MAJOR-II: PHYS2011: MECHANICS
MINOR II: PHYS2021: MECHANICS

Practical: 30 Lectures
Practical:

Rules to do experiment:

Maintain an exercise book for data recording. This is called a "Data Recording Notebook". Bring that khata everyday to do the experiments. All the experiments' data should be recorded there, from Sem-1 to Sem-VI or Sem-VIII. I/We shall sign on the data when you finish the experiment. That is the proof of your daily work.

How to write your "Practical Notebook" (Fair copy)?

Do's:

1. **Definition and unit of the quantity you are getting or finding from the experiment.**
2. **Theory: Only Working Formula. And explain all the symbols used in that formula. No need to derive the working formula.**
3. **Systematic data recording and graph plotting (if any). The Schematic diagram (is optional) and circuit diagram (is mandatory) on the practical notebook.**
4. **Calculations. (Mandatory to show detailed calculation of numerator and denominator)**
5. **At the end of calculation, write a line on what you get. The final answer for the experimental value you get should be written clearly.**
6. **Precaution and Discussion.**

Don'ts:

1. **Do not write "Apparatus needed for the experiment**
2. **Do not derive the working formula**
3. **Do not write the theory of the experiment**
4. **Do not forget to write the units**
5. **Do not write the experiment which you have not done at our college. As some of the experimental set up are not there in our college which nearby colleges may have. Don't be oversmart and write all the experiments from the syllabus.**
6. **We don't have the**

P.S. In any unfortunate event, if your fair copy of "Practical Notebook" is lost, you can bring the "data recording notebook" which we signed daily during the course of the semester, to the final day of examination. It will be helpful and fulfil the same purpose as the "Practical Notebook".

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~~1. To study the Motion of Spring and calculate (a) Spring constant, (b) g and (c) Modulus of rigidity.~~

2. To determine the Moment of Inertia of a ~~Flywheel~~/regular shaped body.

Working Formula: $I_2 = I_1\left(\frac{T_2^2 - T_0^2}{T_1^2 - T_0^2}\right)$

Here

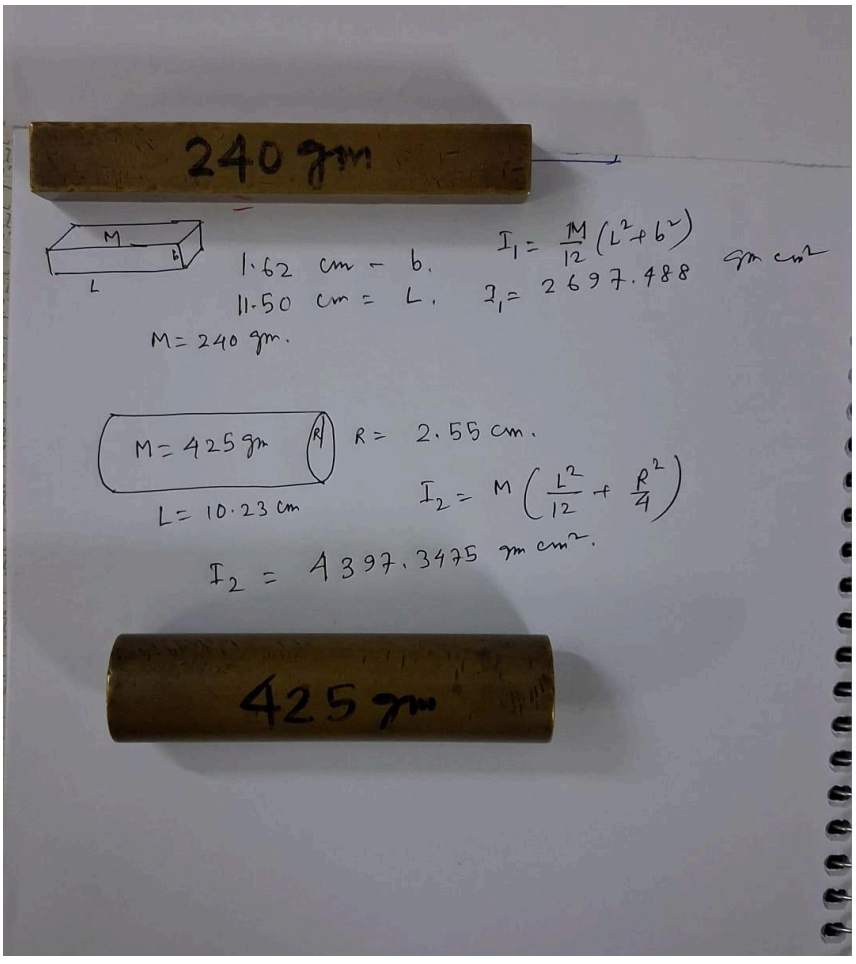
T_0 = time period of the empty cradle

T_1 = time period of cradle with the regular shaped body whose moment of inertia we know.

T_2 = time period of cradle with the regular shaped body whose moment of inertia we do not know.

I_1 = Moment of Inertia of the known object

I_2 = Unknown Moment of Inertia of the regular shaped object from the above formula.



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~~3. To determine g and velocity for a freely falling body using Digital Timing Technique.~~

~~4. To determine the Young's Modulus of a Wire by Optical Lever Method.~~

5. To determine the Modulus of Rigidity of a Wire by ~~Maxwell's needle~~/dynamical method.

Working formula:

$$\eta = \frac{8\,\pi I\, l}{T^2 r^4}$$

Here

$I = \frac{1}{2}MR^2$ = Moment of Inertia of the cylinder hanging from the experimental wire.

M is the mass of the Hanging cylinder and R is its radius. (M=2733 gm; R=3.822 cm)

l = length of the wire (76.5 cm)

T= Time period of oscillation of the cylinder of mass M & radius R (2.122 sec)

r= radius of the wire whose rigidity modulus we are going to find. (1.20 mm)

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6. To determine the elastic constant of a wire by Searle's method.



Working Formula:

$$Y = \frac{Mg\,L}{\pi r^2 l}$$

Where Y = Young's modulus of the wire

M= mass of the load which is changed from 0 to 4 kg in step of 1 Kg

g = acceleration due to gravity (980 cm/sec^2)

L= length of the experimental wire (not the reference wire) (2.0 meter)

r = Radius of the wire (1.0 mm)

l = depression/ elongation of the wire (changes with applied load M)

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7. To determine the value of Acceleration due to Gravity (g) using ~~Bar pendulum~~/Kater's Pendulum.

Working formula: $g = \frac{8\pi^2}{\left[\frac{T_1^2+T_2^2}{l_1+l_2} + \frac{T_1^2-T_2^2}{l_1-l_2}\right]}$

Here T_1 = time period of K1 knife edge (generally 50 oscillations have been recorded by adjusting metal disc for rough adjustment and wooded disc for fine/small adjustment)

T_2 = time period of K2 knife edge (T_2 ~ T_1 but must not be exactly equal.)

l_1 = distance between Centre of Gravity to the K1 knife edge

l_2 = distance between Centre of Gravity to the K2 knife edge

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8. To determine the value of Young's Modulus by Flexure method.

Working Formula:

$$Y = \frac{gL^3M}{4bd^3l}$$

Where

g = acceleration due to gravity

L = Length of the metallic bar between two knife edges

M = mass of the weights we put

b= breadth of the Rectangular Bar whose Young's modulus we want to find

d = depth of the bar.

l = depression of the bar due to hanging of mass M.

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