hendaklah ditulis dalam ruang yang disediakan dalam kertas soalan
3. Write your answers for **Question 3** on the 'helaian tambahan' provided by the invigilators. You may use equations, diagrams, tables, graphs and other suitable methods to explain your answer.
Tuliskan jawapan anda bagi Soalan 3 dalam helaian tambahan yang dibekalkan oleh pengawas peperiksaan. Anda boleh menggunakan persamaan, gambar 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 akan 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. Marks allocated for each question or 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 baru.
8. You may use a non-programmable scientific calculator.
*Anda dibenarkan menggunakan kalkulator saintifik yang **tidak** boleh diprogramkan.*
9. You are advised to spend 60 minutes to answer **Question 1 and Question 2** and 30 minutes for **Question 3.**
Anda dinasihati supaya mengambil masa 60 minit untuk menjawab Soalan 1 dan Soalan 2 dan 30 minit untuk menjawab Soalan 3.
10. Tie the 'helaian tambahan' together with this question paper and hand in to the invigilator at the end of the examination.
Ikat helaian tambahan bersama-sama kertas soalan ini dan serahkan kepada pengawas peperiksaan pada akhir peperiksaan.