This question paper consists of two sections: **Section A** and **Section B**.
Kertas soalan ini mengandungi dua bahagian: ***Bahagian A*** *dan* ***Bahagian B***.

Section A
Bahagian A

[28 *marks*]
[28 *markah*]

Answer **all** question from this section.
Jawab **semua** *soalan daripada bahagian ini.*

1 A student carries out an experiment to investigate the relationship between the mass of a slotted weight, m and the period of oscillation, T of a spring.
Seorang murid menjalankan eksperimen untuk menyiasat hubungan antara jisim pemberat, m dengan tempoh ayunan, T bagi suatu spring.

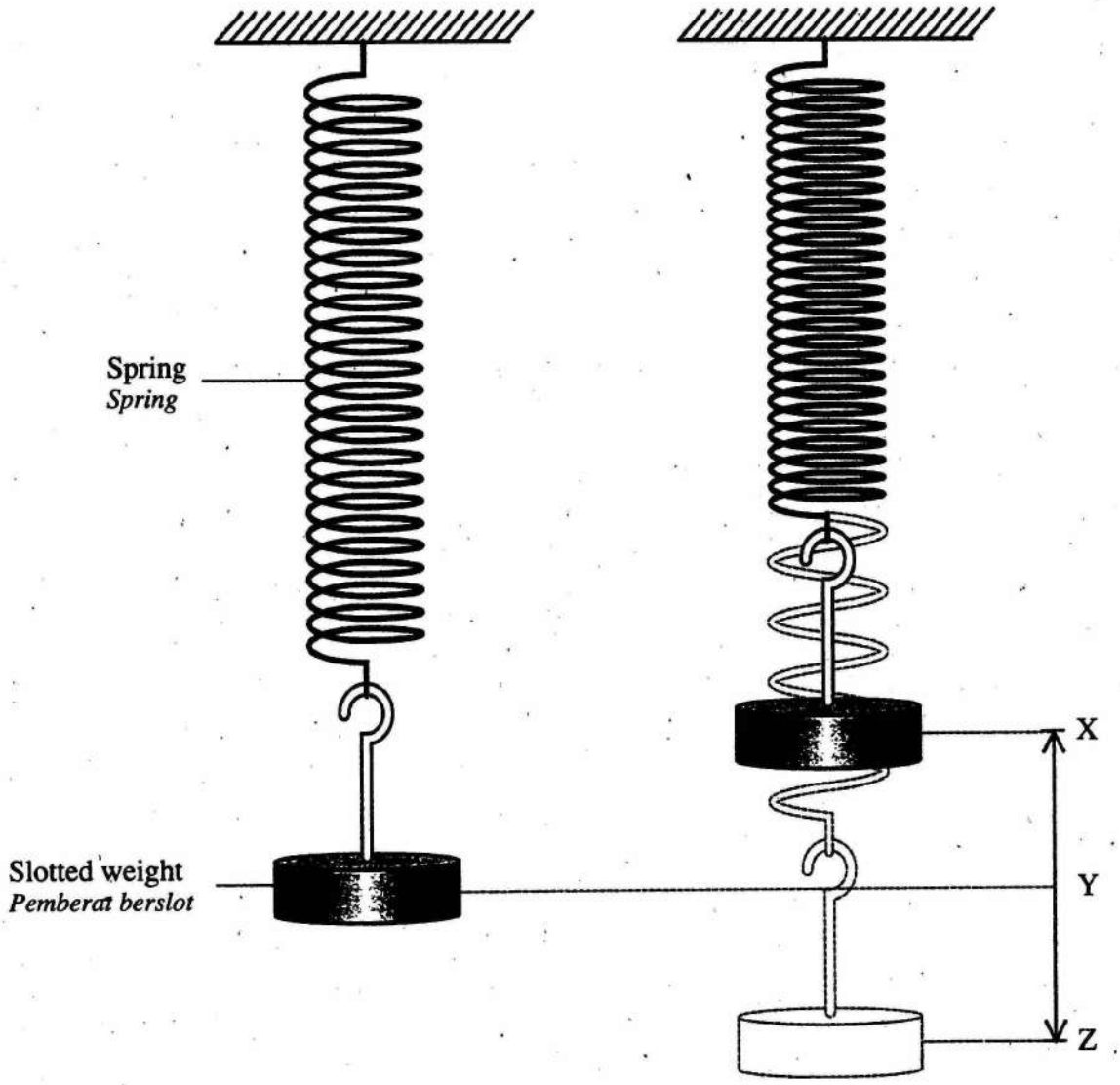
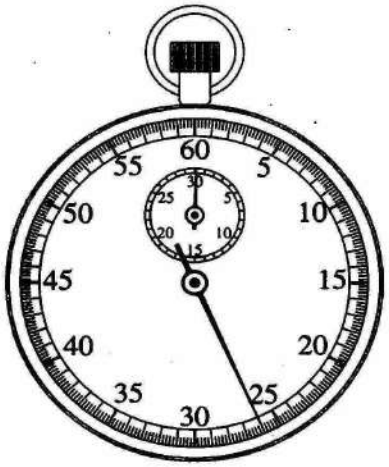


