

Country	<input type="text"/>	Team	<input type="text"/>
ID Code: 1)	<input type="text"/>	2)	<input type="text"/>
3)	<input type="text"/>		



International Junior Science Olympiad,
Pune, India

Time : 3 hrs
Marks :40

Experimental Tasks



Task: **A** This task is divided into three parts. **Total marks: 14**

- A1:** To determine the centre of gravity of a triangular plate, A.
- A2:** To record the time period of oscillation for different suspension points for the plate.
- A3:** To analyze the above data and results.

A.Q1 Determination of CG:

[1.0 mark]

Mark "X" on **Sheet 1** at the appropriate position to denote the CG (large sized sheet).

CG within 5 mm
CG within 10 mm

[1.0]
[0.5]

A.Q2 Table A.1: Oscillation measurements:

[4.0 marks]

	h (m)	h ² (m ²)	Time taken for 50 oscillations (s)				T = T1/50 (s)	T ² (s ²)	hT ² (ms ²)
			1 st (t1)	2 nd (t2)	3 rd (t3)	Mean (T1) (t1+t2+t3)/3			
H1	0.243					53.65			
H2	0.155					47.77			
H3	0.179					49.08			
H4	0.098					45.48			

For each value of h within ± 5 mm
For each value of T1 within ± 1 s
For each value of T1 within ± 2 s
For calculating h² and hT²

[0.25 x 4.0= 1.0]
[0.5 x 4.0= 2.0]
[0.25 x 4.0= 1.0]
[0.25 x 4.0= 1.0]

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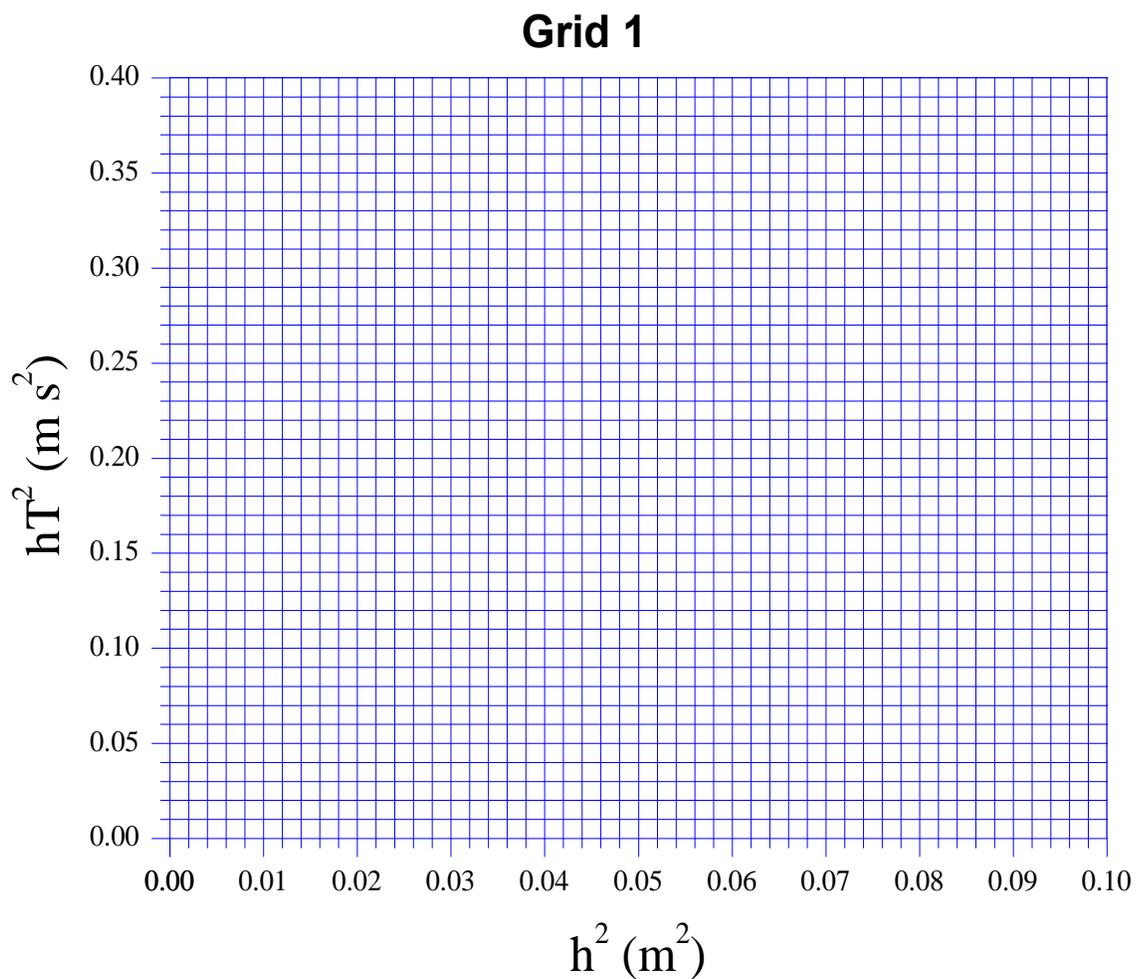
Experimental Tasks



A.Q3 Results of the data analysis

(a) Grid1: hT^2 (y-axis) versus h^2 (x-axis)

[2.0 marks]



Plotting 4 points correctly
For best fit straight line

[0.25 x 4.0= 1.0]
[1.0]

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A.Q4 Table A.2: Calculations from Grid 1 [3.0 marks]

Quantity	Numerical value	FULL CREDITS		HALF CREDITS
Slope of the graph (s)	4.06 ± 0.2	[0.5]	4.06 ± 0.4	[0.25]
y-intercept of the graph (c)	0.040 ± 0.005	[0.5]	0.040 ± 0.01	[0.25]
Acceleration due to gravity (g)	9.8 ± 0.5	[1.0]	9.8 ± 1.0	[0.5]
Radius of gyration (K)	0.10 ± 0.01	[1.0]	0.10 ± 0.02	[0.5]

Values outside the above mentioned range = Zero

A.Q5(a) Table A.3:

[3.0 marks]

Holes	h (m)	h' (m)
H1	0.243	0.045
H4	0.098	0.11

Each correct value of h' within ± 10 mm [0.5 x 2 = 1.0]

Values outside the above mentioned range = Zero

(b) Sheet 1: Mark the positions of points of oscillation J1 and J4 on Sheet 1. Label them as J1 and J4 clearly.

[1 x 2 = 2.0]

A.Q6 Table A.4: Lengths of equivalent simple pendulums [1.0 mark]

Holes	h (m)	L (m)
H1	0.243	0.288
H4	0.098	0.209

For each correct calculation within ± 0.015 m [0.5]