3-Practice

I - To determine the torsion constant, certain conditions are established to facilitate the measurement and calculation of (C).

θ = 180°, which can be determined when the indicator LED of the optical barrier lights up. F is directly measured using the dynamometer, and φ = 90°.

Consider a steel rod with a mass m = 132.2 g and a length l = 60 cm. The point of force application is adjusted until it balances with the restoring force."

1- Complete the following table:

r (cm)	17	19	21	23	25	27	29
F(N)							
$\bar{F}$ (N)							
$\frac{\bar{F}.r}{\theta}$							

2- Calculate the average value of the torsion constant ($\overline{C}$) …….
3- Calculate the average absolute error ($\overline{\Delta C}$)……...
4- Calculate the relative and absolute uncertainty ($\Delta C, \Delta C/C$)……..…..
5- Provide the value of (C) in the form ($C = \bar{C} \mp \Delta C$)…….....

II-

a- Take the rod alone, adjust it so that the axis of rotation passes through its center of mass. Measureitsperiod five times.

Order of measurement	1	2	3	4	5
T/2 (s)					

1- Record the result in the table.
2- Provide the value of (T) in the form ($T = \overline{T} \mp \Delta T$)……
3- Calculate (I_0) with respect to an axis passing through the center of mass of the rod …….....
4- Compare the measured value of (I_0) with the calculated one. Comment.……
……..…..……
….....

b- Take the rod alone, measure the oscillation period by sliding the rod in steps of (4 cm). Repeat each measurement twice.

Torsion pendulum

1- Complete the following table.

r (cm)	4	8	12	16	20
T/2 (s)					
$\bar{T}(s)$					
$I = C.\bar{T}/4\pi^2$					
$(I - I_0)/r^2$					

2- What do you observe about the value of the expression $(I-I_0)/r^2$? Whatdoesitrepresent?

……

c- Take a solid sphere, mount it on the rotation axis, and measure its period (take 5measurements).

1- Calculate the average period: $\bar{T} =$……
2- Calculate its moment of inertia:$I_{s/0} =$……
3- Compare this value with the one calculated in the theoretical preparation (part 4).
Comment on the results ……...……

d-Repeat the same procedure with a solid cylinder.

4- Calculate the average period: $\bar{T} =$……
5- Calculate its moment of inertia:$I_{s/0} =$……
6- Compare this value with the one calculated in the theoretical preparation (part 5).
Comment on the results ……...……

4-Conclusion

……
……
……
……
……

Torsion pendulum

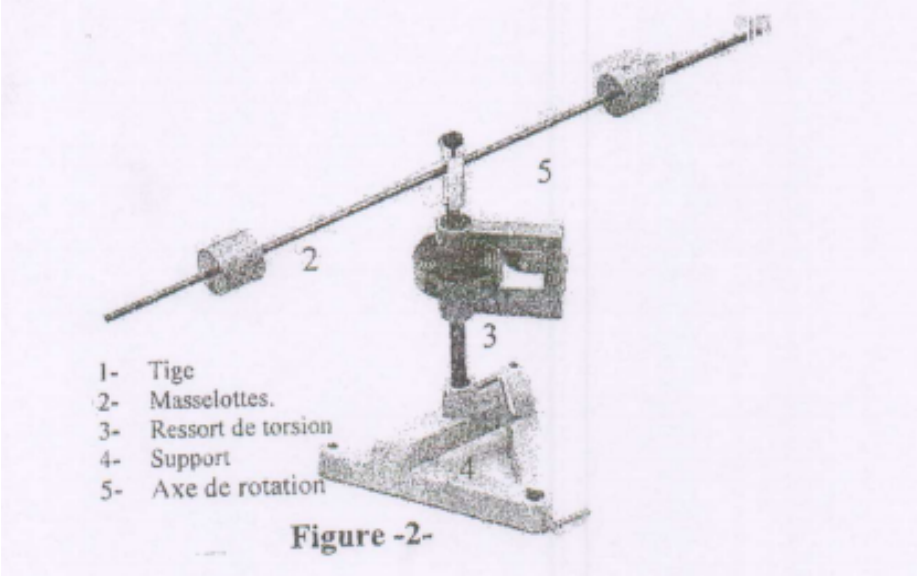

Figure -2-