Diagram 1.1
Rajah 1.1

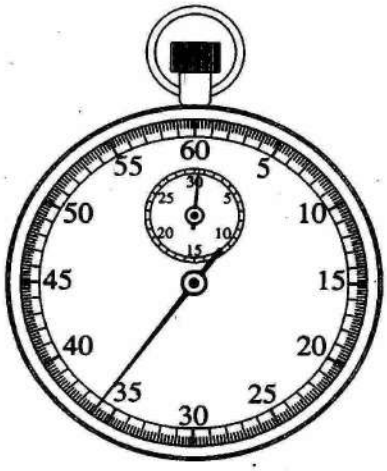
A slotted weight with mass, m = 20 g is placed at the end of the spring. The spring is then displaced to point Z from point Y. The spring is released and the time taken for 20 complete oscillations, t is measured using a stopwatch. One complete oscillation is from point Z → Y → X → Y → Z.
The procedure is repeated with slotted weights with mass, m = 40 g, 60 g, 80 g, and 100 g. The corresponding readings of time taken for 20 complete oscillations, t are shown in Diagram 1.2, 1.3, 1.4, 1.5 and 1.6

Pemberat berslot yang berjisim, m = 20 g diletakkan pada hujung suatu spring. Spring itu kemudian disesarkan ke titik Z dari titik Y. Spring dilepaskan dan masa untuk 20 ayunan lengkap, t diukur menggunakan jam randik. Satu ayunan lengkap adalah dari titik Z → Y → X → Y → Z.
Prosedur ini diulang dengan pemberat berslot berjisim m = 40 g, 60 g, 80 g, dan 100 g. Bacaan yang sepadan untuk masa 20 ayunan lengkap, t ditunjukkan pada Rajah 1.2, 1.3, 1.4, 1.5 dan 1.6



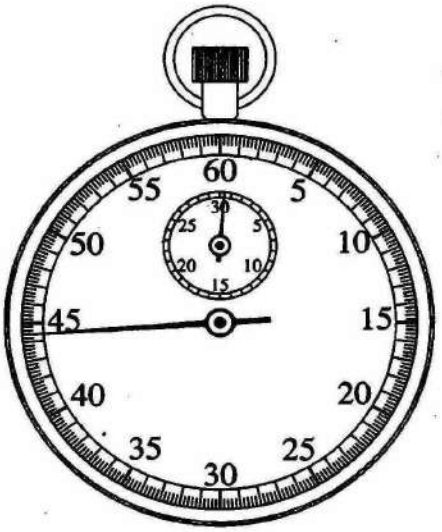
m = 20 g
t = ... s
T = ...
T^2 = ...

Diagram 1.2
Rajah 1.2



m = 40 g
t = ... s
T = ...
T^2 = ...

Diagram 1.3
Rajah 1.3



m = 60 g

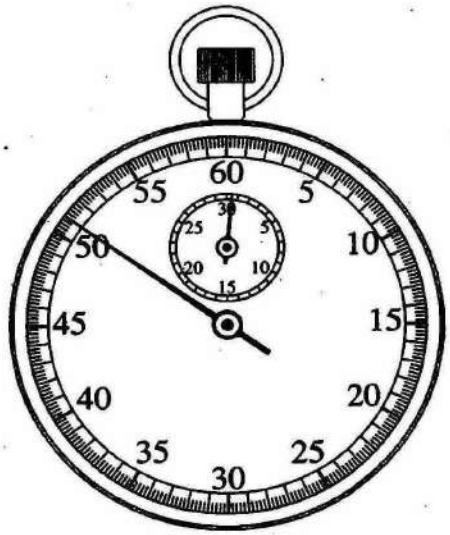
t = ... s

T = ...

