

Name :

Class:.....

CONFIDENTIAL

4531/3

4531/3

Physics

Paper 3

September

2008

1 ½ hrs



MAKTAB RENDAH SAINS MARA

**SIJIL PELAJARAN MALAYSIA
TRIAL EXAMINATION 2008**

PHYSICS

Paper 3

One hour and thirty minutes

DO NOT OPEN THIS QUESTION BOOKLET UNTIL YOU ARE TOLD TO DO SO

1. Write down your name and class in the space provided.
2. The questions are written in English and bahasa Melayu.
3. Candidates are required to read the information given on the last page of this booklet

<i>Examiner's Code</i>			
Section	Question	Marks	Score
A	1	16	
	2	12	
B	3	12	
	4	12	
Total			

This booklet consist of 16 printed pages

Section A

Bahagian A

[28 marks/ 28 markah]

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

1. A student carries out an experiment to investigate the relationship between the pressure of water and its depth, h .

The arrangement of the apparatus for the experiment is shown in Diagram 1.1. A thin rubber sheet is fixed across the mouth of a thistle funnel. The funnel is attached to a manometer by a rubber tube.

x_1 and x_2 are the liquid levels in both arms of the manometer. The pressure exerted by water is determined by the difference in the liquid level, l .

Seorang pelajar menjalankan satu eksperimen untuk mengkaji hubungan antara tekanan air dengan kedalaman, h . Susunan radas untuk eksperimen ditunjukkan pada Rajah 1.1. Sekeping getah nipis diletakkan pada mulut corong tisel. Corong itu disambung kepada sebuah manometer dengan tiub getah.

x_1 dan x_2 adalah aras cecair dalam kedua lengan manometer. Tekanan air ditentukan oleh perbezaan aras cecair, l .

