Umm Al-Qura University
Faculty of Applied Science
Physics Department

General Physics 101 lab report

Student Name	
ID number	
Group no.	
Practical Teacher	
Theoretical Teacher	

Experiment Title	***Graphing***
Experiment Date	*/ /*
Practical Mark	*/ 5*
report Mark	*/ 5*
Total Mark	*/ 10*

Objective of the experiment

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Example 1 (F = - K X)

M (kg)	0.12	0.15	0.22	0.27	0.35	0.40
X (m)	0.30	0.45	0.67	1.09	1.15	1.4
F = Mg (N)						

the value of the x-axis is ………………………………………………

Determine the scale of the graph on x – axis = ―――――― = ……………….

Determine the scale Partial reading on x - axis = $\frac{\quad}{10}$ = ……………….

the value of the y-axis is ………………………………………………

Determine the scale of the graph on y - axis = ―――――― = ……………….

Determine the scale Partial reading on y - axis = $\frac{\quad}{10}$ = ……………….

After the graph the slope is (which is k)

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the percentage error if the theoretical value of spring constant is 4.5 N/m

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Example 2:

the value of the x-axis is …………………………………………………

Determine the scale of the graph on x – axis = ―――――――― = ……………….

Determine the scale Partial reading on x - axis = $\frac{\quad}{10}$ = ……………….

the value of the y-axis is …………………………………………………

Determine the scale of the graph on y - axis = ―――――――― = ……………….

Determine the scale Partial reading on y - axis = $\frac{\quad}{10}$ = ……………….

After the graph the slope is

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The intercept of $y - axis$

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The equation for the relation between v & t is

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The acceleration a is ……………………………………

The initial velocity v_o ……………………………………………

Experiment Title	***Accurate Measurements***
Experiment Date	/ /
Practical Mark	*/ 5*
report Mark	*/ 5*
Total Mark	*/ 10*

Objective of the experiment

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Equipment of the experiment

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First: Vernier Calipers

1-Less reading of the Vernier (accuracy):

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2-Zero error amount:

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Sample Type: Cylinder

Measurement type	Reading	First reading (mm)	Second reading (mm)	Average (mm)
External diameter	main scale			
	vernier scale			
	Zero error			
	total reading			
Internal diameter	main scale			
	vernier scale			
	Zero error			
	total reading			
Height	main scale			
	vernier scale			
	Zero error			
	total reading			

Depth	main scale			
	vernier scale			
	Zero error			
	total reading			

Second: Micrometer Screw Gauge

1-Less reading of the Micrometer (accuracy):

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2-Zero error amount:

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Sample and type of measurement	Reading	First reading (mm)	Second reading (mm)	Average (mm)
The thickness of the slide	main scale			
	vernier scale			
	Zero error			
	total reading			
Diameter of metal wire	main scale			
	vernier scale			
	Zero error			
	total reading			

Experiment Title	***Force Table***
Experiment Date	*/ /*
Practical Mark	*/ 5*
report Mark	*/ 5*
Total Mark	*/ 10*

Objective of the experiment

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Equipment of the experiment

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Part 1: experimental method

Experiment	*First Force*	*Second Force*	*Balancing force*
$\boldsymbol{\theta}$			
M(g)			
M (Kg)			
F(N)= mg			
Result force (F_R)			
Result angle $\boldsymbol{\theta}_R$			

Part 2: component method:

	First force	second force
$\boldsymbol{\theta}$		
$F = mg$		
$x-component$ $F_x = F\cos\boldsymbol{\theta}$		
Total component in $x-direction$ $F_x = F_{1x} + F_{2x}$		
$y-component$ $F_y = F\sin\boldsymbol{\theta}$		
Total component in $y-direction$ $F_y = F_{1y} + F_{2y}$		
$F_R = \sqrt{F_x^2 + F_y^2}$		
$\theta_R = \tan^{-1}\left(\frac{F_y}{F_x}\right)$		

Calculate the percentage error:

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Part 3: Graphical method.