T^2 = ...

Diagram 1.4

Rajah 1.4



m = 80 g

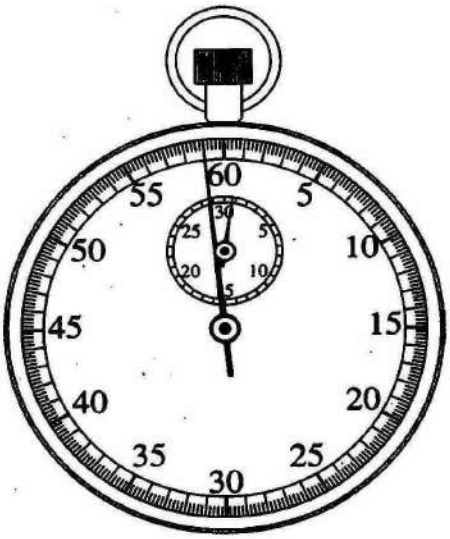
t = ... s

T = ...

T^2 = ...

Diagram 1.5

Rajah 1.5



m = 100 g

t = ... s

T = ...

T^2 = ...

Diagram 1.6

Rajah 1.6

(*a*) For the experiment described, identify:
Bagi eksperimen yang diperihalkan, kenal pasti:

(i) The manipulated variable
Pemboleh ubah dimanipulasikan

.....

[1 *mark*]
[1 *markah*]

(ii) The responding variable
Pemboleh ubah bergerak balas

.....

[1 *mark*]
[1 *markah*]

(iii) The constant variable.
Pemboleh ubah dimalarkan

.....

[1 *mark*]
[1 *markah*]

(*b*) Based on Diagram 1.2, 1.3, 1.4, 1.5 and 1.6
Berdasarkan Rajah 1.2, 1.3, 1.4, 1.5 *dan* 1.6

(i) Record the values of t in the space provided in each diagram.
Catat nilai t di ruang yang disediakan dalam setiap rajah.

[2 *marks*]
[2 *markah*]

(ii) For each value of t in **1**(*b*)(i), calculate the period of oscillation, T by using the following equation:
Bagi setiap nilai t di **1**(*b*)(i), *hitung tempoh ayunan,* T *dengan menggunakan persamaan berikut:*

$$T = \frac{t}{20}$$

Record the values of T in the spaces provided in each diagram.
Catatkan nilai T di ruang yang disediakan di dalam setiap rajah.

[1 *mark*]
[1 *markah*]

(iii) Calculate the values of T^2 and record the values in the spaces provided in each diagram.
Hitung nilai bagi T^2 *dan catatkan nilai tersebut di ruang yang disediakan dalam setiap rajah.*

[1 *mark*]
[1 *markah*]

(*c*) Tabulate your result for all values of *m*, *t*, *T* and T^2 in the space below.
Jadualkan keputusan anda bagi semua nilai m, t, T dan T^2 di ruang di bawah.

[3 *marks*]
[3 *markah*

(*d*) On the graph paper , draw a graph of T^2 against m.
Pada kertas graf , lukis graf T^2 melawan m.

[5 *marks*]
[5 *markah*]