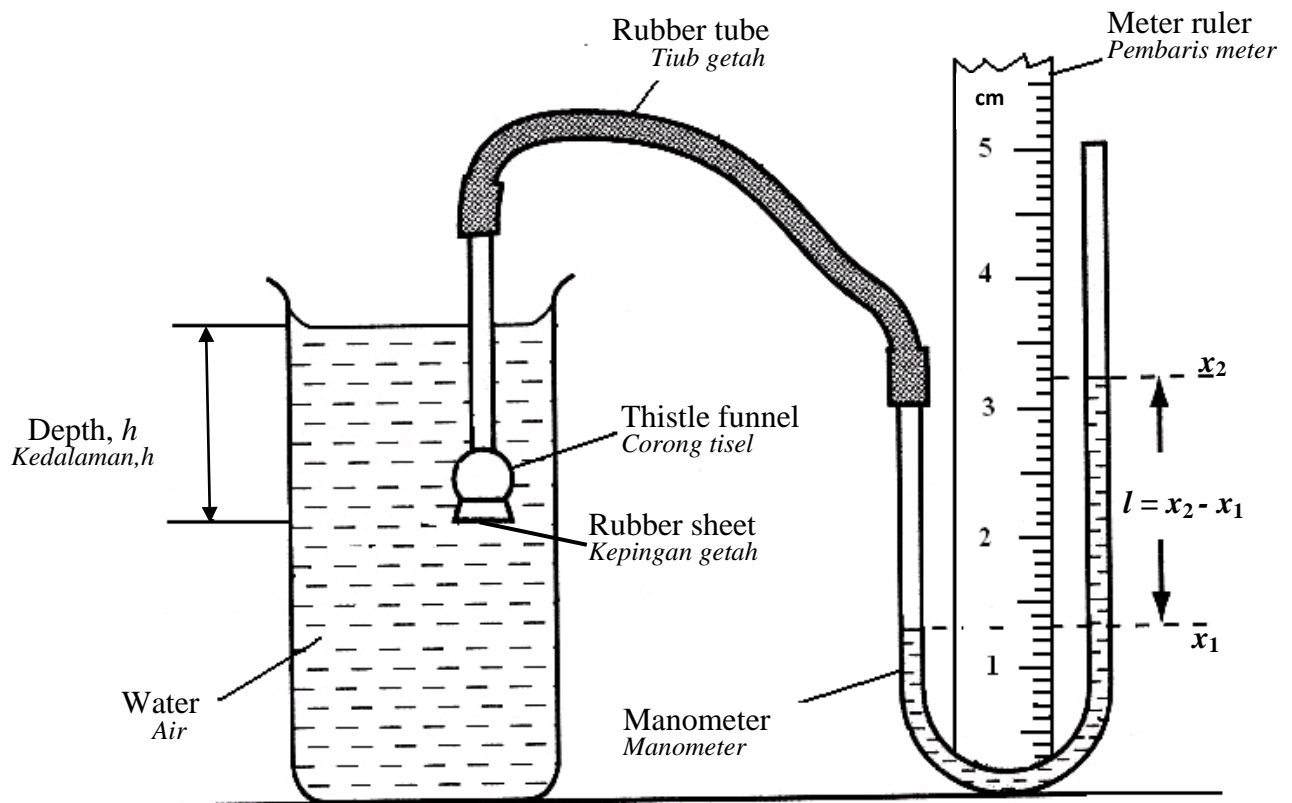


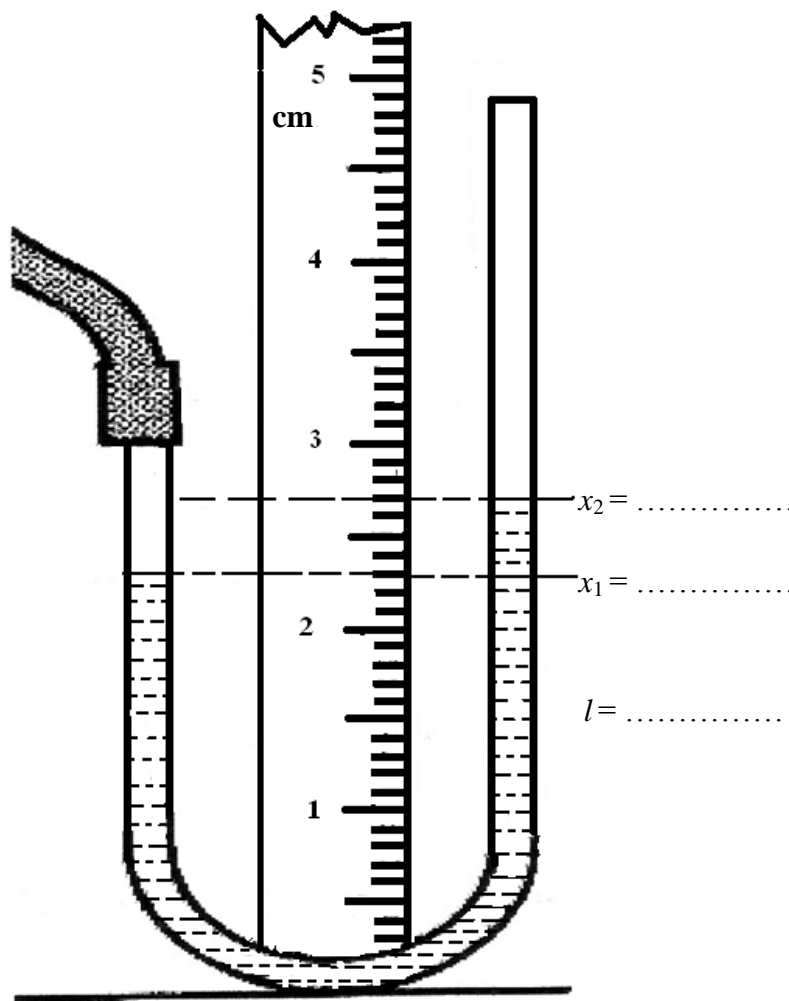
Diagram 1.1/ *Rajah 1.1*

The thistle funnel is immersed in the water at a depth, $h = 0.5$ cm from the water surface. The manometer reading is as shown in Diagram 1.2.

The procedure is repeated with $h = 1.0$ cm, 1.5 cm, 2.0 cm and 2.5 cm, and the corresponding manometer readings are shown in Diagram 1.3, 1.4, 1.5 and 1.6 on page 4 and 5.