	First force	*second force*
$\boldsymbol{\theta}$		
$F = mg$		
drawing scale = *0.3 N = 1 cm* $\frac{\ldots\ldots\ldots x1\ cm}{0.3\ N}$		

graph

Result Force (F_R) from graph = ……………………………………….

F_R after using drawing scale =

$$\frac{\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots x\ 0.3\ N}{1\ cm}$$ ……………………………………………………………

$\boldsymbol{\theta_R}$ from graph = ………………………………………………………………

Calculate the percentage error:

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Experiment Title	***Forces on an Inclined Plane***
Experiment Date	*/ /*
Practical Mark	*/ 5*
report Mark	*/ 5*
Total Mark	*/ 10*

Objective of the experiment

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Equipment of the experiment

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Calculation:

M (mass of the roller) = ………………………..g = …………………………… Kg

m_p (mass of the pan) = …………………g = …………………………… Kg

Angle of inclination (θ^0)	$sin\theta$	$M\ g\ sin\theta$ (N)	Weight in pan when roller moves		Total weight when roller moves $M_{1,2} = m_{1,2} + m_p$		Force acting on roller downward $W = \frac{(M_1+M_2)g}{2}$ (N)
			Upwared m_1 (g)		Upwared M_1 (kg)		
			Downwared m_2 (g)		Downwared M_2 (Kg)		
			Upwared m_1 (g)		Upwared M_1 (kg)		
			Downwared m_2 (g)		Downwared M_2 (kg)		
			Upwared m_1 (g)		Upwared M_1 (kg)		
			Downwared m_2 (g)		Downwared M_2 (kg)		
			Upwared m_1 (g)		Upwared M_1 (kg)		
			Downwared m_2 (g)		Downwared M_2 (kg)		
			Upwared m_1 (g)		Upwared M_1 (kg)		
			Downwared m_2 (g)		Downwared M_2 (kg)		

What is relation between downward force and angle of inclination of the plane?

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Experiment Title	***Atwood Machine***
Experiment Date	*/ /*
Practical Mark	*/ 5*
report Mark	*/ 5*
Total Mark	*/ 10*

Objective of the experiment

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Equipment of the experiment

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Calculation:

y_0 (the maximum height of m_2) = …………...cm = ………..m

	The hanging mass (g)	*The holder mass (g)*	*The total mass (Kg)*
m_1 =			
m_2 =			

y (cm)	*y (m)*	*Δy (m)*	*Time t (s)*	*Avenge of time T (s)*	T^2 (s^2)

Find the slope for your straight line.

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Find experimentally acceleration a.

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Find theoretically acceleration a.

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Find the percentage error of acceleration

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Experiment Title	***Archimedes Principle***
Experiment Date	/ /
Practical Mark	*/ 5*
report Mark	*/ 5*
Total Mark	*/ 10*

Objective of the experiment

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Equipment of the experiment

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The first method

Type of object	Weight in air W_{air} (N)	Weight in water W_{water}(N)	Buoyant force $F_B = W_{air} - W_{water}$ (N)
Floating objects (Plastic cylinder)			
Objects submerged in water (Aluminum cylinders)			
Objects submerged in water (copper cylinders)			
Objects submerged in water (Aluminum cube irregular)			

The second method

Remember:

1ml = 1×10^{-6} m^3

Density of water = 1000 kg /m^3

Type of object	Volume of displaced water V (m^3)	Mass of displaced water $m = \rho_{water} \times V$ (Kg)	Weight of displaced water $F_{displaced\ water} = mg$ (N)
Floating objects (Plastic cylinder)			
submerged object (Aluminum cylinders)			
Submerged object (copper cylinders)			
Submerged object (Aluminum cube irregular)			

The third method

	Aluminum cylinder	Copper cylinder
Hight of cylinder h (m)		
Diameter of cylinder d (m)		
Radius of cylinder r (m)		
Volume of cylinder $V = \pi r^2 h$ **(m^3)**		
$F_B = \rho_{water} \times V_{object} \times g$ **(N)**		

Finally , what can you get from this experiment ?

