

COURTIEA - 2025
SCORING GUIDE FOR PHYSICS, E3S/2
ITEM ONE

Aim: CODE: A score = 02

An experiment to determine the acceleration due to gravity to help the community determine the Pressure for the pump to supply water to the storage tank.

Two Key Points; ✓ Aim, Purpose ✓

Hypothesis: Code: H Score = 01 The acceleration due to gravity, g , ranges from 8.0 ms^{-2} to 12.0 ms^{-2} to be used to determine the pressure for the pump to supply water

Variables; Code: VAR; score = 03.

- Independent Variables; length of string ✓
- dependent variables; time for twenty oscillations, t }
Periodic time, T , and T^2
- Controlled / fixed / Constant variables; ✓ anyone
mass of the bob, Amplitude of swing } anyone ✓

6 key points

(4-6) = 3 scores

(2-3) = 2 scores

1 = 1 score

SOURCES OF ERRORS AND PRECAUTIONS

SCORE = 04

Sources of errors; (ER = 02)

- Inconsistence in time of oscillations
 - Wind / air resistance
 - Anelastic thread / string
 - Large Amplitude of swing
 - Shaking Retort stand
 - Parallax error
 - Zero error
- any two
= 2 Key points. ✓

Precautions taken (PR=02)

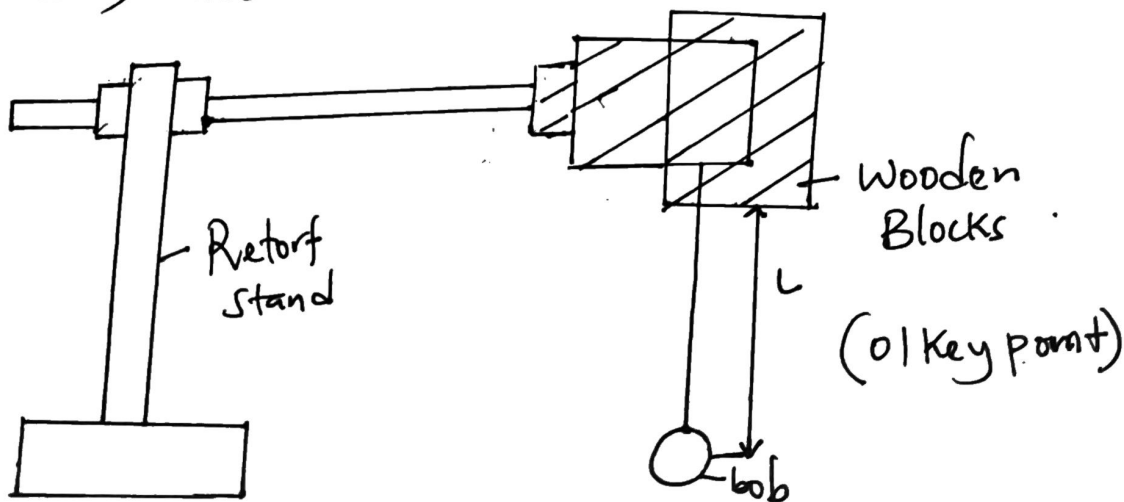
- I measured time for twenty oscillations and I found the average to minimize inconsistencies in time.
- I reduced Air/wind resistances by closing the window
- I used a clear Ruler that zero as the starting value to reduce on the zero error.
- I used an inelastic string to have the actual value of the length of the thread even during oscillation.
- I kept the amplitude of the swing so small to minimize the error due to large amplitude of swing.
- I placed a big wooden block on the base retort stand to make it stable
- I placed my eye perpendicular to the point on the metre rule I was reading to minimize on the error due to parallax.

Note; Any two Precautions = 2 Key Points

Procedure; code: P score = 03.

List of apparatus.