Corong tisel dicelupkan ke dalam air pada kedalaman, $h = 5.0$ cm dari permukaan cecair. Bacaan manometer ditunjukkan pada Rajah 1.2.

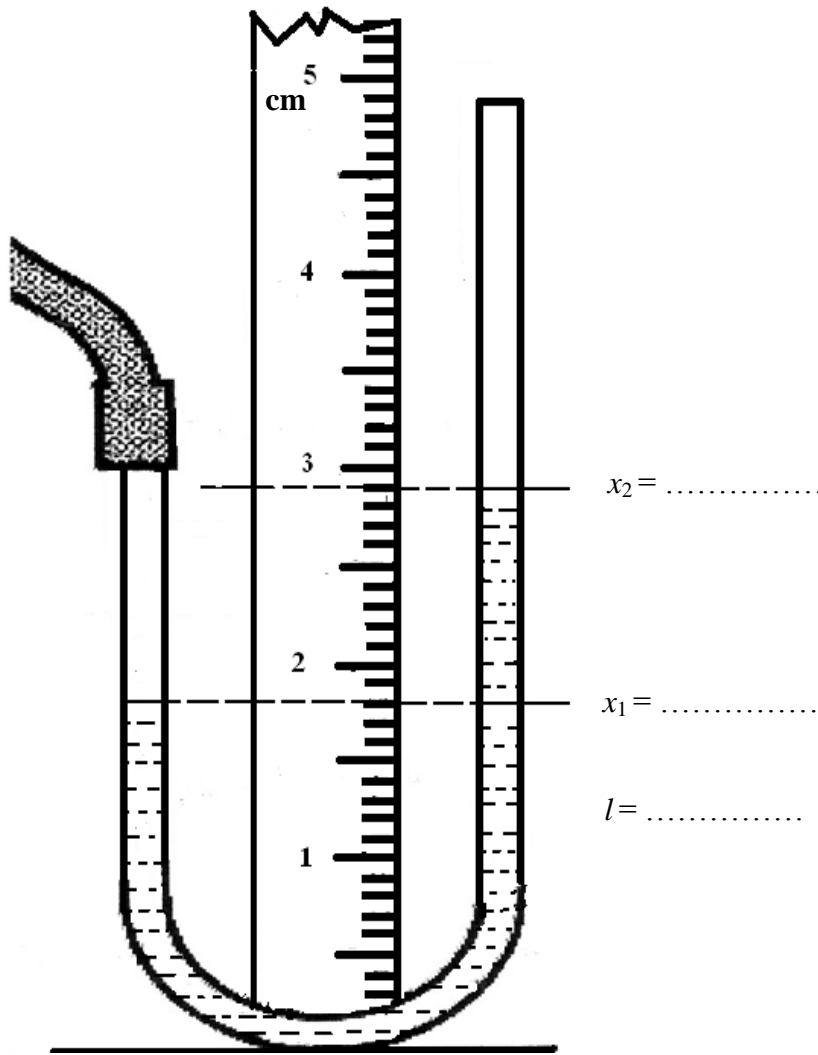
Prosedur diulangi dengan kedalaman $h = 1.0$ cm, 1.5 cm, 2.0 cm and 2.5 cm, dan bacaan manometer yang sepadan ditunjukkan pada Rajah 1.3, 1.4, 1.5 dan 1.6 di halaman 4 dan 5.