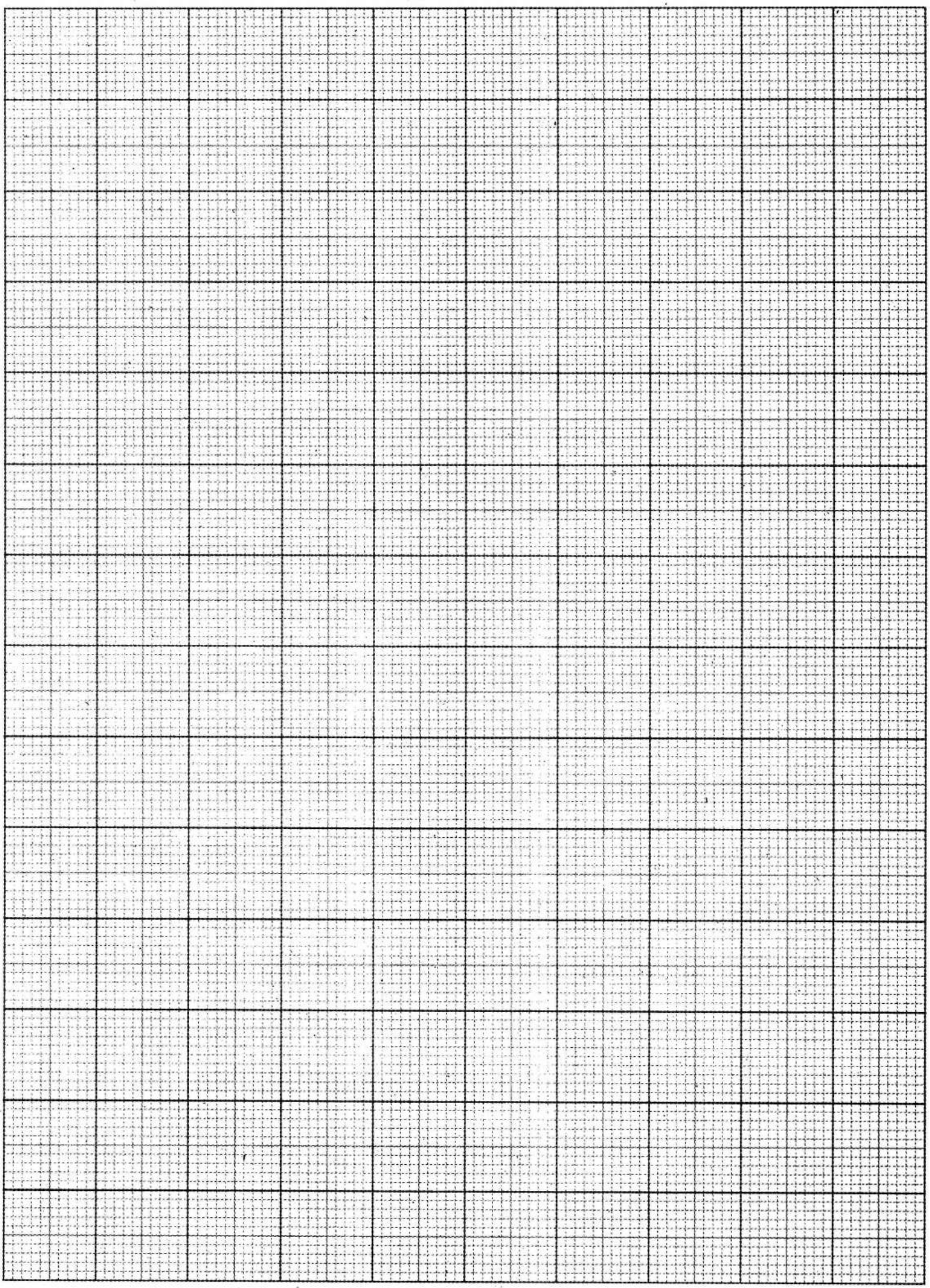
(e) Based on the graph in **1**(*d*), state the relationship between T^2 and *m*.
Berdasarkan graf di **1**(*d*), *nyatakan hubungan antara T^2 dengan m.*

.....

[1 *mark*]
[1 *markah*]

Graph of T^2 against m

Graf T^2 melawan m



2 A student carries out an experiment to determine the value of gravitational acceleration, g. The results of this experiment is shown in the graph of v^2 against h in Diagram 2.1

Seorang murid menjalankan eksperimen untuk menentukan nilai pecutan graviti, g. Keputusan eksperimen ditunjukkan oleh graf v^2 melawan h 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^2 and h.

Nyatakan hubungan antara v^2 dengan h.

.....

[1 *mark*]

[1 *markah*]

(ii) Determine the value of v when $h = 2.0$ m.

Show on the graph, how you determine the value of v.

Tentukan nilai v apabila h = 2.0 m.

Tunjukkan pada graf itu cara anda menentukan nilai v.

v = ...

[3 *marks*]

[3 *markah*]

(iii) Calculate the gradient, k, of the graph.

Show on the graph how you determine k.

Hitung kecerunan, k, bagi graf itu.

Tunjukkan pada graf cara anda menentukan k.

k = ...

[3 *marks*]

[3 *markah*]

(*b*) The gravitational acceleration, g, of the object is given by the formula, $g = \frac{k}{2}$, where k is the gradient of the graph.

