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Physics\_Questions\_0041

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- 3, Find the angular speed of Earth about the sun in radians per second and degrees per day.
- 4, a potter's wheel moves from rest to an angular speed of 0.20 rev/s in 30s.  
Find its angular acceleration in radians per second per second.
- 5, a dentist's drill starts from rest. After 3.20s of constant angular acceleration, it turns at a rate of  $2.51 \times 10^4$  rev/min.
  - a) Find the drills angular acceleration
  - b) Determine the angle (in radians) through which the drill rotates during this period.
- 25, an air puck of mass 0.25kg is tied to a string and allowed to revolve in a circle of radius 1.0m on a frictionless horizontal table. The other end of the string passes through a hole in the center of the table, and a mass of 1.0kg is tied to it. The suspended mass remains in equilibrium while the puck on the tabletop revolves.
  - a) what is the tension in the string
  - b) what is the horizontal force acting on the puck
  - c) what is the speed of the puck

Figure: is a table with a circle on top and a weight on a sting down below hanging thru the middle.

- 3, Calculate the net torque (magnitude and direction) on the beam in figure down below, about...
  - a. an axis through O perpendicular to the page and
  - b. an axis through C perpendicular to the page
  
- 15, A person bending forward to lift a load "with his back" rather than "With his knees" can be injured by large forces exerted on the muscles and vertebrae. The spine pivots mainly at the fifth lumbar vertebra, with the principal supporting force provided by the erector spinalis muscle in the back. To see the magnitude of the forces involved, and to understand why back problems are common among humans, consider the model shown below, of a person bending forward to lift a 200-N object. The spine and upper body are represented as a uniform horizontal rod of weight 350-N, pivoted at the base of the spine, maintains the position of the back of the spine. The erector spinalis muscle, attached at a point two-thirds of the way up the spine, maintains the position of the back. The angle between the spine and this muscle is 12.0 degrees. Find the tension in the back muscle and the compressed force of the spine.

- 32, A potters wheel having a radius of 0.50m and a moment of inertia of  $12\text{kg} \times \text{m}^2$  is rotating freely at 50 rev/min. The potter can stop the wheel in 6.0s by pressing a wet rag against the rim and exerting a radially inward force of 70N.  
Find the effective coefficient of kinetic friction between the wheel and the wet rag
- 39, a 10.0kg cylinder rolls without slipping on a rough surface. At an instant when its center of gravity has a speed of 10.0m/s, determine.....
- c. the translational kinetic energy of its center of gravity
  - d. the rotational kinetic energy about its center of gravity and
  - e. its total kinetic energy
- 50, a student sits on a rotating stool holding two 3.0kg object. When his arms are extended horizontally, the objects are 1.0m from the axis of rotation and he rotates with an angular speed of 0.75 rad/s. The moment of inertia of the student plus the stool is  $3.0 \text{ kg} \times \text{m}^2$  and is assumed to be constant. The student then pulls in the objects horizontally to 0.30m from the rotation axis.
- a) Find the new angular speed of the student.
  - b) Find the kinetic energy of the student before and after the objects are pulled in.