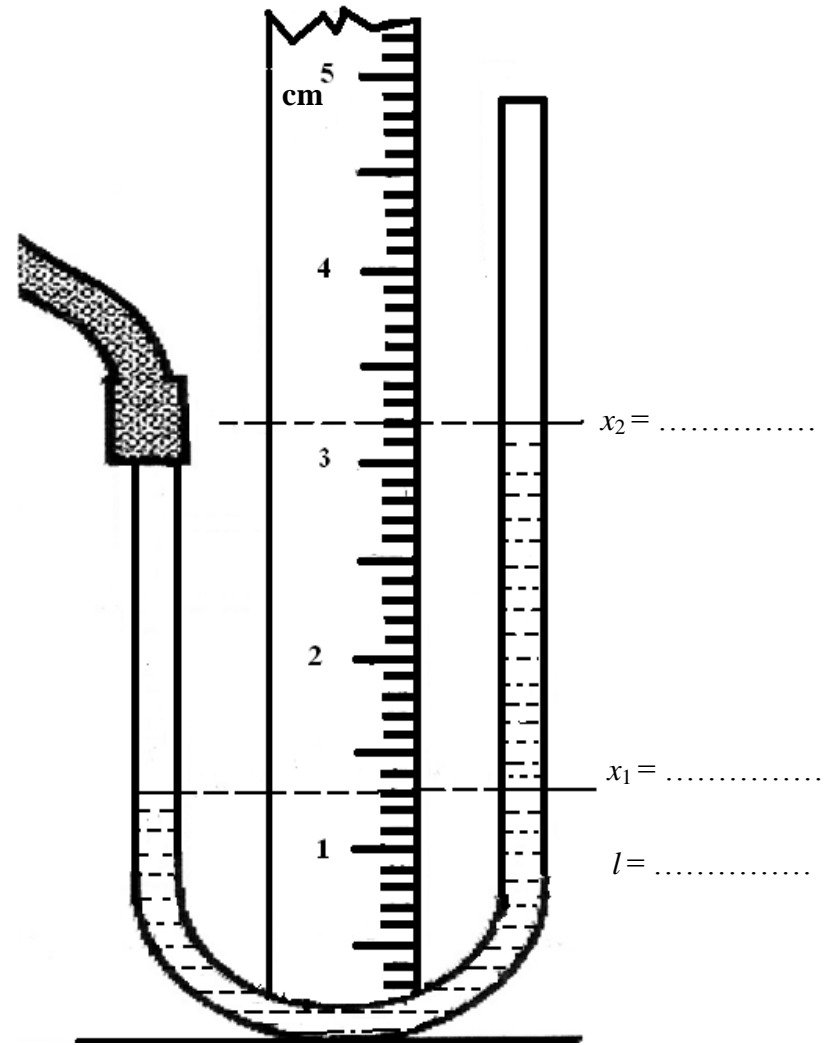
$h = 0.5$ cm

Diagram 1.2

Rajah 1.2



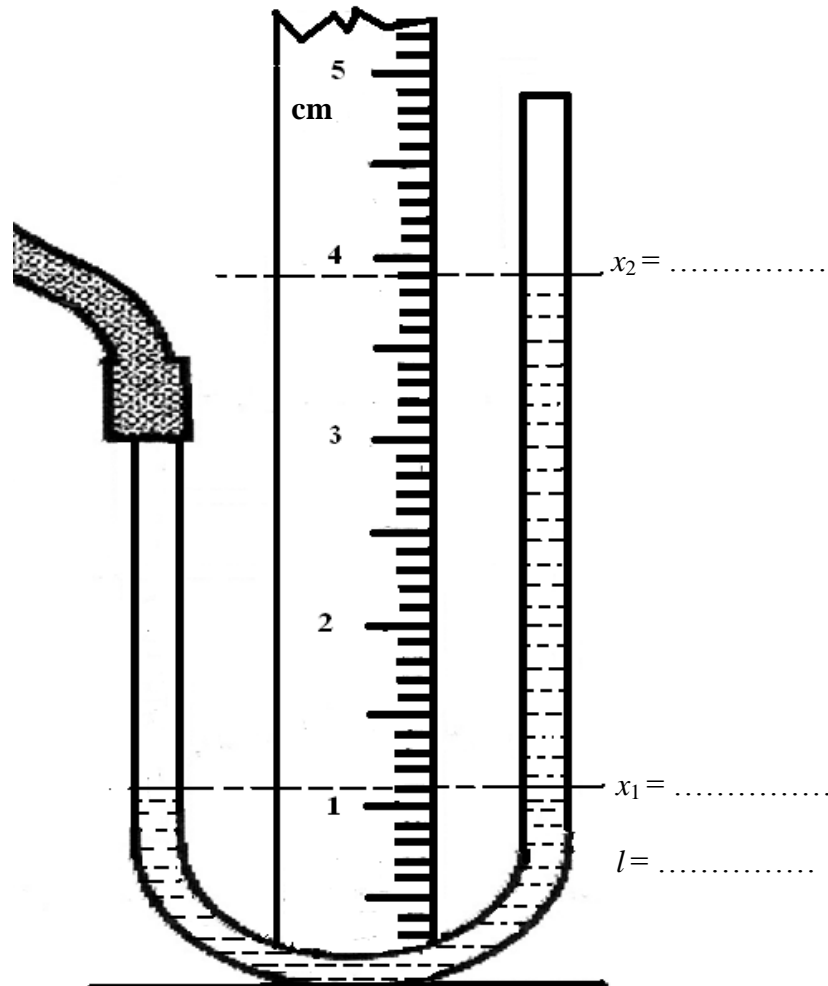
h = 1.0 cm
Diagram 1.3
Rajah 1.3



h = 1.5 cm
Diagram 1.4
Rajah 1.4

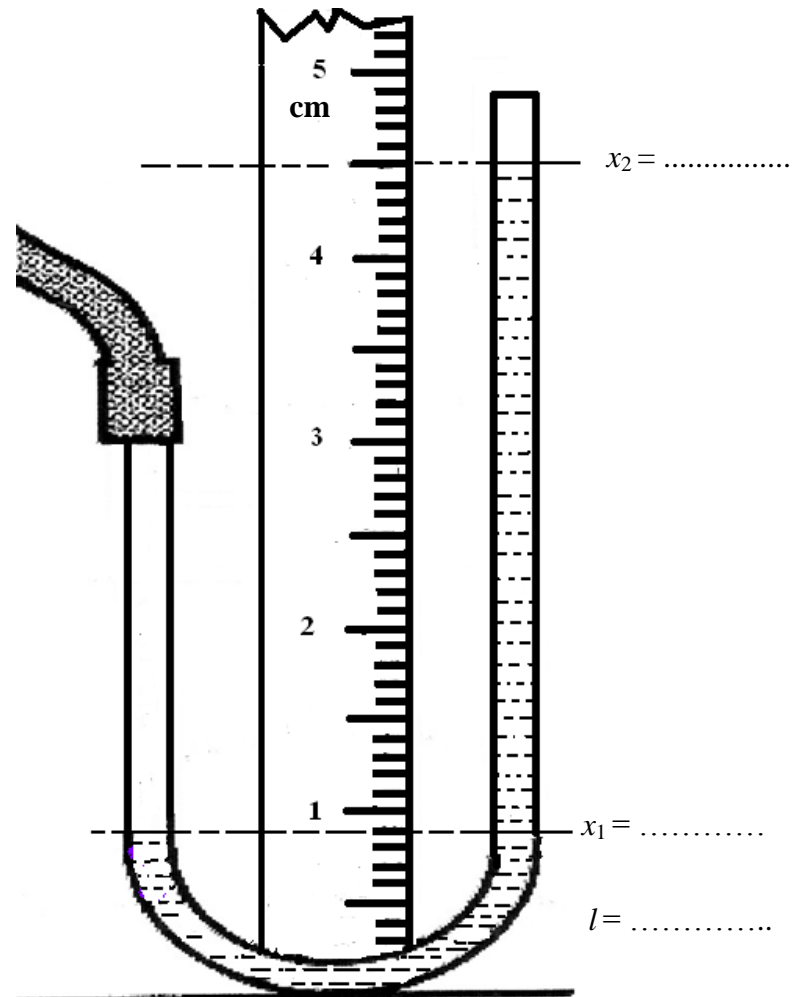
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$h = 2.0 \text{ cm}$

Diagram 1.5
Rajah 1.5



$h = 2.5 \text{ cm}$

Diagram 1.6
Rajah 1.6

For
Examiner's
use

(a) Based on the experiment described on page 2 and 3, identify:

Berdasarkan eksperimen yang diterangkan di halaman 2 dan 3, kenal pasti:

(i) the manipulated variable.

pembolehubah dimanipulasi

1(a)(i)

	1
--	---

.....