Calculate the value of gravitational acceleration, g.

Pecutan graviti, g bagi objek diberi oleh formula, $g = \frac{k}{2}$, yang mana k ialah kecerunan graf.

Hitung nilai pecutan graviti, g.

g = ...

[2 *marks*]

[2 *markah*]

(*c*) The relationship between the velocity, v, and the height of object dropped, h is given by $v = \sqrt{2gh}$, in which g is gravitational acceleration.

Using the answer in **2**(*b*), calculate the value of v when $h = 7{\cdot}0$ m.

Hubungan antara halaju, v, dengan ketinggian objek dijatuhkan, h diberi oleh $v = \sqrt{2gh}$, yang mana g ialah pecutan graviti.

Menggunakan jawapan di **2**(*b*), *hitungkan nilai v apabila h* = 7·0 m.

v = ...

[2 *marks*]

[2 *markah*]

(*d*) State **one** precaution that should be taken to improve the accuracy of the result of this experiment.

Nyatakan **satu** *langkah berjaga-jaga yang perlu diambil untuk memperbaik ketepatan keputusan eksperimen ini.*

.....

[1 *mark*]

[1 *markah*]

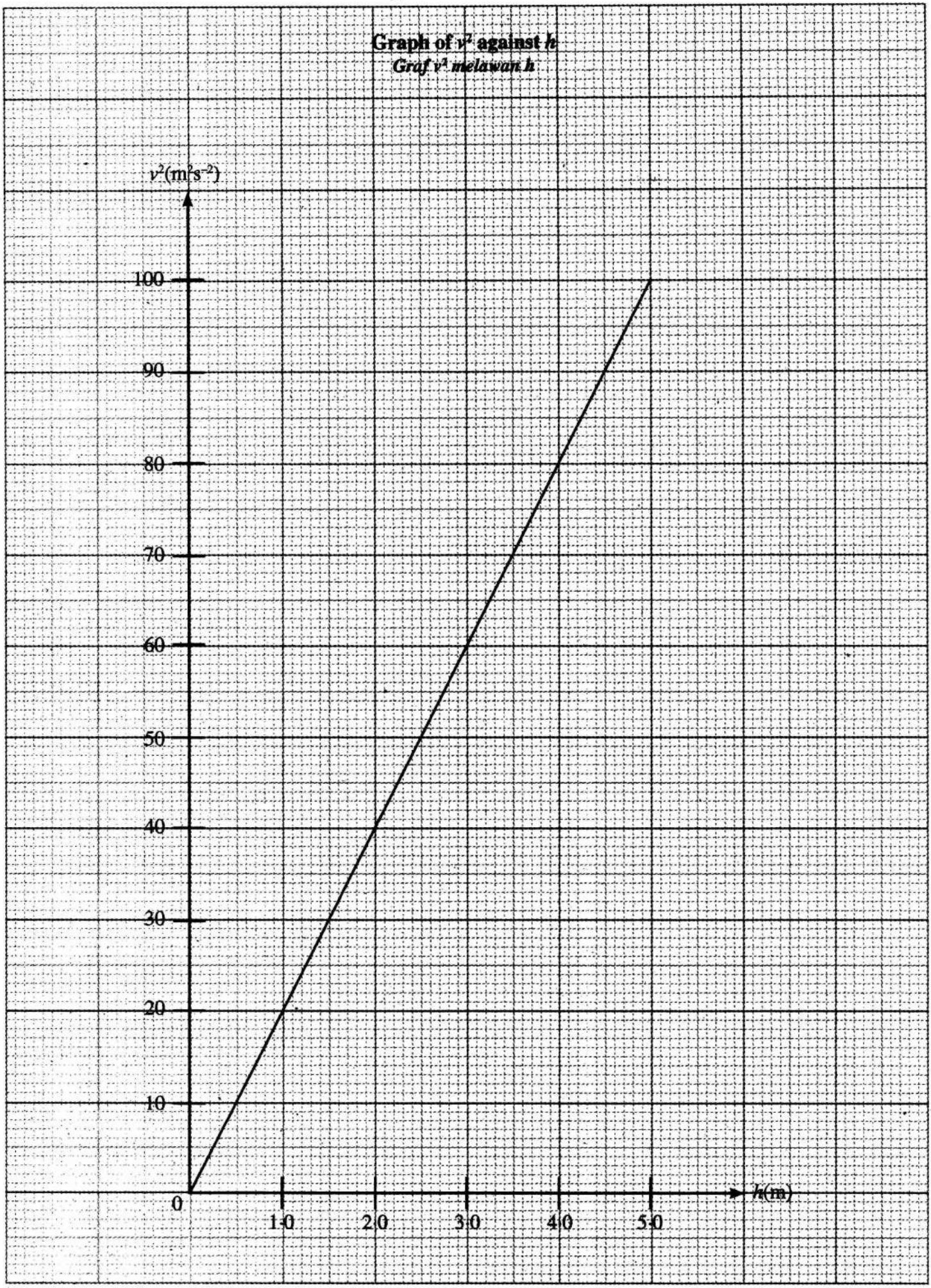


Diagram 2.1

Rajah 2.1

Section B
Bahagian B

[12 *marks*]
[12 *markah*]

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

3 Diagram 3.1 shows a dented ping pong ball.
Diagram 3.2 shows the same ping pong ball returning to its original shape when it is placed in hot water.
Rajah 3.1 menunjukkan sebiji bola ping pong yang kemek.
Rajah 3.2 menunjukkan bola ping pong kembali ke bentuk asal apabila diletakkan dalam air panas.

Diagram 3.1
Rajah 3.1

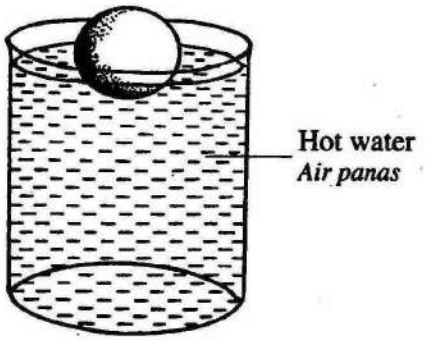


Diagram 3.2
Rajah 3.2

Based on the information and observation:
Berdasarkan maklumat dan pemerhatian itu:

(*a*) State **one** suitable inference. [1 *mark*]
Nyatakan **satu** *inferens yang sesuai.* [1 *markah*]

