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PHYSICS

Paper 3

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KANUNGU DISTRICT JOINT MOCK EXAMINATIONS

UGANDA CERTIFICATE OF EDUCATION

PHYSICS PRACTICAL

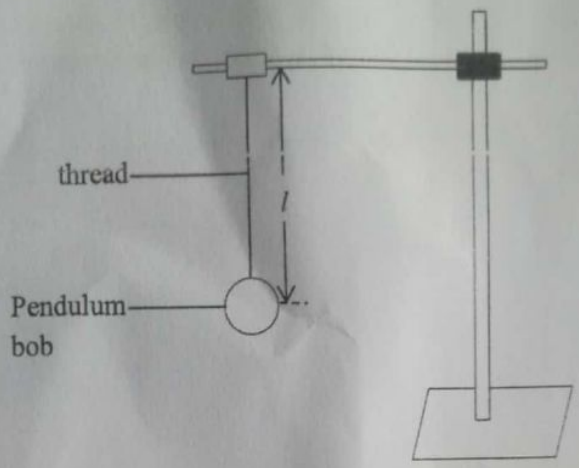
PAPER 3

Turn Over

1. **In this experiment, you will determine the constant, k, of the spring provided**

PART 1

(a) Set up the apparatus as shown in the figure below



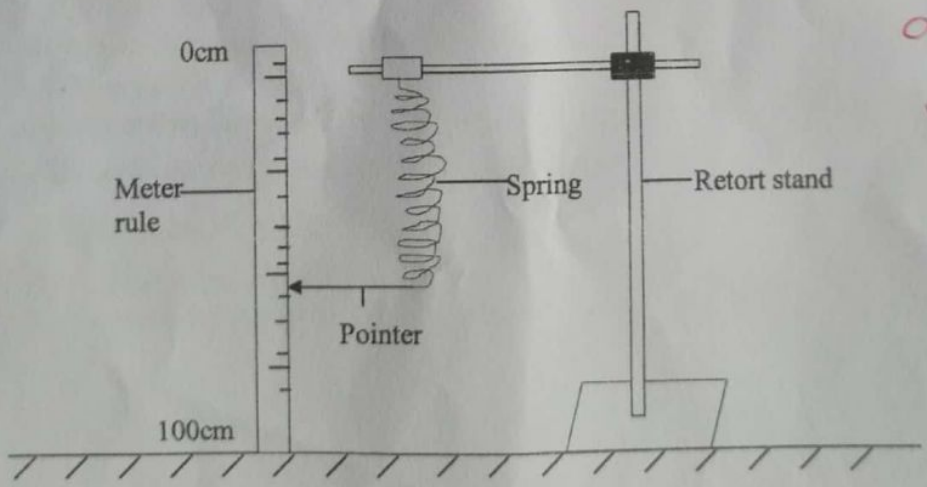
(b) Measure and record length l

(c) Pull the bob slightly towards you and release it to oscillate

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

PART 2

(a) Clamp one end of the spring in the retort stand as shown in the figure below



(b) Read and record the initial position Yo, of the point on the vertical metre rule scale placed with the zero mark at the top.