[1 mark/markah]

(ii) the responding variable

pembolehubah bergerak balas

1(a)(ii)

	1
--	---

.....

[1 mark/markah]

(iii) the constant variable

pembolehubah dimalarkan

1(a)(iii)

	1
--	---

.....

[1 mark/markah]

(b) Based on Diagrams 1.2, 1.3, 1.4, 1.5 and 1.6 on pages 3, 4 and 5:

Berdasarkan Rajah 1.2, 1.3, 1.4, 1.5 dan 1.6 di halaman 3, 4 dan 5:

(i) Determine x_1 , x_2 and the value of ℓ by using the formula

$$\ell = x_2 - x_1$$

Record all the values of x_1 , x_2 and ℓ in the spaces provided.

Tentukan x_1 , x_2 dan nilai ℓ dengan menggunakan formula

$$\ell = x_2 - x_1$$

Catatkan bacaan x_1 , x_2 dan ℓ dalam ruang yang disediakan.

1(b)(i)

	3
--	---

[3 marks/markah]

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use*

- (ii) Tabulate your results for x_1 , x_2 , and ℓ for all values of h , in the space below.

Jadualkan keputusan anda bagi x_1 , x_2 , dan ℓ untuk semua nilai h , pada ruang yang disediakan di bawah.

- (c) On the graph paper on page 8, plot a graph of ℓ against h .

Pada kertas graf di halaman 8, lukis graf ℓ melawan h .

- (d) Based on your graph in **1(c)**, state the relationship between l and h .

*Berdasarkan graf anda di **1(c)**, nyatakan hubungan antara l dengan h .*

.....

[4 marks/markah]

1(b)(ii)

	4
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[5 marks/markah]

1(c)

	5
--	---

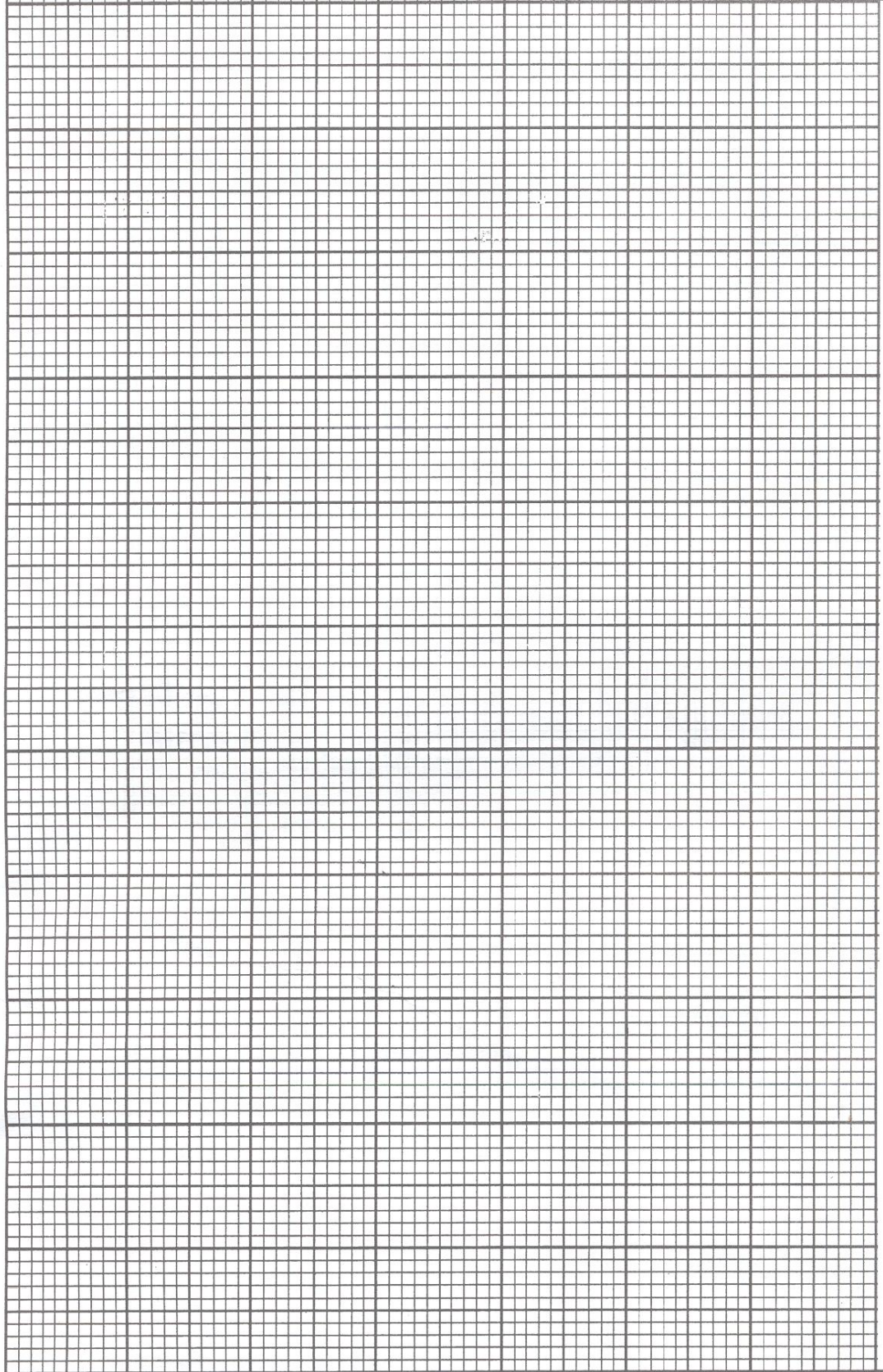
[1 mark/markah]

