1st Laboratory exercise

Measurement of volume, mass weight, density

Theoretical part

Density is a major property of materials. We can count density ***d*** if we know the mass ***m*** and volume ***V*** of a body from the equation:

$$d = m/V \quad (1)$$

Experimental part

Instruments, apparatus and materials:

1. Number of solid bodies (various shapes),
2. Volumetric Cylinder
3. Libra

Experimental procedure:

A. Measurement of mass.

To measure mass, we need a Libra (scale). The Libra in the laboratory is a two discs Libra in which the mass of the body is compared to the fixed masses.

1. We place on the disc of the scale the essay No. 1 (solid body), of which we want to measure the mass.
2. On the other disc, we lay different weights until the scales balance.
3. We record the value in table 1.
4. Repeat the procedure with the specimens No 2, 3 and 4.

Image.1: *Essays of various shapes*

Image **2**: *Libra Two Disk*

Table 1

Essay	1	2	3	4
Mass (gr)				

B. Volume measurement.

The volume of shapes can be measured by the volume of liquid (water) they displace when they are immersed in it.

1. Fill the ½ a volumetric cylinder of 100 or 200 Ml.
2. Note the exact value of the volume of liquid V_A.
3. Add one by one the bodies carefully to be completely immersed in the liquid. Note the new volume value V_B. The volume of the essay is equal to the difference.
4. Fill in table 3.

Table 2

	V_A (cm^3)	V_B(cm^3)	V(cm^3)
Essay 1			
Essay 2			
Essay 3			
Essay 4			

C. Density calculation

Using the measurements from tables 1 and 2 calculate the density and specific weight of the bodies. Fill in table 3.
What material are the essays made of? Table 3 will help you.

Table 3

	Density ***d*** (gr/cm^3)
Essay 1	
Essay 2	
Essay 3	
Essay 4	

Table 4	
Material	Density gr/cm^3
Aluminum	2,6
Steel	7,7
Brass	8,4
Copper	8,9
Lead	11,34
Zinc	7,14
Tin	7,28
Nickel	8,9
Plexiglas	1,2
Iron	7,86