Gr:	***First Name :***	
	Last Name :	
	N°	

TP-4
Inclined Plane

Experiment 1

Motion, without friction, of a cart on an Inclined Plane

- The angle of inclination α of the plane is: $\alpha = 5°$.
- Fill in Table 1.

X(m)	**0,2**			**0,3**			**0,4**			**0,5**			**0,6**			**0,7**		
t (s)																		
$t^2(s^2)$																		

Table 1

Kinematic Study

1. Plot the graph of ***$x = f(t^2)$*** **on millimeter paper**.

2. The motion of the cart is uniformly accelerated: ☐ ***true*** ☐ ***false***

The position ***x*** of the mobile as a function of time t (we will take as initial conditions: at ***t=0 x=0*** **et** ***v=0***) is written: .....

The shape of the curve $x = f(t^2)$ is:.....

3. The acceleration ***a*** of the cart is: .....

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Dynamics Study

4. The forces acting on the cart are:

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5. The fundamental law of dynamics is:

. .....

.. ..

% *ox:* .....

. .....

% *oy:* .....

6. The relation between ***a***, ***g,*** and ***sin(α)*** is in the form:

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7. Verification of the relation using our experimental data (we will take $g = 9{,}8\ ms^{-2}$):

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Experiment 2

Motion, with friction, of a mass M on an inclined plane

- The angle of inclination α of the plane is: $\alpha = 20°$.
- Fill in Table 2.

X(m)	**0,2**			**0,3**			**0,4**			**0,5**			**0,6**			**0,7**		
t (s)																		
$t^2(s^2)$																		

Table 2

Kinematic Study

1. Plot the graph of $x = f(t^2)$ **on millimeter paper**.

2. The acceleration ***a*** of mass **M** is: .....

Dynamics Study

3. The forces acting on the mass ***M*** are:

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4. The fundamental law of dynamics is:

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% *ox:* .....

% *oy:* .....

5. Determination of the expression of the frictional force $\mathbf{F}_f$ as a function of **M**, **a**, **g**, and **sinα**:

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6. Determination of the dynamic friction coefficient μ_d (its expression and numerical value).
Given that:

$$F_f = \mu_d(Mg)\cos\alpha \quad \text{et} \quad g = 9.8\ ms^{-2}$$

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7. Conclusion

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