1(d)

	1
--	---

Graph of l against h
Graf l melawan h

*For
Examiner's
use*



2 A student carries out an experiment to investigate the relationship between the speed of water wave, v and the distance between two consecutive bright bands, s using a ripple tank. The results of the experiment are shown in the graph of v against s as shown in Diagram 2.1

Seorang pelajar menjalankan satu eksperimen untuk mengkaji hubungan antara laju gelombang air, v dan jarak antara dua jalur cerah berturutan, s dengan menggunakan sebuah tangki riak. Keputusan eksperimen ini ditunjukkan pada graf v melawan s pada Rajah 2.1.

(a) Based on the graph in Diagram 2.1,

Berdasarkan graf pada Rajah 2.1,

(i) state the relationship between v and s .

nyatakan hubungan antara v dan s .

.....
[1 mark/markah]

2(a)(i)

	1
--	---

(ii) determine the value of s when the speed of the water wave, $v = 4.0 \text{ cm s}^{-1}$. Show on the graph how you determine the value.

*tentukan nilai s , jika laju gelombang air, $v = 4.0 \text{ cm s}^{-1}$.
Tunjukkan pada graf bagaimana anda menentukan nilai ini.*

$s = \text{.....}$

[2 marks/markah]

2(a)(ii)

	2
--	---

(b) (i) Calculate the gradient of the graph, k . Show on the graph how you calculate k .

*Hitungkan kecerunan graf, k .
Tunjukkan pada graf bagaimana anda menghitung k .*

$k = \text{.....}$

[3 marks/markah]

2(b)(i)

