ريبوتات . فيزياء (١) ١٠٣

LAB REPORT FOR EXPERIMENT 1

Date: ------------------------

Name:------------------------ Partner's Name:--------------

Registration No:-------------- Registration No:--------------

Physics Section:-------------- Instructor's Name:------------

PHYSICS LAB EXPERIMENT 1: COLLECTION AND ANALYSIS OF DATA

I. PURPOSE :

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II. DATA :

Table (1.1)

h (cm)	t in seconds			
	d = 1.5 mm	d= 2.0mm	d=3.0mm	d=5.0 mm
30.0	73.0	41.2	18.4	6.8
10.0	43.5	23.7	10.5	3.9
4.0	26.7	15.0	6.8	2.2
1.0	13.5	7.2	3.7	1.5

Using data inTable (1.1) fill in Table (1.2) below:

Table (1.2)

d (mm)	t in seconds			
	h = 30.0 cm	h=10.0cm	h=4.0cm	h=1.0cm
5.0				
3.0				
2.0				
1.5				

for h = 30 cm , fill in Table 1.3 below:

Table(1.3)

t (s)	d (mm)	$1/d^2$ (mm^{-2})

for d = 2 mm fill in Table 1.4 below:

Table(1.4)

log t	log h

III. ANALYSIS OF DATA :

Graph your results. **Independent** variables will be the diameter of hole and depth of water in the container. Time is the **dependent** variable and will depend on the previous two independent variables.

A. Plot the time **(t)** versus the depth **(h)** for each diameter **(d)** used. Do four graphs on one sheet, using the same set of axes, connecting points in a smooth curve for each and labeling them d_1 , d_2 , d_3 and d_4 .

B. On a second sheet of graph paper, plot the time **(t)** versus diameter **(d)** for each value of depth **(h)**. Connect the points in a smooth curve and label the curves h_1 , h_2 , h_3 and h_4 .

C. Plot **t** versus **$1/d^2$** for h = 30 cm

D. plot **log t** versus **log h** for d = 2 mm.

IV. CONCLUSIONS

1. From your graph (t) versus (h) for d = 1.5 mm, extrapolate the curve toward the origin. Does it pass through it ? Would you expect it to do so?

2. What type of relationship do you see between the time and diameter? Is it direct or inverse?

3. From t versus $1/d^2$ graph, find the empirical relationship between time (t) and hole diameter (d) for h =30 cm .

4. From the previous relation, can you predict the time needed to empty the container if the diameter of the opening was 4 mm, 8 mm?

5. From the log t versus log h graph, find the empirical relationship between time (t) and depth (h) for d = 2 mm .

6. Can you predict the time needed to empty the container if the depth of water was 25 cm, 80 cm?

LAB REPORT FOR EXPERIMENT 2

Date: ---------------------------

Name:------------------------------ Partner's Name:-----------------

Registration No:---------------- Registration No:----------------

Physics Section:---------------- Instructor's Name:-------------

PHYSICS LAB EXPERIMENT 2 : MEASUREMENTS AND UNCERTAINTIES

I. PURPOSE :

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II. DATA AND DATA ANALYSIS :

A. Measurement of π

Record your data in Table (2.1) below:

Table (2.1)

Trial No	d (cm)	$\lvert d-\bar{d}\rvert$ (cm)	c (cm)	$\lvert c-\bar{c}\rvert$ (cm)
1				
2				
3				
4				
5				
Average	$\bar{d} =$ cm		$\bar{c} =$ cm	
Error	$\Delta\bar{d} = \pm$ cm		$\Delta\bar{c} = \pm$ cm	

1. Calculate the error, $\Delta \bar{d}$, in measuring the diameter of the disk, and, $\Delta \bar{c}$, in measuring the circumference and enter the values calculated in Table 2.1
Example for one calculation ($\Delta \bar{d}$) or ($\Delta \bar{c}$):

2. Using your average measured values of $\bar{d}$ and $\bar{c}$, calculate $\bar{\pi}$.

3. Calculate the error, $\Delta\bar{\pi}$, in the measured value, $\bar{\pi}$.

Note: $\Delta\bar{\pi} = \bar{\pi}\,[(\Delta \bar{d} / \bar{d})^2 + (\Delta \bar{c} / \bar{c})^2]^{1/2}$ **(2.1)**

4. Which error contributes most to $\bar{\pi}$? (give a quantitative answer)

5. Does the measured average value of $\bar{\pi}$ agree with the accepted value of $\bar{\pi}$ (3.14159) within the calculated experimental error.

