



INERTIA TABLE

An **Inertia Table** is an experimental apparatus used in physics labs to measure the **moment of inertia** of various objects. The moment of inertia is a property of a body that determines how much resistance it offers to rotational motion around a specific axis. The inertia table is crucial for studying the dynamics of rotational motion and verifying the principles of rotational mechanics.

Function of the Inertia Table:

1. Measuring the Moment of Inertia:

- The primary function of the inertia table is to determine the moment of inertia of different objects (discs, rods, cylinders, etc.) about a given axis of rotation. The moment of inertia depends on the mass distribution of the object relative to the axis.

2. Rotational Motion Experiments:

- The table allows objects to rotate freely about a vertical axis. By applying known forces or torques and measuring the resulting angular acceleration, students can calculate the moment of inertia using **Newton's second law for rotation**: $\tau = I\alpha$ where:
 - τ is the applied torque,
 - I is the moment of inertia,
 - α is the angular acceleration.

3. Experimental Setup:

- A typical inertia table consists of a flat, horizontal rotating platform (usually circular) mounted on a low-friction bearing. Various objects can be placed on the table, and its rotational speed and acceleration are measured.
- A string wound around a spindle connected to the rotating platform can be used to apply a known torque by attaching a weight that falls under gravity. The angular acceleration produced by the falling weight is measured, allowing for the calculation of the moment of inertia.

4. Comparing Moments of Inertia:

- The apparatus can be used to compare the moment of inertia of different objects, helping students understand how factors like mass distribution, shape, and size influence rotational inertia.



STEFAN CONSTANT

The **Stefan constant** (often denoted as σ) is a physical constant used in the Stefan-Boltzmann law, which relates the total energy radiated per unit surface area of a black body to the fourth power of its temperature. The Stefan-Boltzmann law is crucial in thermodynamics and the study of radiative heat transfer.

Significance in Physics Labs

In a physics lab, the Stefan constant is essential in experiments involving thermal radiation, heat transfer, and black-body radiation. Key applications include:

1. **Measuring Radiative Heat Transfer:** It helps in calculating the energy radiated by heated objects, which is useful in studies of heat emission and absorption.
2. **Studying Black Body Radiation:** It is foundational for experiments exploring Planck's law and Wien's displacement law, which are related to the emission of electromagnetic radiation by objects at different temperatures.
3. **Applications in Astrophysics:** The law is used in determining the temperature and luminosity of stars by treating them as approximate black bodies.