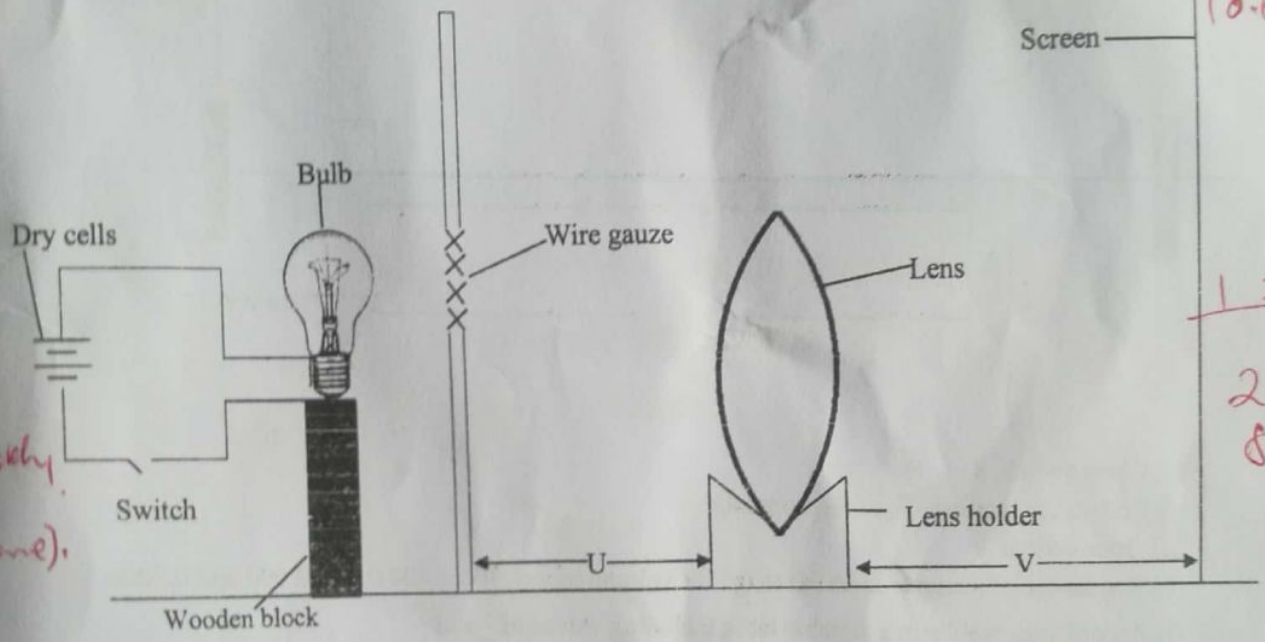
(c)Suspend a mass, M=0.10kg from the lower hook of the spring.

Turn Over

(d) Read and record the new position, Y, of the pointer on the vertical metre rule as in (b).
(e) Repeat procedure (c) to (d) for M=0.20, 0.30, 0.40 ,0.50 and 0.60kg
(f) Record your results in a suitable table including values of $x = Y - Y_o$ in metres
(g) Plot a graph of M against x
(h) Determine the slope, s, of your graph.
(I) Calculate k, from the expression: $k = 1.6 \times 10^3 (\pi/)^2 \times l \times S$.

2. In this experiment, you will determine the focal length of the lens provided

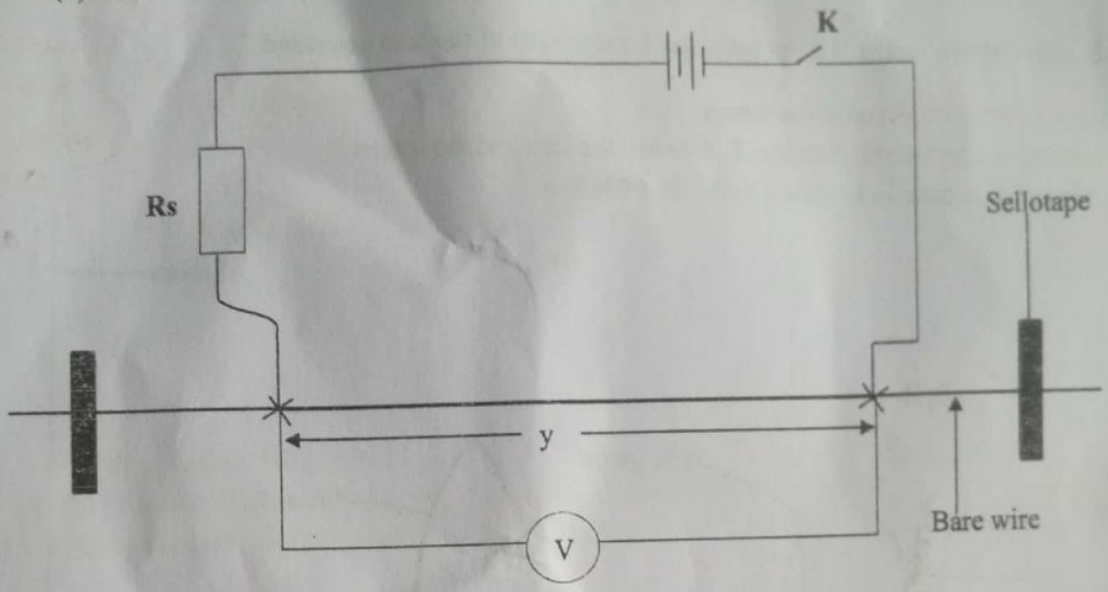
(a) Focus a distant object onto the screen
(b) Measure and record the distance, F, between the lens and the screen
(c) Arrange the apparatus as shown in the figure below



