*P510/3*

*Physics Practical*

*Paper 3*

*July/August 2022*

*3¼ hours*

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***🖎***

**Community**

UNNASE MOCK EXAMINATIONS 2O22

*Uganda Advanced Certificate of Education*

PHYSICS PRACTICAL

PAPER 3

3HOURS 15 MINUTES

***INSTRUCTIONS TO CANDIDATES***

* *Answer question* ***1*** *and* ***one*** *other question.*
* *Any additional question answered will not be marked.*
* *Candidates are not allowed to use the apparatus for the first fifteen minutes*
* *Graph papers are provided.*
* *Non-programmable scientific calculators may be used.*
* *Candidates are expected to record all their observations as they are made and 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.*
* *Candidates should, however record any special precautions they have taken and particular feature of their 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 of them.*

1. In this experiment, you will determine the acceleration due to gravity, g, by two methods.

METHOD 1

(a) Tie the pendulum bob at the end of the long piece of thread provided.

(b) Suspend the pendulum bob shown in figure 1 by clamping the end of the thread using two small pieces of wood blocks such that length X = 0.900m.

Piece of wooden blocks

**x**

Thread

Bob

Table

**Fig.1**

(c) Displace the bob slightly and release it to oscillate.

(d) Measure and record the time, t, for 20 oscillations.

(e) Calculate period **T**.

(f) Find the acceleration, g, due to gravity from, g =

(g) Dismantle the apparatus.

**METHOD II**

(a) Clamp the metre rule horizontally so that its scale faces you.

**L**

**h**

**y**

Short piece of thread

Pendulum bob

**Fig. 2**

(b) Make a loop at the end of the long piece of thread.

(c) Slide the metre rule through the loop and tighten the loop.

(d) Tie the free end of the thread on the metre rule such that the length of thread between the two loops is 1.00m.

(e) Tie the pendulum bob at the end of the short piece of thread.

(f) Suspend the pendulum bob from the mid-point of the looping thread such that the length, h is 0.200m as shown in figure 2.

(g) Adjust the two loops to the 0.400m and 0.600m marks on the metre rule.

(h) Read the distance, y, between the two marks.

(i) Measure and record the height, ***L***in metres.

(j) Displace the bob slightly towards you and release it to oscillate.

(k) Measure and record the time, t, for 20 oscillations.

(l) Determine the period, **T**.

(m) Adjust the distance, y, to 0.300m by moving each loop towards the end of the metre rule.

(n) Repeat procedures (i) to (***L***)

(o) Repeat procedures (i) to (***L***) for values of

y = 0.400m, 0.500m, 0.600m and 0.700m.

(p) Tabulate your results including values of T2.

(q) Plot a graph of T2 against ***L***.

(r) Find the slope, **S** of the graph.

(s) Calculate the acceleration due to gravity, g from g =

2. In this experiment, you will determine the refractive index of the liquid M provided by two methods.

Cork

Optical pin

Measuring cylinder

Liquid M

Office pin

x

y

**Fig. 3**

(a) Place an office pin horizontally at the bottom of the measuring cylinder provided so that its head touches the curved surface of the cylinder.

(b) Pour liquid **M** in the cylinder to a height x = 10.0cm.

(c) Clamp an optical pin horizontally so that its head lies directly above the head of the pin in the cylinder as shown in the figure above.

(d) Adjust the position of the optical pin until its head appears to coincide with the head of the office pin as viewed from above.

(e) Read and record the height, **y**, of the optical pin from the bottom of the cylinder.

(f) Repeat (b) to (e) for x = 11.0, 12.0, 13.0, 14.0 and 15.0cm. Record your values in a suitable table.

(g) Plot a graph of **y** against x.

(h) Determine the slope, **S**, of the graph.

(i) Calculate the refractive index, n1 from n1 = .

**METHOD II**

(a) Place the converging mirror provided on the bench.

Cork

Optical pin

Converging mirror

**h**

**Fig.4**

(b) Clamp an optical pin horizontally so that the pointed end lies along the vertical axis of the converging mirror as shown in the figure above.

(c) Adjust the height of the pin until its position coincides with its image formed in the mirror.

(d) Measure the distance, **h,** of the pin from the pole of the mirror.

(e) Pour a small amount of liquid m on the mirror.

(f) Adjust the height of the pin above the pole of the mirror until the pin coincides with its mage.

(g) Measure the height, **H**, of the pin from the pole of the mirror.

(h) Calculate the refractive index n2 of liquid m from n2 =H/h.

(i) Find the value of 100 (n1 – n2)

n1

3. In this experiment, you will determine the resistance per metre length of the wire provided.

**PART I**

(a) Connect the dry cell, rheostat, P, switch, S, ammeter, A and a resistance of 5Ω in series as shown in figure 5.

**A**

**5Ω**

**S**

**P**

**Fig.5**

(b) Close switch, S.

(c) Adjust the rheostat until the ammeter register a current, **I** = 0.08A.

(d) Disconnect the circuit, but keep the setting of the rheostat unaltered.

(e) Connect eh circuit as shown in figure 6.

cello tape

**y**

**V**

**A**

Rheostat, **P**

Crocodile clips

Bare wire, **X**

**S**

**Fig. 6**

(f) Close switch, **S**.

(g) Without altering the setting of the rheostat, adjust the position of the crocodile clips until the reading of the ammeter, = 0.08A.

(h) Read and record the length yo of the bare wire, X between the two crocodile clips.

(i) Open switch, **S**.

(j) Calculate the resistance per metre length, ro from ro =

(k) Close switch, **S**.

(l) Adjust the length of the bare wire, **X** between the crocodile clips such that y = 0.200m.

(m) Adjust the rheostat until the current registered by the ammeter reading = 0.08A.

(n) Read and record the voltmeter reading, **V**.

(o) Repeat procedures () to (n) for values of y = 0.300, 0.400, 0.500, 0.600 and 0.700m.

(p) Disconnect the circuit.

(q) Tabulate your results including values of and .

(r) Plot a graph of against

(s) Determine the slope, r1 of the graph.

**PART II**

**G**

**A**

**B**

**Q**

**S**

**Rs=10Ω**

*l1*

*l2*

1.00m

Bare wire, x

**Fig.7**

(a) Connect the circuit shown in figure 7 with 1.00m length of the bare wire, **X** connected in the left hand gap of the metre bridge.

(b) Connect the standard resistor, Rs = 10Ω in the right hand gap of the metre bridge.

(c) Close switch, **S**.

(d) Move the sliding contact, **Q** along the metre bridge wire, AB, to locate a point for which the galvanometer shows no deflection.

(e) Read and record the balance lengths 1and 2.

(f) Open switch, **S**.

(g) Calculate the resistance per metre length, r2 of the bare wire, x from r2 = Rs

(h) Repeat procedures (b) to (f) with Rs = 5.0Ω

(i) Calculate the resistance per metre length, r3 of bare wire, X from r3 = Rs

(j) Calculate the average of ro, r1, r2 and r3.

***END***