	3
--	---

Graph of v against s
Graf v melawan s

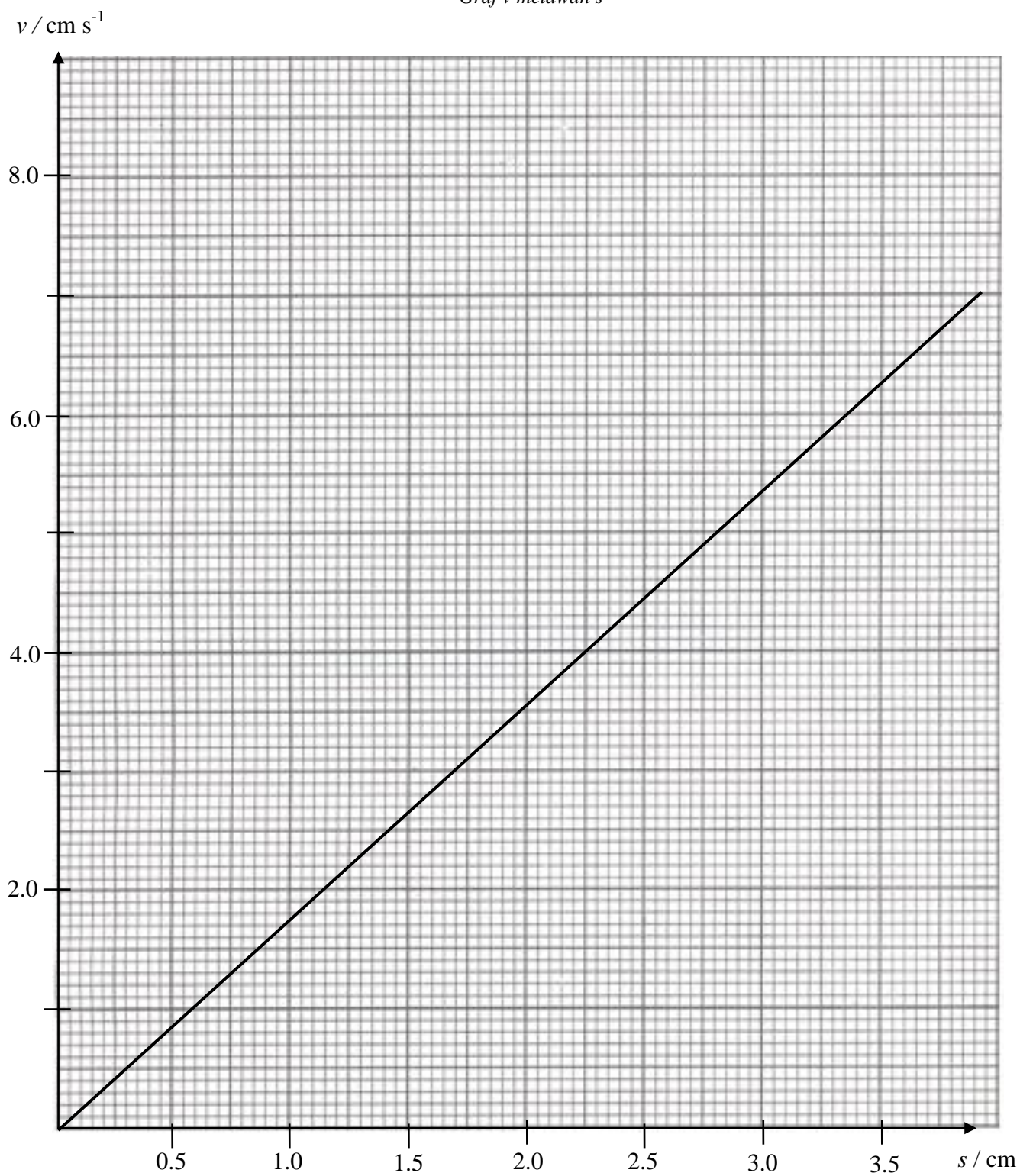


Diagram 2.1
Rajah 2.1

*For
Examiner's
use*

- 2. (b) The gradient of the graph, k is related to a physical quantity, P by the following formula:

Kecerunan graf, k dihubungkan dengan kuantiti fizik, P oleh formula:

$$k = 0.1 P$$

- (ii) Calculate the value of P .

Hitung nilai P .

$P = \dots\dots\dots$

[2 marks/markah]

2(b)(ii)

	2
--	---

- (c) The time taken, t for the waves to travel a distance, s , is given by formula:

Masa, t , yang diambil oleh gelombang untuk merambat jarak, s diberi oleh formula:

$$t = \frac{1}{P}$$

Calculate time, t

Hitungkan masa, t .

$t = \dots\dots\dots$

[2 marks/markah]

2(c)

	2
--	---

- (d) State **two** precaution steps that can be taken to increase the accuracy of the experiment.

*Nyatakan **dua** langkah berjaga-jaga yang boleh diambil untuk meningkatkan kejituan eksperimen ini.*

1

.....

2

.....

[2 marks/markah]

2(d)

	2
--	---

Section B

Bahagian B

[12 marks/12 markah]

Answer any **one** question from this section.*Jawab mana-mana **satu** daripada bahagian ini.*

3. Diagram 3.1 shows a man pulling a spring with a force of 20 N. Diagram 3.2 shows the man pulling the same spring with a force of 50 N.

Rajah 3.1 menunjukkan seorang lelaki menarik spring dengan daya 20 N. Rajah 3.2 menunjukkan lelaki tersebut menarik spring yang sama dengan daya 50 N.

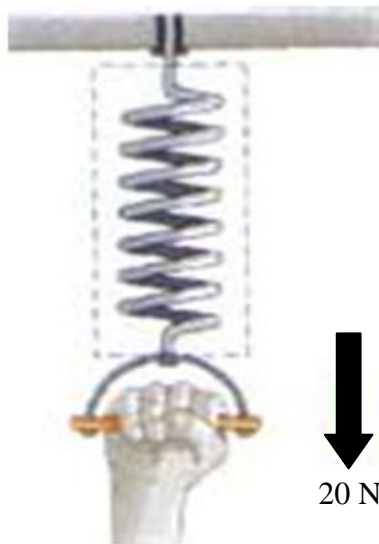


Diagram 3.1
Rajah 3.1



Diagram 3.2
Rajah 3.2

Based on the force exerted and the length of the spring,
Berdasarkan kepada daya yang digunakan dan panjang spring:

- (a) State **one** suitable inference. [1 mark/markah]
*Nyatakan **satu** inferens yang sesuai.*
- (b) State **one** suitable hypothesis. [1 mark/markah]
*Nyatakan **satu** hipotesis yang sesuai.*

- (c) With the use of apparatus such as a spring, slotted weights and other apparatus, describe an experiment framework to investigate the hypothesis stated in 3(b).

Dengan menggunakan radas seperti spring, jisim berslot dan lain-lain radas, terangkan satu rangka kerja eksperimen untuk menyiasat hipotesis yang anda nyatakan dalam 3(b).

In your description, state clearly the following :

Dalam penerangan anda, jelaskan perkara berikut:

- (i) The aim of the experiment.
Tujuan eksperimen.
- (ii) The variables in the experiment.
Pembolehubah-pembolehubah dalam eksperimen.
- (iii) The list of apparatus and materials.
Senarai radas dan bahan.
- (iv) The arrangement of the apparatus.
Susunan radas.
- (v) The procedure used in the experiment.
Describe how you control the manipulated variable and how to measure the responding variable.
Prosedur yang digunakan dalam eksperimen.
Terangkan kaedah mengawal pembolehubah dimanipulasikan dan kaedah mengukur pembolehubah bergerak balas.
- (vi) The way you would tabulate the data.
Cara untuk menjadualkan data.
- (vii) The way you would analyse the data.
Cara untuk menganalisis data.