(*b*) State **one** suitable hypothesis. [1 *mark*]
Nyatakan **satu** *hipotesis yang sesuai.* [1 *markah*]

(*c*) With the use of apparatus such as bunsen burner, capillary tube with sulphuric acid and other apparatus, describe an experiment to investigate the hypothesis that is stated in **3**(*b*).
Dengan menggunakan radas seperti penunu bunsen, tiub kapilari dengan asid sulfurik dan radas-radas lain, perihalkan eksperimen untuk menyiasat hipotesis yang dinyatakan di **3**(*b*).

In your description, state clearly the following:
Dalam penerangan anda, nyatakan dengan jelas perkara berikut:

(i) The aim of the experiment.
Tujuan eksperimen.

(ii) The variables in the experiment.
Pemboleh ubah dalam eksperimen.

(iii) The list of apparatus and materials.
Senarai radas dan bahan.

(iv) The arrangement of the apparatus.
Susunan radas.

(v) The procedure of the experiment which includes **one** method of controlling the manipulated variable and **one** method of measuring the responding variable.
Prosedur eksperimen termasuk **satu** *kaedah mengawal pemboleh ubah dimanipulasikan dan* **satu** *kaedah mengukur pembolah ubah bergerak balas.*

(vi) The way to tabulate the data.
Cara untuk menjadualkan data.

(vii) The way to analyse the data.
Cara untuk menganalisis data.

[10 *marks*]
[10 *markah*]

4 Diagram 4.1 shows a lifting machine used to lift an iron cylinder.
Diagram 4.2 shows a lifting machine with more number of turns used to lift more iron cylinders.
Rajah 4.1 *menunjukkan mesin pengangkat digunakan untuk mengangkat sebuah silinder besi.*
Rajah 4.2 *menunjkkan mesin pengangkat dengan bilangan lilitan yang lebih banyak silinder besi.*

