Lab 3: Density

Name: **Your Name**

Class: **PHYS 2125 (15921)**

Date: **2025-01-31**

Objective

To determine the masses of different objects using density method.

Equipment

- (1) aluminum cylinder
- (1) brass cylinder
- (1) aluminum block (rectangular cuboid)
- (1) brass block (rectangular cuboid)
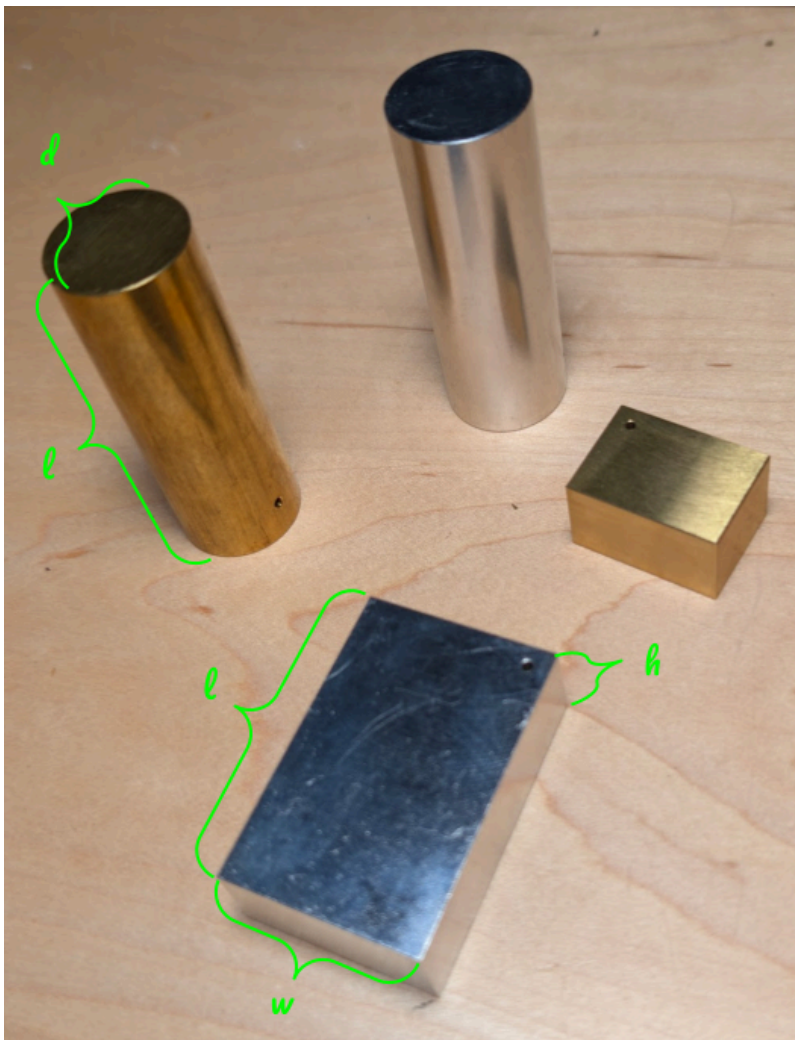- (1) vernier calipers

Theory

The density (d), mass (m) and volume (V) of an object are related per the following equation:

$$Density\ (\rho) = \frac{mass(m)}{volume(V)}$$

$$\rho = \frac{m}{V}$$

$$m = p * V$$

The volume, V, of a cylinder can be calculated as $V = \pi * r^2 * h$

The volume, V, of a rectangular cuboid can be calculated as $V = l * w * h$

Procedure

1. For each object critical dimensions were taken.
    A. For the cylinder the diameter, d, and height, h, were measured.
    B. For the blocks the length, l, width, w, and height, h, were measured.
2. The volume, V, was calulcated using the measurements taken and the formulas above.
3. With the volume, V, and the known density, d, of the materials in question (aluminum and brass), the mass, m was calculated.

Data

Object	Diameter (meters)	Radius (meters)	Height (meters)	Volume (cubic meters)	Mass (kilograms)
Aluninum Cylinder	0.2	0.1	0.5	0.015708	42.4115
Brass Cylinder	0.2	0.1	0.5	0.015708	137.1305

Object	Length (meters)	Width (meters)	Height (meters)	Volume (cubit meters)	Mass (kilograms)
Aluminum Block	0.2	0.4	0.3	0.024	64.80
Brass Block	0.2	0.4	0.3	0.024	209.52

Discussion

A solid object is made of two materials, one material having density of 2 000 kg/m3 and the other having density of 6 000 kg/m3. If the object contains equal volumes of the materials, what is its average density?

Your Answer to Question 1

The standard kilogram is a platinum-iridium cylinder 39.0 mm in height and 39.0 mm in diameter. What is the density of the material in SI units?

Your Answer to Question 2