B. Determination of Density

Record your data in Table (2.2) below:

Table (2.2)

Trial No	h (cm)	$\lvert h-\bar{h}\rvert$(cm)	d (cm)	$\lvert d-\bar{d}\rvert$(cm)
1				
2				
3				
4				
5				
Average	$\bar{h}=$ cm		$\bar{d}=$ cm	
Error	$\Delta\bar{h}=\pm$ cm		$\Delta\bar{d}=\pm$ cm	
mass	$m=$ g		$\Delta m=\pm$ g	

1. Calculate the error, $\Delta\bar{h}$, in the average measured length and enter the result in Table (2.2).

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2. Calculate the error, $\Delta\bar{d}$, in the average measured diameter and enter the result in Table (2.2).

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3. Take Δm to be half the smallest division of the balance used .

4. Using your average measured values of $\bar{h}$,$\bar{d}$, $\bar{\pi}$ determined in **part A** , and the measured value of mass m, calculate $\bar{\rho}$.

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5. Calculate the error, $\Delta\bar{\rho}$, in the average value for the measured density, $\bar{\rho}$.

Note:

$$\Delta\bar{\rho}=\bar{\rho}\left[\left(\frac{\Delta m}{m}\right)^2+\left(\frac{\Delta\bar{h}}{\bar{h}}\right)^2+\left(\frac{2\Delta\bar{d}}{\bar{d}}\right)^2+\left(\frac{\Delta\bar{\pi}}{\bar{\pi}}\right)^2\right]^{\frac{1}{2}} \qquad (2.2)$$

and use for $\bar{\pi}$ and $\Delta\bar{\pi}$, the values determined in **part A.**

6. Which error in m, $\bar{h}, \bar{d}$, or $\bar{\pi}$ contributes **most** to $\bar{\rho}$?
(give a quantitative answer)

7. Using your calculations in (6), which error in m, $\bar{h}, \bar{d}$, or $\bar{\pi}$ contributes the least to $\bar{\rho}$?

8. Compare the measured value of $\bar{\rho} \pm \Delta\bar{\rho}$ with the accepted value of ρ .

LAB REPORT FOR EXPERIMENT 3

Date: ---------------------------

Name:---------------------------- Partner's Name:--------------

Registration No:---------------- Registration No:--------------

Physics Section:----------------- Instructor's Name:------------

PHYSICS LAB EXPERIMENT 3: VECTORS (FORCE TABLE)

I. PURPOSE :

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II. DATA AND DATA ANALYSIS :

1- Record the **experimentally** measured value of the resultant of the **two forces** in step one of the procedure (magnitude and direction) .

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2- Determine the resultant of the **two forces** in step one of the procedure **graphically**. How does it compare with the measured value?

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3- Again determine the resultant of the **two forces** in step one by the **method of components**. How does it compare with the measured value?

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4. Record the **experimentally** measured value of the resultant of the **three forces** in step two of the procedure (magnitude and direction) .

5. Determine the resultant of the **three forces** in step two of the procedure **graphically** using the polygon method . Compare it with the measured value.

6. Again, use the **method of components** to determine the resultant for the **three forces** in step two of the procedure. Compare with experimental findings.

7. State the major source(s) of inaccuracy in the experimental results?

LAB REPORT FOR EXPERIMENT 4

Date: ------------------------

Name:-------------------------- **Partner's Name:**--------------

Registration No:-------------- **Registration No:**--------------

Physics Section:--------------- **Instructor's Name:**-----------

PHYSICS LAB EXPERIMENT 4: KINEMATICS OF RECTILINEAR MOTION

I. PURPOSE :

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II. MEASUREMENTS :

1. Measure the distances x_1 , x_2 , x_3 etc. and record your measurements taken directly from the ticker timer tape in the second column of Table 4.1, and then complete entering the rest of the required derived quantities in Table 4.1 below:

Table (4.1)

Time t_i (s)	Displacement x_i (cm)	Displacement differences (cm) $\Delta x_i = (x_{i+1} - x_i)$	Average Speed (cm/s) $\overline{v}_i = \Delta x_i / \Delta t$	Velocity differences (cm /s) $\Delta v_i = v_{i+1} - v_i$	Average Acceleration (cm /s²) $\bar{a}_i = \Delta v_i / \Delta t$
0					
0.05					
0.1					
0.15					
0.2					
0.25					
0.3					
0.35					
0.4					
0.45					
0.5					
0.55					
0.6					
0.65					
0.7					
0.75					
0.8					
0.85					
0.9					
0.95					
1.0					

