Pg 1.

UTEC - Guides 2022
PHYSICS PRACTICAL (UCE). Qn 1 Paper 3

R_1 - Rec. value P_0 = , 1d.p / 3d.p cm, or m. — ½, ½

T_1 - Design of 6-Columnar enclosed table — ½
- M-Values entered in stated order. — ½

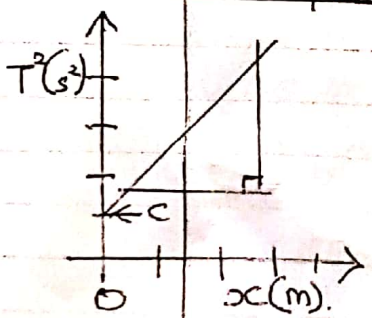
T_2 - Label of Columns M, P, t, T, x, T^2 — 1½ any two
- Indicators of Units Kg, cm, S, S, m, S^2. — 1½

T_3 - Rec. 6 values of P, ↑sing to 1dp. each ½MK — 3 (a) ½ MK
- Rec. 6 values of t ↑sing to 1dp (0 or 5) — 3 (a) ½ MK
- Rec. 6 values of T, for $\frac{t}{20}$, to 2dp. — 3 (a) ½ MK
- Rec. 6 values of x, to 3dp. — 1½ ✓ for ½M
- Rec 6 values of T^2 to 2dp so. — 1½ again ½M

=17

M(kg)	P(cm)	x(m)	t(s)		T(s)	$T(s^2)$
0.200		0.060 — 0.140	9.0 —	15.0		
0.300		0.100 — 0.200	12.0 —	18.0		2dp/3dp -
0.400		0.130 — 0.270	14.0 —	21.0	3dp/	
0.500		0.160 — 0.340	15.0 —	24.0	2dp	3dp/4dp -
0.600		0.200 — 0.400	17.0 —	26.0		
0.700		0.230 — 0.470	19.0 —	28.0		

3dp — 1dp (0 or 5) or 2dp



G_1 - Title, A graph of T^2 against x — 1

G_2 - Drawing of axes with arrows
- Labelling of axes & Units — 2

G_3 - Uniform Scales & Corr. Usage. — 2

G_4 - Corr. plotting in ½ small sq radius — 3 (a) ½MK

G_5 - Best line of fit — 1

G_6 - Indication of Triangle for slope. — 1

10

C_1 - Calc. of slope, S ✓ Corr. subtn ✓ — 1
✓ Corr. Arithmetic ✓

C_2 - Calc of g, ✓ Corr. Arithmetic. ✓ — 1
✓ Unit, ms^{-2} ✓

C_3 - Rec. value of I_V = . ✓ — ½

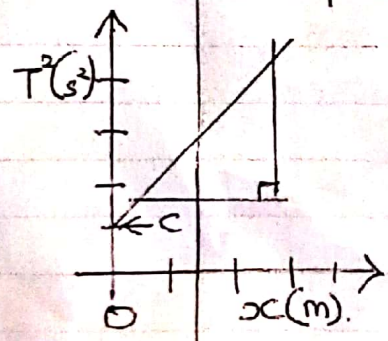
C_4 - Calc. m_0, from. m_0 = . ✓ — ½

03

UTEC - Guides 2022
PHYSICS PRACTICAL (UCE). Q.No 1 Paper 3

R | R_1 - Rec. value P_o = , 1dp / cm, 3dp / m | ½, ½
T_1 - Design of 6-Columnar enclosed table | ½
- M-Values entered in stated order. | ½
T_2 - Label of Columns M, P, t, T, x, T^2 | 1½ any two
- Indicators of Units Kg, cm, S, S, m, s^2. | 1½
T_3 - Rec. 6 values of P, ↑sing to 1dp. each ½MK. | 3 (a) ½ MK
- Rec. 6 values of t ↑sing to 1dp (0 or 5) | 3 (b) ½ MK
- Rec. 6 values of T, from $\frac{t}{20}$, to 2dp. | 3 (c) ½ MK
- Rec. 6 values of x, to 3dp. | 1½ ✓ for ½M
- Rec 6 values of T^2 to 2dp so. | 1½ again ½M
=17

