



XINMIN SECONDARY SCHOOL

新民中学

SEKOLAH MENENGAH XINMIN

Preliminary Examination 1997

SCIENCE (PHYSICS) 5142 / 5
SECONDARY 4 EXPRESS / 5 NORMAL
WEDNESDAY, 17 SEPTEMBER 1997
SETTER: M SHONE

Name: _____ () Class: _____

INSTRUCTIONS

- 1 Time allowed: 45 minutes.
- 2 Calculators may be used.
- 3 When handing in staple the graph paper to the back of this question booklet.
- 4 Ensure that measurements and calculated values are recorded to a suitable accuracy.
- 5 This booklet consists of 5 numbered pages.

You may take the value of π to be 3.14.

Before beginning the exercises you are advised to read the instructions carefully and completely, so that you know exactly what has to be done.

- 1 You are going to perform an experiment to find the value of the acceleration due to gravity, g , using a pendulum.
 - a) Attach the pendulum bob to one end of the string and clamp the other end between the two halves of the split cork as shown in *figure 1*.

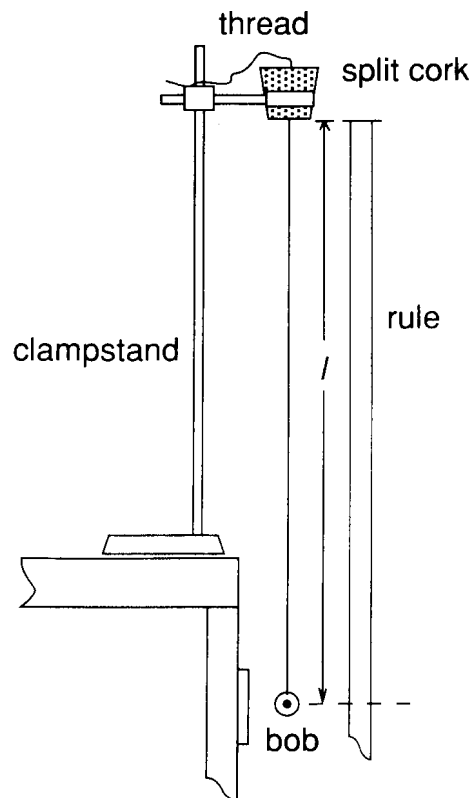


figure 1

- b) Set the length of the string, l , to approximately 50 cm. Accurately measure the length of l using the meter rule.

Record of the length of the string, l :

- c) Pull the bob slightly to one side and release it such that it swings freely from side to side as shown in *figure 2*.

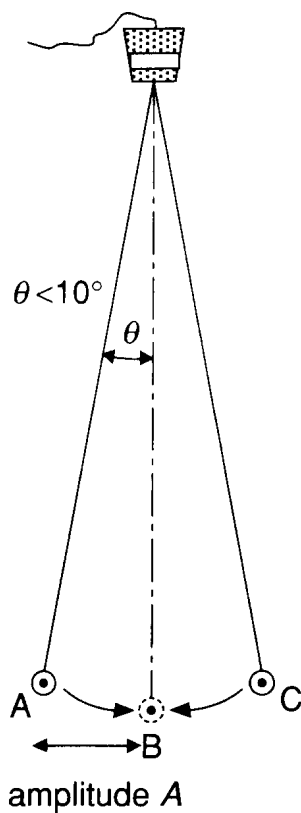


figure 2

- d) Record the time taken for the bob to make 25 complete oscillations.

Record of the time taken for twenty five complete oscillations, t_{25} :

- e) Using your answer to d), calculate an average value for the period of the pendulum. The period is the time taken for **one** complete oscillation.

Calculation of the period of the pendulum, T:

[1]

f) Calculate the square of the period of the pendulum.

Calculation of the square of the period of the pendulum, T^2 : [1]

g) Repeat steps b) to f) taking at least four more readings varying the length of the string, l , from 30 cm to 1 m.

Record your results in the table below: [2]

l (cm)	t_{25} (s)	T (s)	T^2 (s)

h) On the graph paper provided plot a graph of T^2 (y-axis) against l (x-axis). [5]

i) Find the gradient of the graph, m .

Calculation and record of gradient, m : [2]

j) Given that the acceleration due to gravity, g , can be found from the equation

$$g = \frac{2\pi^2}{m}$$

calculate g from your graph.

Calculation and record of the acceleration due to gravity, g : [2]

k) With reference to *figure 2* explain what is meant by one complete oscillation. [1]

l) State clearly one precaution that you undertook while carrying out this experiment. [1]