(d) Starting with u=1.5F adjust the position of screen to obtain a sharp imagine of wire gauze on the screen.
(e) Measure and record the image distance, V,
(f) Repeat procedures (d) and (e) for values u=2.0F, 2.5F, 3.0F, 3.5F, 4.0F, and 4.5F.
(g) Tabulate your results in a suitable table including values of (u+v)
(h) Plot a graph of (u+v) against u
(I) Find the minimum values, W of (u+v)
(j) Fine the focal length of the lens from expression, W = 4f

3. **In this experiment, you will determine the internal resistance, r, of the cell provided**

(a) Record the resistance, Rs, of the standard resistor provided
(b) Connect the cells in series across the voltmeter and record the reading, E of the voltmeter
(c) Fix the bare wire, W provided on the meter rule using cello tape
(d) Connect the circuit shown in the figure below starting with length y = 0.200m



(e) Close switch, k
(f) Record the reading, V, of the voltmeter
(g) Open switch, k
(h) Repeat the procedures from (d) to (g) for volume of y=0.300,0.400,0.500,0.600 and 0.700m
(i) Record your results in a suitable table including values of $\frac{1}{y}$ and $\frac{E}{V}$
(j) Plot a graph of $\frac{E}{V}$ against $\frac{1}{y}$
(k) Find the slope, S of the graph
(l) Calculate the internal resistance, r, from the expression 4.4s = r + Rs

END

NAMUWAYO ... JOINT MOCK

PHYSICS PRACTICAL PAPER:3

MARKING GUIDE O' level Pr. OBRS

R-recording
T-Table
G-Graph
C-Calculation

CODE	NO I.	MAR
R_1	Recording the length, l of the pendulum bob and unit to 1dp in cm or 3dp in m, $l = (5.0 - 120.0\,cm)$	1½ mks
R_2	Recording the time, t, for 20 oscillations and unit to 1dp or 2dp or 0dp $t = 39.7\sqrt{l} \pm 2$ (l in m) when substituting. $t = L(m)$	1½ mks
R_3	Record the initial position, Y_0, of the pointer and unit $Y_0 = (0.0 - 80.0)\,cm$	1½ mks
R_4	Recording the new position, Y of the pointer when $M = 0.10kg$ is suspended on the spring	1½
		6 mks
T_1	Design of the table of results with atleast 3-columns with M-column labelled with unit and all its values entered in stated order.	01
T_2	Labe of the rest of the columns with and units (each ½)	02

M(kg)	Y(cm) or (m)	X (m)
0.10		
0.20		
0.30		
0.40		
0.50		
0.60		

Table with pencil (Cross)

Graph with pencil (fairly called)

Y-cm or M. (difference ±2)

T_3	- Recording 5 more values of Y increasing (to 1dp ~~or~~ in cm or 3dp in m @ 1mk)	05 mks
	- Recording 6 values of x correctly calculated to 3dp @ ½	03 mks
		11 mks
G_1	- Title of the graph (A graph of m against x)	01
G_2	- Drawing and labelling the axes with units	02
G_3	- Choosing a suitable and convenient scale	02
G_4	- Correctly plotting 6 points @ point of ½ mk)	03
G_5	Drawing the line of the best fit	01
G_6	Method of finding the slop	01
	Slope = 5 ± 2	10
C_1	- Calculation of the slope S	
	* Substitution = ½	
	* Arithmetic = ½	
	* unit (kgm^{-1} or $kg\,cm^{-1}$) = ½	01½.
C_2	Calculation of K $K = 1.6\times10^{-3}(\pi/4)^2 \times L \times S$	
	* Substitution = ½	
	* an correct conversion and arithmetic = ½	
	* unit (kgs^{-2} or Nm^{-1}) = ½ Nm^{-1} (Hooke's modulus)	01½. 03
	K ± 10	
	28.1 – 65.7	
	Total	30 mks.