2. Complete entering the rest of the required derived quantities in Table 4.2 below:

Table (4.2)

Total Time t_i (s)	Distance on Tape x_i (cm)	Average Speed $\bar{v}$ (cm/s)
$t_2 = 0.2$	$x_2 =$	$\bar{v}_{2\text{-}10} =$
$t_3 = 0.3$	$x_3 =$	
$t_4 = 0.4$	$x_4 =$	$\bar{v}_{3\text{-}9} =$
$t_5 = 0.5$	$x_5 =$	
$t_6 = 0.6 = t_m$	$x_6 =$	$\bar{v}_{4\text{-}8} =$
$t_7 = 0.7$	$x_7 =$	
$t_8 = 0.8$	$x_8 =$	$\bar{v}_{5\text{-}7} =$
$t_9 = 0.9$	$x_9 =$	
$t_{10} = 1.0$	$x_{10} =$	

III. DATA AND DATA ANALYSIS :

A. From an inspection of **your tape**, can you find where your speed wa highest? Where it was lowest ? Can you find where the acceleration wa (a) greatest (b) smallest?

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B. Now using Tables (4.1) and (4.2) continue the following analysis:

1. Plot on a linear graph paper **x** against **t**. Connect your plotted points with a **smooth** curve. From your graph can you tell where the speed was constant? Increasing ? Decreasing ?

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2. Plot a **histogram** of average speed $\bar{V}$ against time **t**. Fig.4.2 shows a histogram of the data in the sample table. Can you see regions where v is increansing? Decreasing? Constant?

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3. Calculate the average speed during some long and shorter time interval all with the same midpoint $t_m = t_6 = 0.6$ s. Record your results in **Table (4.2)**. Do your computed value of $\bar{v}$ appear to be approaching a limiting value? Can you tell what is the instantaneous speed at the midpoint $t_6 = 0.6$ s ?

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4. On your histogram of $\bar{V}$ against **t** draw a graph of instantaneous speed **v** against the time **t** by joining with **straight lines** the midpoints of the horizontal bars of the histogram ; By joining the mid-points by **straight lines,** what assumption are you making about the way the instantaneous speed varies during each time interval?

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5. From your (v,t) graph read off the instantaneous speed at $t = t_m = 0.6$ s. How does it agree with the value obtained in part B-3. ?

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6. **Calculate** the **instantaneous** speed at t_m by measuring the **slope** of the (x,t) graph. Does the value obtained for the instantaneous speed at $t = t_m = 0.6$ s agree with your previous two values obtained in **B-3** and **B-5** ?

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7. **Measure** the area under your (v, t) graph between two times t_i and t_f **of your choice**, what does this area represent ?

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8. Now measure directly on the **paper strip** the distance actually moved during the time interval from t_i to t_f. Compare with the answer you got in B-7.

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9. Using your computed data of the average acceleration $\bar{a}$ in Table (4.1) plot a smooth graph of instantaneous acceleration **(a)** against the time **t**. How good was your early guess as to the times of the greatest and the smallest accelerations?

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D. Further Exploration - Acceleration Due To Gravity

1. Calculate the acceleration due to gravity g and estimate the error in your result.

2. How does your result compare with the accepted value of $g = 9.8\ m/sec^2$?

2. What are the possible sources of error in this experiment?

3. Calculate the specific heat capacity (C_2) of the metal using the following equation:
Heat gained (by calorimeter + water) = Heat lost (by metal)

4. Calculate ΔC_2 and express your final result as : $C_2 \pm \Delta C_2$.

$C_2 \pm \Delta C_2 =$

5. What is the heat capacity of the metal sample?

6. How much heat is required to raise the temperature of 120g of Aluminum from 25 °C to 140 °F.

LAB REPORT FOR EXPERIMENT 5

Date: ---------------------------

Name:----------------------------- **Partner's Name:**--------------

Registration No:----------------- **Registration No:**--------------

Physics Section:----------------- **Instructor's Name:**-----------

PHYSICS LAB EXPERIMENT 5: FORCE AND MOTION

I. PURPOSE:

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II. DATA AND DATA ANALYSIS

A. Acceleration and Added Mass with Constant Driving Force

1-Enter your computed values of v versus t in Table (5.1) below:

Table (5.1)

Added mass m_a (g)	Time t (s)	0.05	0.15	0.25	0.35	0.45	0.55	0.65
m = 0	v(cm/s)	9.[illegible]	18.2	27.4	36.5	45.2	54.2	63.3
m = 100	v(cm/s)	4.8	9.5	14.2	19	23.8	27.5	32.3
m = 200	v(cm/s)							
m = 300	v(cm/s)							
m = 400	v(cm/s)							

2- For **each** value of added mass, **plot a graph of v against t. Plot them all on the same sheet of graph paper.** Label each graph with the corresponding value of the added mass m_a for identification.