M(kg)	P(cm)	x(m)	t(s)		T(s)	$T^2(s^2)$
0.200		0.060 – 0.140	9.0 –	15.0		
0.300		0.100 – 0.200	12.0 –	18.0		2dp/3dp -
0.400		0.130 – 0.270	14.0 –	21.0	3dp/	
0.500		0.160 – 0.340	15.0 –	24.0	2dp	3dp/4dp ≤
0.600		0.200 – 0.400	17.0 –	26.0		
0.700		0.230 – 0.470	19.0 –	28.0		
		3dp	1dp (.5 or .5) or 2dp			



G_1 - Title, A graph of T^2 against x | 1
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G_6 - Indication of Triangle for slope. | 1
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C_1 - Calc. of slope, S ✓ Corr. Subtn ✓
✓ Corr. Arithmetic ✓ | 1
C_2 - Calc. of g, ✓ Corr. Arithmetic. ✓
✓ Unit, ms^{-2} ✓ | 1
C_3 - Rec. Value of I_v = ✓ | ½
C_4 - Calc. m_o, from. m_o = ✓ | ½
03

535/3
PHYSICS
Paper
July / Aug. 2022
2¼ hours

UGANDA TEACHERS' EDUCATION CONSULT (UTEC)

Uganda Certificate of Education

PHYSICS

(PRACTICAL)

Paper 3

2 hours 15 minutes

Instructions to candidates

*Answer **Question 1** and one other question. You will not be allowed to start working with the apparatus for the first quarter of an hour*

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

Candidates are reminded to record their observations as soon as they are made. Whenever possible candidates should put their observations and calculations in a suitable table drown in advance

An account of the method of carrying out the experiment is not required

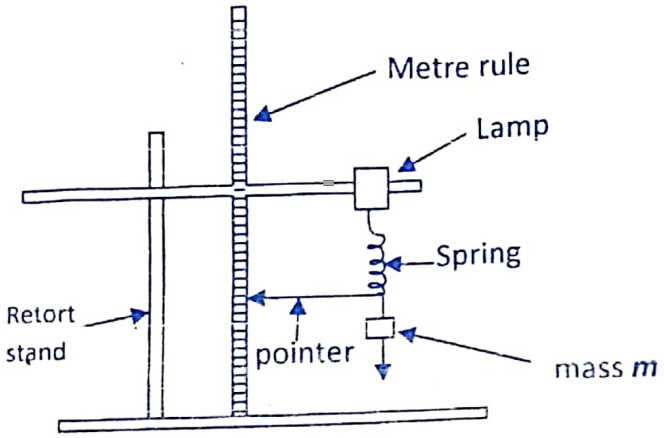
Squared papers are provided

Mathematical tables, slide rules and silent non- programmable calculators may be used.

 Turn Over

1. **In this experiment, you will determine the mass m_o of the spring and the constant, g.**

(a) Clamp the metre rule and the spring provided as shown in **fig.1.**



(b) Attach a pointer to the spring.

(c) Read and record the initial pointer position P_o on the metre rule.

(d) Suspend a mass, $M = 0.200kg$ from the free end of the spring.

(e) Read and record the new pointer position P, on the metre rule.

(f) Displace the mass through a small vertical distance and release it to oscillate freely.

(g) Measure and record the time for 20 oscillations.

(h) Calculate the period, T.

(i) Repeat procedures (d) to (h) for values of;
$M = 0..300, 0.400, 0.500, 0.600 \; and \; 0.700kg$.

(j) Record your results in a suitable table, including values of $x = (P - P_o)$ in metres and T^2.

(k) Plot a graph of T^2 (along the vertical axis) against x (along the horizontal axis).

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

(m) Calculate g, from the expression; $3.14 = \sqrt{\frac{gs}{4}}$.

(n) Read and record the intercept C on the $T^2 - axis$

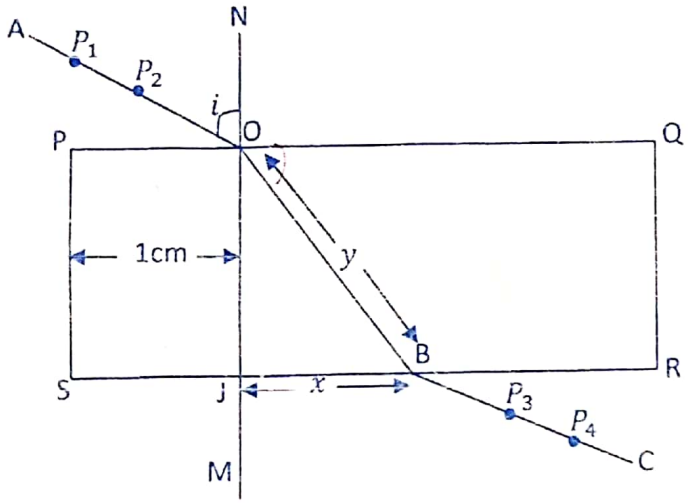
(o) Calculate the mass m_o from $m_o + C = 0.03$.