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Experiment Title	***Viscosity***
Experiment Date	/ /
Practical Mark	*/ 5*
report Mark	*/ 5*
Total Mark	*/ 10*

Objective of the experiment

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Equipment of the experiment

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Calculation:

L (distance between the two marker) = …………...cm = ………..m

ρ (the density of the sphere ball) = 7790 kg / m^3 . ρ_o (the density of glycerin) = 1260 kg / m^3

<table>
<tr><th>dimeter of ball d (mm)</th><th>dimeter of ball d (m)</th><th>radius of the ball
r = d/2 (m)</th><th>square radius
r^2 (m^2)</th><th>Time
t (s)</th><th>Avenge of time
T (s)</th><th>velocity v = L / T (m/s)</th></tr>
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Find the slope for your straight line.

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Find viscosity of glycerin η .

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Experiment Title	***Surface tension***
Experiment Date	*/ /*
Practical Mark	*/ 5*
report Mark	*/ 5*
Total Mark	*/ 10*

Objective of the experiment

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Equipment of the experiment

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Calculation:

d (diameter of the metal ring) = …………...cm = ……………….. m

$2\pi d$ = ………………………..……………………………………. m

F_0 (Weight the ring in air) = …………………………N

Type of Liquid	water	glycerine	
F_1 (N)			
$F = F_1 - F_0$ (N)			
$\sigma_{experiment} = \frac{F}{2\pi d}$ *(N/m)*			
$\sigma_{theoretical}$ *(N/m)*			
percentage error *(%)*			

Experiment Title	***Refractive Index of the Materials***
Experiment Date	/ /
Practical Mark	*/ 5*
report Mark	*/ 5*
Total Mark	*/ 10*

Objective of the experiment

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Equipment of the experiment

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First: a rectangular acrylic plate

graph

From graph the incident and refracted angles

i	r_1	r_2	*e*

What you observe between the incident and refracted angles

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The index refraction is

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Calculate the percentage error:

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<u>Second: an acrylic prim</u>

graph

From graph the incident and refracted angles

i	r_1	r_2	e	Ψ	$\varnothing$

The index refraction is

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Calculate the percentage error:

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Experiment Title	***Focal Length of Thin Lens***
Experiment Date	*/ /*
Practical Mark	*/ 5*
report Mark	*/ 5*
Total Mark	*/ 10*

Objective of the experiment

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Equipment of the experiment

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<u>First, determined the focal length of convex lens</u>

Table 1

Object Distance ***o*** (c*m*)	Image Distance ***i*** (c*m*)	$1/o$ ((c*m*)$^{-1}$)	$1/i$ ((c*m*)$^{-1}$)

1. **<u>Calculation method</u>**

$\frac{1}{f}=\frac{1}{o}+\frac{1}{i}$ ((c*m*)$^{-1}$)	***f*** (c*m*)	The average of ***f*** (c*m*)

the percentage error for focal length

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2. Graphical method

From graph,

$y_{intercept}$ $((cm)^{-1})$	$x_{intercept}$ $((cm)^{-1})$	$\frac{1}{f} = \frac{y_{intercept} + x_{intercept}}{2}$ $((cm)^{-1})$	$\boldsymbol{f}$ (cm)

the percentage error for focal length

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Second, determined the focal length of concave lens

Table 2

Object Distance $\boldsymbol{o}$ (cm)	Image Distance $\boldsymbol{i}$ (cm)	$1/o$ $((cm)^{-1})$	$1/i$ $(cm)^{-1})$

1. Calculation method

$\frac{1}{f} = \frac{1}{o} + \frac{1}{i}$ $((cm)^{-1})$	$\boldsymbol{f}$ (cm)	The average of $\boldsymbol{f}$ (cm)

the percentage error for focal length

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2. <u>Graphical method</u>

From graph,

$y_{intercept}$ ($(cm)^{-1}$)	$x_{intercept}$ ($(cm)^{-1}$)	$\frac{1}{f} = \frac{y_{intercept} + x_{intercept}}{2}$ ($(cm)^{-1}$)	f (cm)

the percentage error for focal length

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