

**PHYSICS DEPARTMENT**

**END OF TERM 2 EXAMINATIONS**

**July 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 answer sheet 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.*

**QUESTION 1**

In this question you will determine the constant γ using two methods.

PART I

A

B

*x*

C

D

Horizontal metre rule

Long thread

Clamping pieces of thread

1. Clamp a metre rule so that it is horizontal.
2. At each of the ends of the long thread provided, fix a pendulum bob.
3. Using short pieces of thread hang the long thread, on the clamped metre rule, with its bobs so as to form a loop ACDB.
4. Make part AC equal to 0.200 m.
5. Set bob A in oscillations of small amplitude in a vertical plane and time 20 oscillations and find the period, To.
6. Calculate 
7. Keeping AC equal to 0.200 m, make *x* = 0.100 m
8. Find the time for 20 small oscillations of bob B and determine the period T.
9. Repeat procedures (g) to (h) for values of *x* = 0.200, 0.300, 0.400, 0.500, and 0.600 m.
10. Tabulate your results including ().
11. Plot a graph of () against *x*.
12. Find the slope, s, and the intercept, c, of your graph.
13. Given that **γ =**  calculate γ.
14. Calculate λ given that **λ = **

PART II

1. Without tampering with the overall length of the string, join the two bobs into one mass, AB.
2. Adjust *x* to 0.300 m

*x*

C

D

A

B

1. Measure and record in metres the overall length y = AC + AD + *x*.
2. Pull AB slightly towards yourself and release it to oscillate in a plane perpendicular to ACD and find the time for 20 oscillations.
3. Determine the period T.
4. Calculate γ, given that **γ = **

**QUESTION 2**

In this experiment you will determine the refractive index of the material of

the glass slab.

1. Measure and record the thickness, t, of the glass slab provided and calculate 4t2.
2. Place the glass slab on a plain sheet of paper as shown in Figure 3 and trace its outline, QRST, of the glass slab.

t

V

U

T

Q

B C

R

S

A

D

P2

P1

P3

P4

Slab

Mirror

α

*x*

Fig. 3

1. Remove the slab.
2. Draw a line AB making an angle α = 20o with QR at B.
3. Fix the sheet of paper onto the drawing board.
4. Stick two optical pins, P1 and P2 on AB.
5. Replace the slab and place a plane mirror just behind it as shown in Figure 3
6. While looking through the face QRUV of the slab stick two optical pins, P3 and P4 in line with the images of P1 and P2 as seen through the slab and the mirror.
7. Remove the slab and the mirror.
8. Draw a line DC through P3 and P4.
9. Measure the distance *x*.
10. Repeat procedures (f) to (k) for values of α = 30o, 40o, 50o, 60o and 70o.
11. Tabulate your results including values of

(o) Find the slope, **s**, of your graph.