

Physics Lab

Torque

Name: _____

$$\text{Torque} = \text{radius} \times \text{force}$$

Introduction: A torque is a result of a force acting at a distance from an axis of rotation. It is determined by the magnitude of the force cross the length of the lever arm. For example, if a force is exerted on a lever at some angle other than 90 degrees, only the perpendicular component of the force can be considered when calculating the value of the torque produced. In this lab all forces will be acting at right angles to the lever and the torque is simply the length of the lever arm times the force. The appropriate unit of torque is the newton meter but we will use gram centimeters in order to speed the calculations. Be certain to include the mass of the hangers when doing your calculations. When a system is not rotating or rotating at a constant speed, it is said to be in rotational equilibrium. For a system in rotational equilibrium, the sum of the clockwise torque must equal the sum of the counterclockwise torque.

$$\text{Torque cw} = \text{Torque ccw}$$

Initial Instructions:

1. Measure the mass of three mass hangers and record each one separately. Write the mass on the hanger in pencil so that you will be able to use the exact mass for your calculations. Mass of hanger 1 _____
hanger 2 _____ hanger 3 _____
3. Find the balance point of the meter stick and record. _____
When calculating the length of the lever all positions will need to be compared with this balance point.