[10 marks/markah]

4. Diagram 4.1 shows a bulb which lights up when it is connected to one dry cell. Diagram 4.2 shows the condition of the same bulb when it is connected to two dry cells.

Rajah 4.1 menunjukkan sebiji mentol menyala apabila disambungkan kepada sebiji sel kering.

Rajah 4.2 menunjukkan keadaan mentol yang sama apabila disambungkan kepada dua biji sel kering.

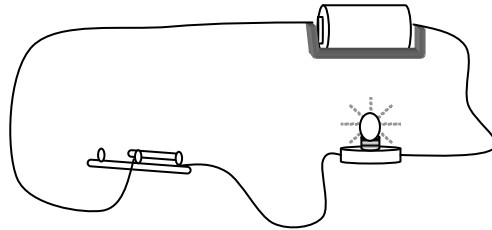


Diagram 4.1
Rajah 4.1

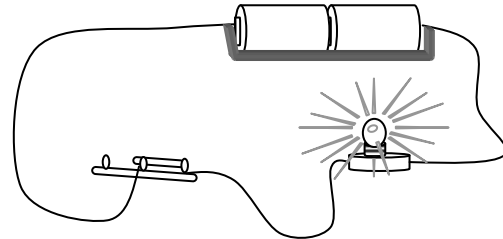


Diagram 4.2
Rajah 4.2

Based on the information and observation above :

Berdasarkan maklumat dan pemerhatian di atas:

- (a) State **one** suitable inference. [1 mark/markah]
*Nyatakan **satu** inferens yang sesuai.*
- (b) State **one** suitable hypothesis. [1 mark/markah]
*Nyatakan **satu** hipotesis yang sesuai.*
- (c) With the use of apparatus such as a 1.5 V battery, connecting wires and other apparatus, describe an experiment to investigate the hypothesis stated in 4(b).

Dengan menggunakan radas seperti sel kering 1.5 V, voltmeter dan radas lain, terangkan satu eksperimen untuk menyasat hipotesis yang anda nyatakan dalam 4(b)

In your description, state clearly the following :

Dalam penerangan anda jelaskan perkara berikut :

- (i) The aim of the experiment.
Tujuan eksperimen.
- (ii) The variables in the experiment.
Pembolehubah-pembolehubah dalam eksperimen.
- (iii) The list of apparatus and materials.
Senarai radas dan bahan.

- (iv) The arrangement of the apparatus.
Susunan radas.
- (v) The procedure used in the experiment
Describe how you control the manipulated variable and how to measure the responding variable.

*Prosedur yang digunakan dalam eksperimen.
Terangkan kaedah mengawal pembolehubah dimanipulasikan dan kaedah mengukur pembolehubah bergerak balas.*
- (vi) The way you would tabulate the data.
Cara untuk menjadualkan data.
- (vii) The way you would analyse the data.
Cara untuk menganalisis data.

[10 marks/markah]

END OF QUESTION PAPER

KERTAS SOALAN TAMAT

INFORMATION TO CANDIDATES
MAKLUMAT UNTUK CALON

1. This question paper consists of **two** sections: **Section A** and **Section B**.
*Kertas soalan ini mengandungi dua bahagian: **Bahagian A** dan **Bahagian B**.*
2. Answer **all** questions in **Section A**. Write your answers for **Section A** in the spaces provided in this question paper.
*Jawab **semua** soalan daripada **Bahagian A**. Jawapan kepada **Bahagian A** hendaklah ditulis dalam ruang yang disediakan dalam kertas soalan.*
3. Answer **one** question from **Section B**. Write your answers for **Section B** on the paper provided by the invigilators. Answer questions in **Section B** in detail. Answers should be clear and logical. Equations, figures, tables, graphs and other suitable methods may be used to explain your answer.

*Jawab **satu** soalan daripada **Bahagian B**. Jawapan kepada **Bahagian B** hendaklah ditulis pada helaian tambahan yang dibekalkan oleh pengawas peperiksaan. Anda diminta menjawab dengan lebih terperinci. Jawapan mestilah jelas dan logik. Persamaan, gambar rajah, jadual, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda boleh digunakan.*
4. Show your workings, it may help you to get marks.
Tunjukkan kerja mengira, ini membantu anda mendapatkan markah.
5. If you wish to cancel any answer, neatly cross out the answer.
Sekiranya anda hendak menukar jawapan, batalkan dengan kemas jawapan yang telah dibuat. Kemudian tulis jawapan yang baru.
6. The diagrams in the questions provided are not drawn to scale unless stated.
Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.
7. The marks allocated for each question or sub-section of a question is shown in brackets.
Markah yang diperuntukkan bagi setiap soalan atau ceraian soalan ditunjukkan dalam kurungan.
8. You may use non-programmable scientific calculator. However, steps in calculation must be shown.
Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.
9. The time suggested to complete **Section A** is 60 minutes and **Section B** is 30 minutes.
*Masa yang dicadangkan untuk menjawab **Bahagian A** ialah 60 minit dan **Bahagian B** ialah 30 minit*
10. Hand in your answer sheets at the end of the examination.
Serahkan kertas jawapan anda di akhir peperiksaan.