Country | Team

ID Code: 1) | 2) | 3)

International Junior Science Olympiad,
Pune, India

Time : 3 hrs
Marks :40

Experimental Tasks A + B + C

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 [1.0]
CG within 10 mm [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)
			1st (t1)	2nd (t2)	3rd (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 [0.25 x 4.0= 1.0]
For each value of T1 within ± 1 s [0.5 x 4.0= 2.0]
For each value of T1 within ± 2 s [0.25 x 4.0= 1.0]
For calculating h^2 and hT^2 [0.25 x 4.0= 1.0]

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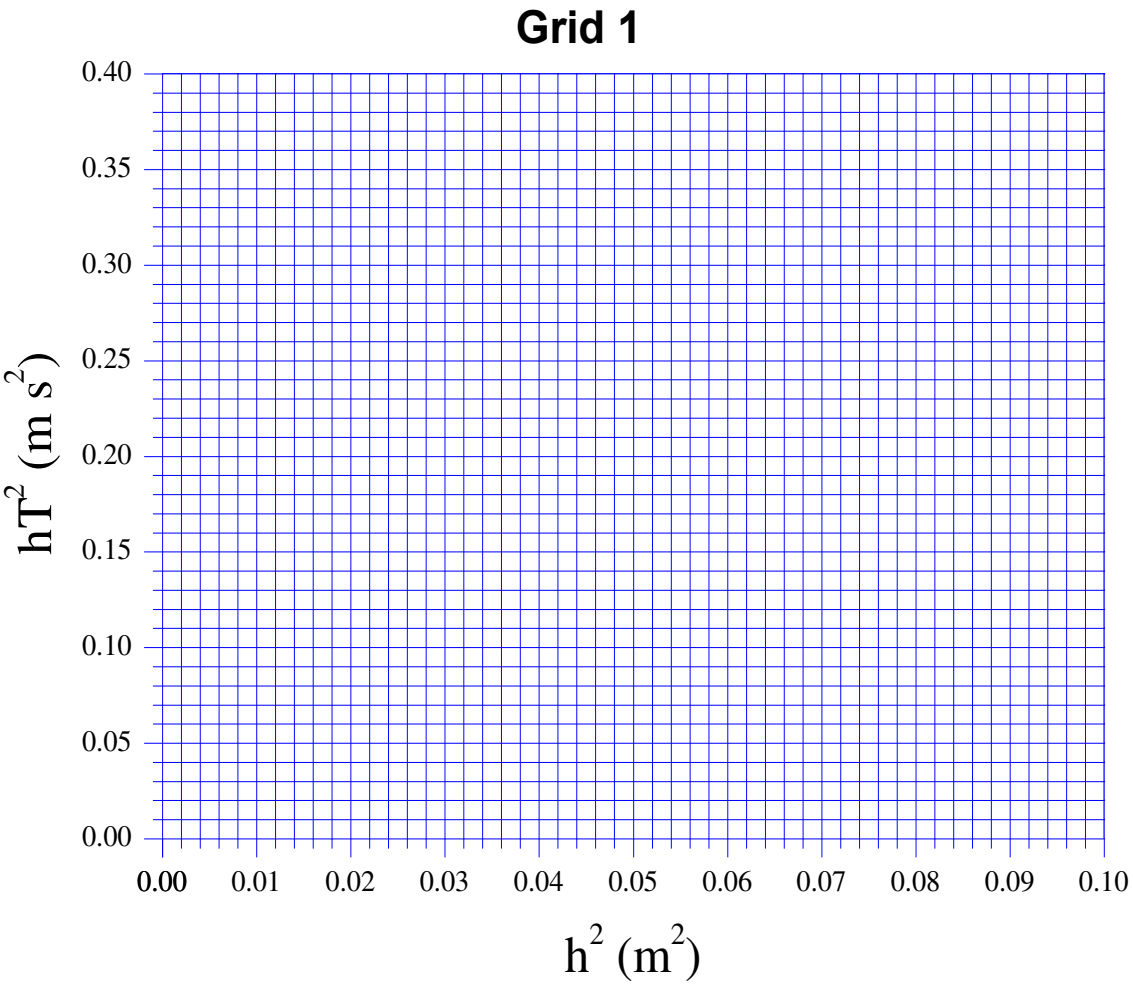
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A.Q3 Results of the data analysis

(a) Grid1: hT^2 (y-axis) versus h^2 (x-axis) **[2.0 marks]**



Plotting 4 points correctly [0.25 x 4.0= 1.0]
For best fit straight line [1.0]

Experimental Tasks A + B + C

A.Q4Table 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 [0.5x 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.Q6Table 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]