NO. CODE	NO. 2 Tr. OBBS	MARK
R_1	Recording the distance, F, and unit to 1 dp (9.0–11.0) cm.	01½
R_2	Recording the distance, V and unit v = (29.0 ± 2) (27.0–31.0)	01½
		03
T_1	Design of the table of results with atleast 3 columns with u column labelled with units {u(cm)} and all its values entered in stated order in the paper.	01
T_2	Labelling the rest of the columns and units	02

	u (cm)	V (cm)	(u+v) (cm)
1.5F	15	(27.0 – 31.0)	
2.0F	20		
	25		
	30		
	35		
	40		
	45		
	3mks @ ½	1dp 5mks	odp or 1dp.

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T_3	Recording 6 values of u correctly calculated to 1 dp	03 mks
	Recording 5 more values of V decreasing	05 mks.
	Recording 6 values of (u+v) correctly calculated to odp @ ½	03 mks
		14

7 is for minimum donation.

G_1	Title of the graph "A graph of (U+V) against W	01
G_2	Labelling the axes with units	02
G_3	Suitable and convenient scale	02
G_4	Correctly plotting 6 points @ ½	03
G_5	Drawing a Smooth Curve	02
		010
C_1	Determining the minimum value and unit W of (U+V)	01½
C_2	Calculation of focal length f.	
	* Substitution — 01/2	
	* arithmetic — 01/2	
	* unit — 01/2	01½
		03
	Total	30 mks

R_1 – Recording the resistance, R_s and unit to 0dp, 1dp, 2dp ($R_s = 5\Omega$ or 5.0Ω or 5.00Ω) 01½M

R_2 – Recording the reading, E, of the voltmeter and unit $E = (2.40 - 3.40)V$ V – 01, unit 01/2

R_3 Recording the voltmeter reading, V, and unit to 1 or 2 dp; $V = (0.30 - 0.80)V$ 01½M

Sub-total 04½

T_1 – Design of the table of results with atleast 4 columns with y-column labelled with unit $\{y(u)\}$ and all its values entered in the stated order in the paper. 01

T_2 – Labelling of the rest of the columns and units, $\frac{E}{V}$ without unit. 03

y(m)	V(V)	$\frac{1}{y}(m^{-1})$	$\frac{E}{V}$
0.200	0.30 – 0.88	5.00	
0.300	0.40 – 0.90	3.33	
0.400	0.50 – 1.00	2.50	
0.500	0.6 – 1.10	2.00	
0.600	0.7 – 1.20	1.67	
0.700	0.8 – 1.30	1.43	

1dp or 2dp 2dp ½ ½ 1dp

T_3 – Recording 5 more values of V, increasing to 1 or 2dps @ 1mk 05 MKS

– Recording 6 values of $\frac{1}{y}$ correctly calculated to 2dp @ ½mk 03 mks

– Recording 6 values of $\frac{E}{V}$ correctly calculated to 1dp or 2dp @ ½ 03 MKS

Subtotal	15 mks.
G_1 – Title of a graph; 'A graph of $\frac{1}{I}\frac{E}{V}$ against $\frac{1}{I}$'	01
G_2 – Drawing & labelling the axes with unit	02
G_3 – Suitable and convenient scale	02
G_4 – Correctly plotting 6 point @ ½	03
G_5 – True best straight line to fit the plotted point	01½
G_6 – True method of finding the slope	01½
	09

C_1 – ~~Calculat~~ Calculation of slope, S,

* Correct substitution and answer = ½
* unit (V) = ½

	01
S ⇒ (1.02 ± 0.02)	

C_2 – Calculation of internal resistance, r

* Correct substitution and answer = ½
* unit = ½ (Ω)

(~~0.85~~ – (1.00 – 1.04))	
r = 0.42 to	
01	
02	

Total	30 mks.