Pendulum bob, Retort stand, Cotton thread, stopwatch/clock, Metre rule, Two small pieces of wooden blocks



Steps taken

- a) The pendulum bob was suspended by means of a thread from a retort stand as shown ✓ in the figure above.
- (b) The length, L , of the thread (Pendulum) was adjusted to 0.900m ✓
- c) The bob was displaced sideways through a small angle and released to oscillate ✓
- d) The time, t , for 20 oscillations was measured using a stop watch and recorded ✓
- e) The time, T , for one oscillation was calculated from $T = \frac{t}{20}$ ✓
- f) Steps (b) to (e) were repeated for different values, $L = 0.800, 0.700, 0.600, 0.500\text{m}$ ✓
- g) The results were tabulated including values of T^2 .
- (h) A graph of T^2 against L was plotted ✓
- (i) The slope, s , of the graph was calculated ✓
- (J) The value of the acceleration due to gravity, g , ✓ was calculated from the expression

$$g = \frac{4\pi^2}{s}$$

Coherency ✓

(13 Keyprints)

(8-12) Key points = 03 scores (4-7) Key points = 02 scores
 (1-3) Key points = 01 score.

TABLE OF RESULTS

L(m)	t(s)	T(s)	T ² (s ²)
0.900			
0.800			
0.700			
0.600			
0.500			

- Presentation of data; Code PD score 04
 five corresponding sets of independent and dependent variables — (5 key points)
 (4-5) Key points = 4
 (2-3) Key points = 3
 1 Key points = 2

RECORDING DATA WITH ACCURACY.

CODE: RDA SCORE = 02

- level of accuracy of the stop watch / clock, ruler ✓
- Any one correct unit ✓
- trend of dependent variables. ✓
 (2-3) = 2 scores; 4 = 1 score. 3 Key points

GRAPH: Code Score = 04

- Title of the graph ✓
- Drawing and labelling axes ✓✓
- Uniform Scales ✓✓
- Any five correctly plotted points ✓✓✓✓✓
- line of best fit ✓
- Method of finding slope ✓ 12 Key point
 (9-12) Key points = 4, (6-8) = 3, (3-5) = 2
 (1-2) = 1 score

Mathematical Computation : Code: MC : Score = 03

- Reading and Recording any one coordinate for the slope ✓

- Substitution ✓

- Value ✓

- Unit ✓

Using $g = \frac{4\pi^2}{5}$

Substitution ✓

Value ✓

Unit ✓

7 Key Points

$(4-6) = 03$

1

$(2-3) = 02$

1 = 4 score.

Conclusion With Advice

Code: Cad Score = 02

~~Code~~ Conclusion ✓

Advice ✓

e.g The Acceleration due to gravity is --- m s^{-2} which is within the range 8.0 m s^{-2} to 12.0 m s^{-2} and can therefore be used to determine the pressure for the pump to supply water to the storage tank.

Total score = 28

ITEM 2

Aim:

A-02

- An experiment to determine the focal length of the convex lens to help the health Community Centre to provide eye care services to the patients.

Two key points: Aim 1

Surface

Hypothesis: H-01

The focal length of convex lens is in the range 8.0 cm to 12.0 cm and can help the health community centre to provide eye care services to its patients

Variables: (VAR-03)

- > independent variable; object distance, u
 - > dependent variables; image distance, v .
- ($u+v$) $\neq$ MV.

controlled variables:

Aperture of the lens
size of the object.

6 key points

(4-6) key points

(2-3) key points

1 key points

= 03 scores

= 02 scores

= 01 score

Sources of errors and precautions

Sources of errors; ($ER=02$)

- > Too much light from outside the laboratory
- > Dry cells with low emf
- > Parallax error
- > zero error
- > Dim light from the bulb.

Any 2
= 2 key points

Precautions ($PR=02$)

- > I closed the window and put curtains in the door to reduce on amount of light from outside
- > I used new dry cells emf 1.5V.
- > I placed my eye perpendicular to the point on the meter rule where I was reading the values of u and v to reduce on parallax error.
- > I used a metre rule which was clearly marked with zero as starting value.
- > I got a better bulb - and new cells that made the bulb give out enough light