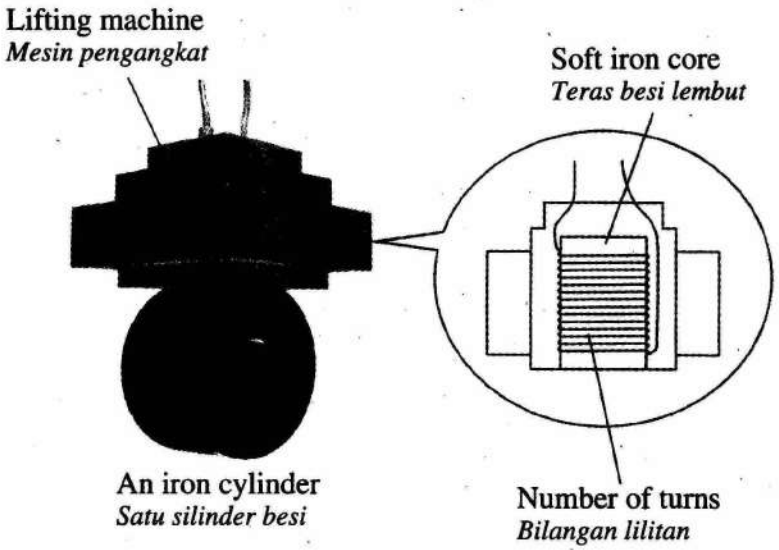


Diagram 4.1
Rajah 4.1

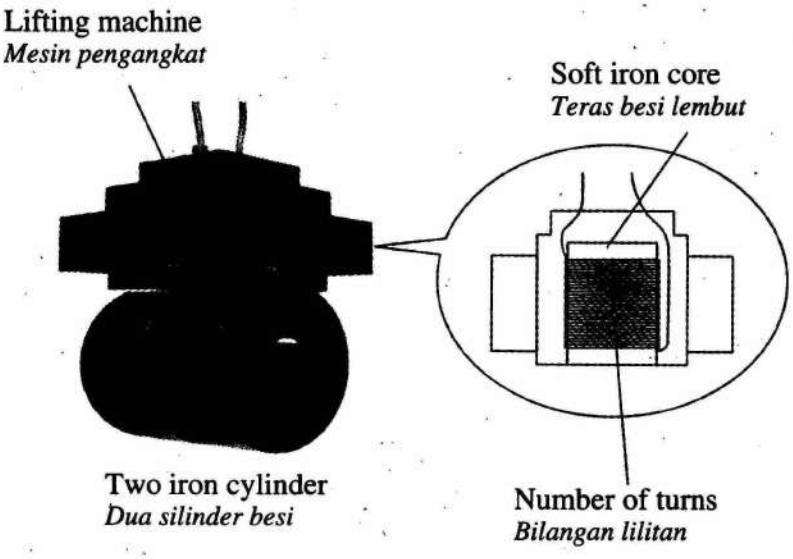


Diagram 4.2
Rajah 4.2

Based on the information and observation:
Berdasarkan maklumat dan pemerhatian itu:

(*a*) State **one** suitable inference. [1 *mark*]
Nyatakan **satu** *inferens yang sesuai.* [1 *markah*]

(*b*) State **one** suitable hypothesis. [1 *mark*]
Nyatakan **satu** *hipotesis yang sesuai.* [1 *markah*]

(*c*) With the use of apparatus such as constantan wire, ammeter and other apparatus, describe **one** experiment to investigate the hypothesis stated in **4**(*b*).
Dengan menggunakan radas seperti wayar konstantan, ammeter dan lain-lain radas, perihalkan **satu** *eksperimen untuk menyiasat hipotesis yang dinyatakan di* **4**(*b*).

In your description, state clearly the following:
Dalam penerangan anda, nyatakan dengan jelas perkara berikut:

(i) The aim of the experiment.
Tujuan eksperimen.

(ii) The variables in the experiment.
Pemboleh ubah dalam eksperimen.

(iii) The list of apparatus and materials.
Senarai radas dan bahan.

(iv) The arrangement of the apparatus.
Susunan radas.

(v) The procedure of the experiment which includes **one** method of controlling the manipulated variable and **one** method of measuring the responding variable.
Prosedur eksperimen termasuk **satu** *kaedah mengawal pemboleh ubah dimanipulasikan dan* **satu** *kaedah mengukur pembolah ubah bergerak balas.*

(vi) The way to tabulate the data.
Cara untuk menjadualkan data.

(vii) The way to analyse the data.
Cara untuk menganalisis data.

[10 *marks*]
[10 *markah*]

END OF QUESTION PAPER
KERTAS PEPERIKSAAN TAMAT