3- What conclusions do you draw from your graphs about the acceleration of the empty and loaded cart under a constant applied force?

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4- **Calculate the slope of each graph and determine the acceleration (a) in each case,** and enter your calculated values in Table (5.2) below:

Table (5.2)

Added mass m_a (g)	Acceleration a (cm/s^2)	1/a (s^2/cm)
0		
100		
200		
300		
400		

5- **Plot a graph of added mass to cart m_a** versus 1/a.. From the graph what conclusion can you make about the way the acceleration of the cart depends on its total mass?

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6- From your graph, find the mass m_c of the cart alone .

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B. Acceleration and Driving Force with Constant Mass of Accelerating System

1. As in the analysis of **part A** compute the velocity v for each recorded tape, and enter your data in Table (5.3) below:

Table (5.3)

Total hanging mass m_h (g)	Time t (s)	0.05	0.15	0.25	0.35	0.45	0.55	0.65
20	v(cm/s)							
40	v(cm/s)							
60	v(cm/s)							
80	v(cm/s)							
100	v(cm/s)							

2. Use your table to plot, **on the same sheet of paper**, graphs of **v** against **t**, for each value of the total hanging mass. What do you conclude from your graphs?

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3. Determine the acceleration (a) of the system in each case by calculating the slopes.

4. Enter your data for hanging weight (m_h g) [where (g), the acceleration due to gravity is 980 cm/sec^2] and corresponding acceleration in Table 5.4 below:

Table 5.4

Hanging weight $m_h g$ (dyne)	Acceleration a (cm/s²)

5. Plot a graph of the **hanging weight (m_h g) against** the corresponding **acceleration (a).**

6. Calculate the slope of your graph.

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7. What does the slope of your graph represent ? Does it pass through the origin? why? or why not? Explain.

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LAB REPORT FOR EXPERIMENT 6

Date: ---------------------------

Name:----------------------------- Partner's Name:--------------

Registration No:---------------- Registration No:--------------

Physics Section:----------------- Instructor's Name:------------

PHYSICS LAB EXPERIMENT 6 : COLLISION IN TWO DIMENSIONS

I. PURPOSE :

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II. ANALYSIS OF DATA AND CONCLUSIONS:

1. Since the masses of the spheres are equal, the velocity vectors can be used to represent the momenta of the spheres. Thus, the vector P_0P_{01} on the sheet represents the **momentum of the projectile sphere before collision,** measure the length P_0P_{01} and record it on your working sheet of paper.
   The vectors P_0P_1 and T_0T_1 represent respectively the **momenta** of the **projectile** sphere and the **target** sphere **after collision,** measure P_0P_1 and T_0T_1 and record them on your working sheet of paper.

2. **Graphically add** the two momentum vectors P_0P_1 and T_0T_1 on your paper by placing the **tail** of the momentum vector of the target sphere at the **head** of the momentum vector of the projectile sphere.

3. How does the **vector sum** of the **final momenta** P_0P_1 and T_0T_1 of the two spheres **compare** with the **initial momentum** P_0P_{01}? Estimate the error in your result.

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LAB REPORT FOR EXPERIMENT 9

Date: ----------------------

Name:------------------------------

Partner's Name:--------------

Registration No:--------------

Registration No:--------------

Physics Section:----------------

Instructor's Name:------------

PHYSICS LAB EXPERIMENT 9: THE LAWS OF GASES

I. PURPOSE :

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II. DATA AND DATA ANALYSIS :

A. Boyle's Law

1. Enter the data in Table (9.1) below:

Table (9.1)

Scale Readings (mm)		L = B-X (mm)	h = Y-X (mm)	1/L (mm^{-1})
X	Y			
B =		mm		
Average Room Temp. =			°C	

2. Plot 1/L as independent variable against **h**. Use the graph to find the value of the atmospheric pressure $P_a \pm \Delta P_a$.