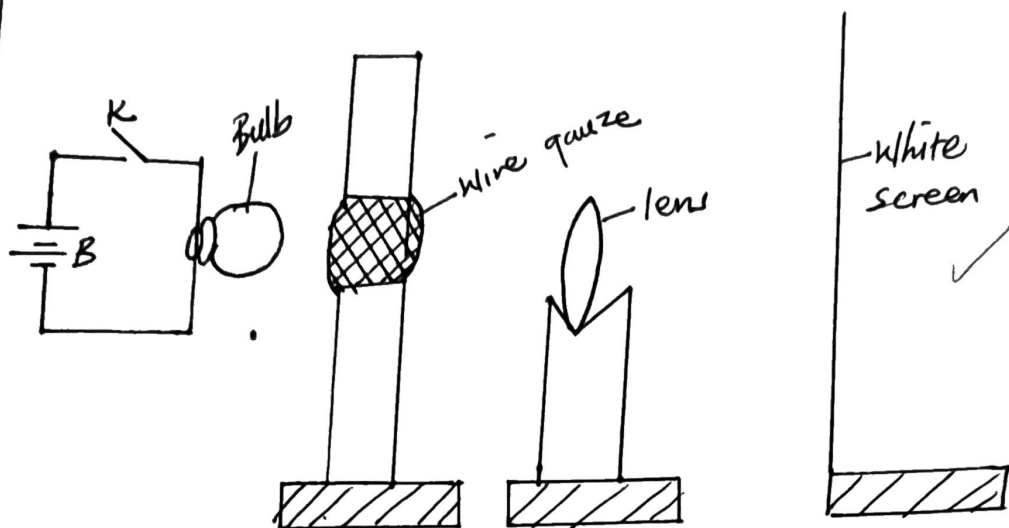
2 key points

PROCEDURE ($P=03$)

List of apparatus:

- > convex lens in a holder, white screen, torch bulb in a holder, dry cells in a cell holder, connecting wire, metre rule, screen with a hole covered by a wire gauze.

Diagram



K - switch

B - Battery (dry cells)

Steps

- The lens, white screen, wire gauze and the bulb were arranged in the straight line as shown in the figure above ✓
- The distance, u , between the wire gauze was adjusted to 15.0 cm ✓
- The switch, K , was closed ✓
- The position of the screen was adjusted until a clear sharp image of the wire gauze was formed on it. ✓
- The distance, v , between the lens and the screen was measured and recorded ✓
- Procedures (b) to (e) were repeated for values of $u = 20.0, 25.0, 30.0$ and 35.0 cm ✓

- g) The results were recorded in a suitable table to include the values of $(u+v)$ and uv ✓
 h) The graph of uv against $(u+v)$ was plotted ✓
 i). The slope, s , of the graph was calculated. ✓
 (j) The value of the focal length, f , was equal to the slope, s , ✓

$$f = s.$$

coherence. ✓

13 Key points

(9-13) Key points = 03

(6-8) Key points = 02

(1-5) Key points = 01

Table of results

$U(\text{cm})$	$V(\text{cm})$	$(u+v)\text{cm}$	$UV(\text{cm}^2)$
15.0			
20.0			
25.0			
30.0			
35.0			

Presentation of Data (PD = 04)

- Five sets of corresponding independent and dependent value.

(4-5) Key points = 04 scores

(2-3) Key points = 03 scores

01 Key points = 02 scores

Recording data with accuracy. (RBA = 02)

- > The level of accuracy of the instrument (v-values) ✓
- > Any one correct unit ✓
- > Trend of dependent values (v-values) ✓

(2-3) key points — 02 scores

1 key points — 01 score

Graph: (GR = 04)

- Title of the graph ✓
- Drawing and labelling axes ✓ ✓
- uniform scale ✓
- correctly plotting five points ✓ ✓ ✓ ✓ ✓
- correctly drawing the line of best fit ✓
- method of finding the slope ✓

(9-12) key ~~words~~ points = 04

(6-8) key ~~words~~ points = 03

(3-5) key points = 02

(1-2) key points = 01

Mathematical computation (MC = 03)

Reading and Recording any one coordinate for the ~~slope~~ slope ✓

- Substitution ✓
 - values ✓
 - units ✓
- } 4 key points

(2-4) — 03 scores

1 — 02 scores

Conclusion and advise (CAD = 02)

The focal length of the lens is — cm which lies in the range 80cm to 120cm and can be used by the health community centre to provide eye car services to its patients