*Unit 8 Worksheet 2B*

*Rotational Momentum*

1. If there were a great migration of people toward the equator, how would this affect the length of the day?
2. A person stands, hands at the side, on a platform that is rotating at a rate of 1.20 rev/s. If the person now raises her arms to a horizontal postion, the speed of rotation decreases to 0.80 rev/s. (a) Why does this occur? (b) By what factor has the moment of inertia of the person changed?
3. What is the angular momentum of a 200-g ball rotating on the end of a string in a circle of radius 1.00 m at an angular speed of 9.45 rad/s?
4. A 2.43-kg uniform cylindrical grinding wheel of radius 12.5 cm when rotating at 1600 rpm, when a 5N force is applied tangent to the edge of the wheel for 0.05seconds.
   1. What is the intial rotational momentum of the grinding wheel?
   2. What is the applied torque on the grinding wheel?
   3. What is the new angular velcity after the torque is applied?
5. A man stands on a platform that is rotating (without friction) with an angular speed of 1.2 rev/sec; his arms are outstretched and he holds a brick in each hand. The rotational inertia of the system consisting of the man, bricks, and platform about the central axis is 6.0 kg m2. If by moving the bricks the man decreases the rotational inertia of the system to 2.0 kg m2, what is the resulting angular speed of the platform?

1. A 4.5-m diameter merry-go-round is rotating freely with an angular velocity of 0.80 rad/s. Its total rotational inertia is 1750 kg•m2. A person standing on the ground, with a mass of 65 kg, suddenly steps onto the edge of the merry-go-round changing the angular velocity to 0.60 rad/s.
   1. Why does the merry-go-round slow down?
   2. What is the new rotational inertia?
   3. Extra Credit: What distance is the person standing from the center of the merry-go-round?