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3. Calculate the pressure of the entrapped gas **P** in each case, using the relation: $P = (P_a + h)$ and also calculate the quantity **PL** and enter their values in Table (9.2) below :

Table (9.2)

L (mm)	$P = P_a + h$ (mm Hg)	P L (mmHg . mm)

4. Plot a second graph between **L** as independent variable and $P = (P_a + h)$. What do you conclude from such a curve?

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5. Plot a third graph between **L** as independent variable against **PL**. What do you conclude from this graph?

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B. Charle's Law

1. Enter your data in Table (9.3) below.

2. Calculate the volume of the gas ($V_1 = V_{w2} - V_{w1}$, and $V_2 = V_{w2}$) at temperatures (T_1 and T_2) and enter their values in the same table.

Table (9.3)

V_{w1}	=	cm^3
V_{w2}	=	cm^3
V_1	=	cm^3
V_2	=	cm^3

3. Now set up the temperature-volume gas scale by plotting T as independent variable against V. Join the two data points by a straight line and extrapolate to zero volume. Find the temperature when $V = 0$.

$T_0 =$ ____________ °C

4. Run an experiment where you can use your gas thermometer to measure the temperature of tap water.

$T_w =$ ____________ °C

LAB REPORT FOR EXPERIMENT 10

Date: ----------------------------

Name:---------------------------- Partner's Name:----------------

Registration No:--------------- Registration No:-------------

Physics Section:---------------- nstructor's Name:-----------

PHYSICS LAB EXPERIMENT 10: THE FALLING SPHERE VISCOMETER

I. PURPOSE :

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II. DATA AND DATA ANALYSIS :

A. To show that a small sphere falls with constant terminal velocity

1. Enter your measured values of t and h in Table 10.1 below:

Table (10.1)

h (cm)	Time of fall (s)

2. Using your data in Table (10.1), plot a graph with values of **h** in cm (as dependent variable) against the values of **t**.
From the graph calculate the terminal velocity. State your conclusion.

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B. Determination of the Viscosity Coefficient

Table (10.2)

Diameter d (mm)	Time of fall t (s)	$V_T = h/t$ (cm/s)	V_c (cm/s)
T=	°C		
h=	cm		

1. From the results of Table (10.2) construct a new table showing values of $\mathbf{V_c}$ in (cm/s) for the corresponding values of **d** in (cm) and record them in Table (10.3) below:

Table (10.3)

d (cm)	d^2 (cm^2)	V_c (cm/s)

2. Plot a graph with values of $\mathbf{d^2}$ versus corresponding values of $\mathbf{V_c}$.

3. Calculate the value of the slope.

4. What is the relation of the slope to η?

5. Use Equation 10.1 and the values of ρ, ρ_o and g to calculate η the coefficient of viscosity at the temperature T.

6. Using uncertainties in the measured quantities, calculate the error $\Delta\eta$.

7. $\eta \pm \Delta\eta$ = , Unit of η is :

LAB REPORT FOR EXPERIMENT 11

Date: ---------------------------

Name:------------------------------ **Partner's Name:**---------------

Registration No:--------------- **Registration No:**---------------

Physics Section:--------------- **Instructor's Name:**-----------

PHYSICS LAB EXPERIMENT 11: SPECIFIC HEAT CAPACITY OF METALS

I. PURPOSE :

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II. DATA AND DATA ANALYSIS :

1. Enter the data in Table (11.1) below:

Table (11.1)

Specific heat capacity of calorimeter C_1	= 0.22 cal/g °C
Specific heat capacity of water C_w	= 1 cal/g °C
Mass of calorimeter M_1	= g
Mass of calorimeter + water	= g
Mass of water M_w	= g
Temp. of calorimeter. +water T_1	= °C
Temp. of metal T_2	= °C
Final Equilibrium Temp. T_f	= °C
Mass of metal M_2	= g

4. Is momentum **conserved** in these interactions?

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5. In an elastic collision, the total kinetic energy (½mv^2) is the **same** before and after the collision. Calculate the kinetic energy before and after the collision and compare the two values.

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6. Is the collision elastic?

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7. For an elastic collision between two equal masses where the target mass is initially at rest, the **angle** between the final momenta vectors P_0P_1 and T_0T_1 is 90° . **Measure** the angle and compare its value with 90° .

