PHYSICS 121 QUIZ 9 11/8/2017

NAME: SECTION:

1. What is the net torque at point P if $\boldsymbol{F}$ is the only force acting on the object? (Positive signs indicate counterclockwise rotation, negative signs indicate clockwise rotation).

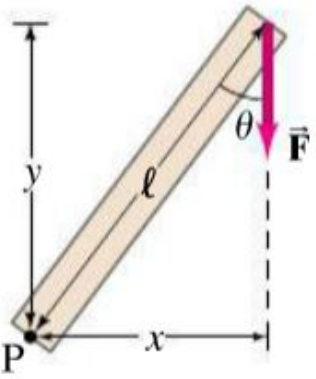
a) xF.

b) $-xF$.

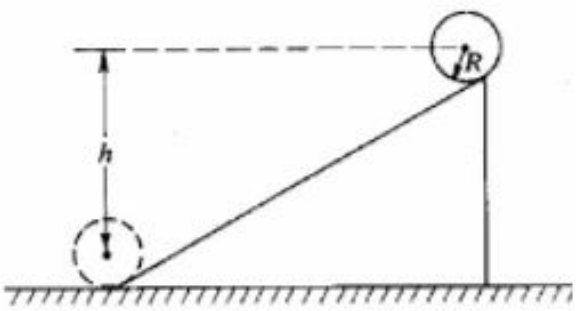
c) yF.

d) $-yF$.

e) 0.



2. A hoop of mass M and radius R with moment of inertia $I = MR^2$ is initially at rest at the top of a hill of height h. The hoop rolls down the plane without slipping. When the hoop reaches the bottom, its angular momentum around its center of mass is



a) $MR\sqrt{gh}$.

b) $\frac{1}{2}MR\sqrt{gh}$.

c) $MR\sqrt{2gh}$.

d) $2MR\sqrt{gh}$.

e) $\frac{3}{5}MR\sqrt{gh}$.

3. A child is standing on the edge of a merry-go-around that has the shape of a solid disk. The mass of the child is 40 kilograms. The merry-go-around has a mass 200 kilograms and a radius of 2.5 meters and it is rotating with an angular velocity of 2.0 radians per second. The child then walk slowly toward the center of the merry-go-around. What will be the final angular velocity of the merry-go-around when the child reaches the center? (Treat the child as a point particle, and recall the moment of inertia of a disk is $I = \frac{1}{2}MR^2$)

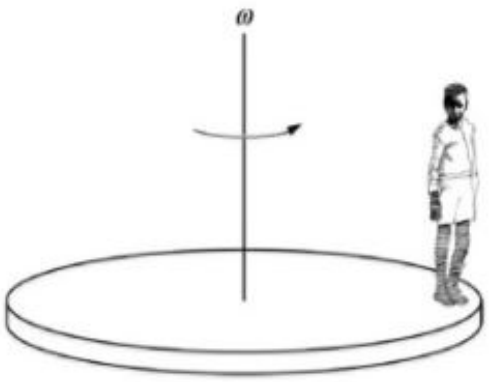
a) $2.0 rad/s.$

b) $2.2 rad/s.$

c) $2.4 rad/s.$

d) $2.6 rad/s.$

e) $2.8 rad/s.$



4. Two uniform cylindrical disks of identical mass M, radius R, and moment inertia $\frac{1}{2}MR^2$ collide on a frictionless, horizontal surface. Disk I, having an initial counter-clockwise angular velocity w_0 and a center-of-mass velocity $v_0 = \frac{1}{2}w_0R$ to the right, makes a grazing collision with disk II initially at rest. If after the collision the two disks stick together, the magnitude of the total angular momentum about the point P is

a) 0

b) $\frac{1}{2}MR^2w_0.$

c) $\frac{1}{2}MR^2v_0.$

d) $MRv_0.$

e) $MR^2w_0.$