2. **In this experiment, you will determine the refractive index, n, of the glass block provided.**

(a) Fix a plane sheet of paper on to the soft board.

(b) Place the glass block with its largest face on the place sheet of paper and trace its outline.

(c) Remove the glass block and label its outline as shown in **fig. 2**



(d) Draw the normal **NM** to meet **PQ** and **SR** at a distance 1.0cm from **PS** at **O** and **J** respectively.

(e) Measure angle $i = 10^o$

(f) Fix pins P_1 *and* P_2 on AO.

(g) Replace the glass block on its outline.

(h) Looking through side **SR**, fix pins P_3 *and* P_4 such that they appear in line with the images of P_1 *and* P_2.

(i) Remove all the pins and the glass block from its outline.

(j) Draw the line **CB** through P_4 *and* P_3 to meet **SR** at **B**.

(k) Measure and record the angle, r, distances x *and* y.

(l) Repeat procedures (e) to (k) for;
$i = 20, 30, 40, 50$ *and* 60^o.

(m) Record your results in a suitable table including values of $\sin i$ *and* $x \cos r$.

(n) Plot a graph of $\sin i$ (along the vertical axis) against $x \cos r$ along the horizontal axis).

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

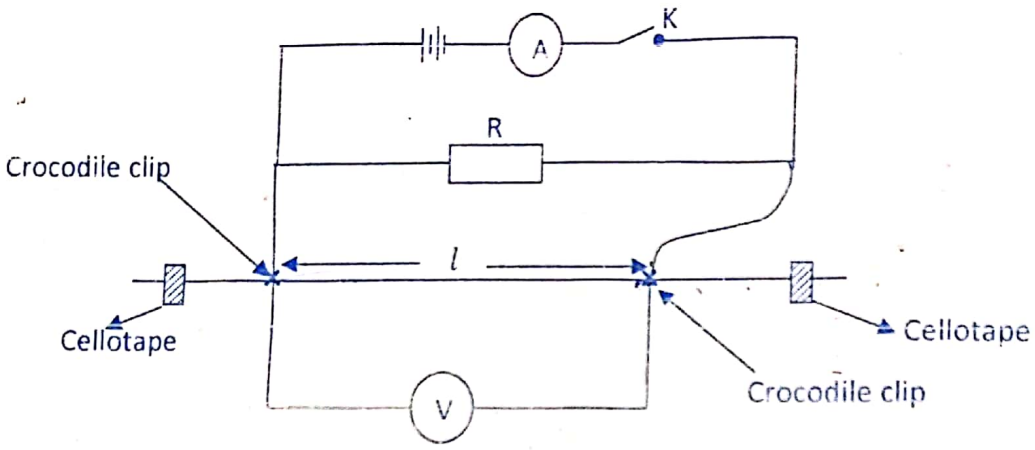
(p) Find the value of t, from the expression, $t = y \cos r$, using values of y *and* r, *for* $i = 30^o$.

(q) Calculate n *from* $s = \frac{n}{t}$.

NB: HAND IN YOUR TRACING PAPER TOGETHER WITH THE REST OF THE WORK.

3. In this experiment, you will determine the Resistance R and the constant β of the bare wire, W.

(a) Connect the circuit as shown in fig. 3.



(b) Adjust the value of l to $0.400m$.

(c) Close switch k

(d) Read and record the Ammeter reading I and the voltmeter reading V.

(e) Open switch k

(f) Repeat procedures (b) to (e) for values of $l = 0.500, 0.600, 0.700, 0.800,$ *and* $0.900m$.

(g) Put your results in a suitable table including values of $\frac{I}{V}$ *and* $\frac{I}{l}$.

(h) Plot a graph of $\frac{I}{V}$ (along the vertical axis) against $\frac{1}{l}$, (along the horizontal axis)

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

(j) Read and record the intercept, c, on the $\frac{I}{V}$ axis.

(k) Calculate β from the expression $S = \frac{1}{\beta}$.

(l) Calculate R, from the expression $C = {}^{1}/_{R}$.

2·50
2·00
1·67
1·43
1·25
1·11

END