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LAB REPORT FOR EXPERIMENT 7

Date: ---------------------------

Name:------------------------------ Partner's Name:---------------

Registration No:------------------ Registration No:---------------

Physics Section:------------------ Instructor's Name:------------

PHYSICS LAB EXPERIMENT 7: ROTATIONAL MOTION

I. PURPOSE :

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II. DATA AND DATA ANALYSIS :

A. Acceleration and Moment of Inertia with Constant Applied Torque.

1. Enter your computed data of v versus t in Table 7.1 shown below:

Table 7.1

	Added mass to the turntable					
	M = 0 g		M = 100 g		M = 200 g	
Time (s)	v cm/s	$\omega = v/R$ rad/s	v cm/s	$\omega = v/R$ rad/s	v cm/s	$\omega = v/R$ rad/s
0.05						
0.15						
0.25						
0.35						
0.45						
0.55						
0.65						
Radius of the turntable (R) =				cm		

2. For each value of the added mass, plot a graph of ω versus t. Plot them all on the **same sheet of graph paper**. Label each graph with the corresponding value of the added mass for identification.

3. What conclusions can you draw from your graphs about the angular acceleration of the empty and loaded turntable under a constant applied torque?

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4. From your graphs determine the angular acceleration (α) of the turntable in each case, and enter your data in Table 7.2 below:

Table 7.2

Added mass M (g)	Angular Acceleration α (rad/s²)	Moment of Ineria I (g .cm²)
0		
100		
200		

5. Calculate the moment of inertia (I) of the turntable with and without the added masses using the following equation:

$$I = mR\left(\frac{g}{\alpha} - R\right)$$

where m is the mass of the falling weight and R is the radius of the turning wheel

6. From your table, how does the moment of inertia of the turntable (I) changes with the added mass?

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B. Acceleration and Torque with Constant Moment of Inertia :

1. Compute the translational and angular velocities v and ω, for each recorded tape, and enter your data in Table 7.3 below:

Table 7.3

	Total Hanging Mass					
	m = 50 g		m = 100 g		m = 150 g	
Time (s)	v cm/s	$\omega = v/R$ rad/s	v cm/s	$\omega = v/R$ rad/s	v cm/s	$\omega = v/R$ rad/s
0.05						
0.15						
0.25						
0.35						
0.45						
0.55						
0.65						

2. Use Table 7.3 to plot, on the **same sheet of paper**, the graphs of ω versus **t**.

3. What do you conclude from your graphs?

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4. Determine the angular acceleration (α) in each case.

5. Enter your results in Table 7.4 below:

Table (7.4)

Total Hanging Mass m (g)	Angular Acceleration α (rad/s²)	Torque (τ) = Rm(g-αR) (dyne.cm)
50		
100		
150		

6. Plot a graph of (τ) the **applied torque** against **angular acceleration** (α).

7. What do you conclude from your graph?

8. Determine the moment of inertia of the empty turntable.

9. Do the values obtained in part A & part B for the moment of inertia of the empty turntable (I_o) agree ?

LAB REPORT FOR EXPERIMENT 8

-- Date:-------------------------------

Name:------------------------------ Partner's Name:---------------

Registration No:---------------- Registration No:--------------

Physics Section:---------------- Instructor's Name:------------

PHYSICS LAB EXPERIMENT 8: SIMPLE HARMONIC MOTION : THE SIMPLE PENDULUM

I. PURPOSE :

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II. DATA AND DATA ANALYSIS :

1. Compute the average of the period for each length of the pendulum and record them in Table 8.1.

2. Fill in the average periods $\overline{T}$ and the lengths L in table 8.2.

Table 8.1

	$L_1 =$ cm	$L_2 =$ cm	$L_3 =$ cm	$L_4 =$ cm	$L_5 =$ cm	$L_6 =$ cm
Trial No.	t /20 (s)	t /20 (s)	t /20 (s)	t /20 (s)	t /20 (s)	t /20 (s)
1						
2						
3						
4						
5						
	$\bar{T}_1 =$ s	$\bar{T}_2 =$ s	$\bar{T}_3 =$ s	$\bar{T}_4 =$ s	$\bar{T}_5 =$ s	$\bar{T}_6 =$ s

Table 8.2

L (cm)	$\bar{T}$ (s)	$\bar{T}^2$ (s^2)

3. Compute the square of the average period for each length and record it in Table 8.2.

4. Use your data in Table 8.1 to plot T versus L. What conclusion can you obtain from your graph?

5. Now plot $\overline{T}^2$ versus L using Table 8.2. What kind of relationship do you obtain?

6. Compute the slope of your graph plotted in 4 above.

7. Using the value of the slope you obtained calculate g, the acceleration due to gravity.

8. Estimate the error in g.