

**PHYSICS DEPARTMENT**

**END OF TERM EAMINATIONS**

**April 2014**

**S5 Paper 3**

**Practical Physics**

**3¼ hours**

**Answer both questions**

*You are* **not allowed** *to use the apparatus or write for* ***the first fifteen minutes*.**

*Graph papers are provided.*

*You are expected to record on your script all your observations as these observations are made and to plan the presentation of the records so that it is not necessary to make a fair copy of them. The working of the answers is to be handed in.*

*Details on the question paper should not be repeated in the answer, nor is the theory of the experiment required unless specifically asked for. You should, however, record any special precautions you have taken and any particular feature of your method of going about the experiment.*

*Marks are given mainly for a clear record of the observations actually made, for their suitability and accuracy, and for the use made of them.*

1. In this experiment you will determine the constant σ using two methods.

METHOD I

1. With a piece of thread, arrange a simple pendulum of length a = 0.800 m
2. Set the simple pendulum in oscillation of small amplitude and find the time for 20 oscillations.
3. Determine the period, T
4. Calculate β, given that **β =** 
5. Repeat procedure (a) to (d) for values of a = 0.600 and 0.400 m
6. Find σ, the average value of β.

METHOD II

(a) Clamp the spring provided and a metre rule as shown below

Spring

Metre rule

Pointer

Mass m

Stand

Fig. 2

(b) Read and record the position of the pointer on the metre rule

(c) Suspend a mass m = 0.100 kg from the spring

(d) Record the new position of the pointer

(e) Find the extension, e, of the spring in metres

(f) Pull the mass vertically downwards through a small distance and release it to oscillate.

(g) Determine the time for 20 oscillations.

(h) Find the period T of the oscillation

(i) Repeat procedures (c) to (h) for values of m = 0.0200, 0.300, 0.400, 0.500 and 0.600 kg.

(j) Plot a graph of T2 against e

(k) Find the slope, s, of the graph

(l) Calculate the value of σ from the expression

2. In this experiment, you will determine parameter, ***x***, of the glass block provided.

1. Measure and record the width, t, of the glass block.

t

P

S

B

A

F

Q

R

C

P3

P4

N

P1

P2

α

d

β

θ

D

1. Place the glass block on the sheet of paper provided with the largest face top most.
2. Trace its outline PQRS with a pencil.
3. Remove the glass block.
4. Mark a point B along PQ such that QB is 2.0 cm.
5. Draw a normal to PQ at B.
6. Draw a line AB making an angle α = 20o as shown in diagram.
7. Fix two pins, P1 and P2 along AB.
8. Put back the glass block on its outline.
9. While looking through the glass block from the opposite side SR, fix two pins P3 and P4 such that they appear in line with the images of P1 and P2 viewed through the glass block.
10. Remove the glass block and the pins P3 and P4.
11. Draw a line DC through P3 and P4 to meet SR at C.
12. Measure angles θ and β.
13. Produce line DC to F.
14. Measure the lateral displacement, d.
15. Calculate the value of φ = (α + θ)
16. Repeat procedure (g) to (p) for α = 25o, 30o, 35o, 40o and 50o.
17. Tabulate your results including values of dcosβ and sin(φ - β).
18. Plot a graph of **dcosβ** against **sin(φ - β)**.
19. Determine the slope, ***x***, of the graph.

HAND IN THE TRACING PAPER USED IN THE EXPERIMENT TOGETHER WITH YOUR RESULTS