Extended Response

6.1 Angle of Rotation and Angular Velocity   54.

Consider two pits on a CD, one close to the center and one close to the outer edge. Compare their angles of rotation and distance traveled after one full revolution.

a. The one close to the center would go through the greater angle of rotation. The one near the outer edge would trace a greater arc length.
b. The one near the edge would go through the greater angle of rotation. The one close to the center would trace a greater arc length.
c. Both would go through the same angle of rotation. The one near the outer edge would trace the greater arc length.
d. Both would go through the same angle of rotation. The arc length traced by both would be zero because they returned to their starting points.

55.

Consider two pits on a CD, one close to the center and one close to the outer edge. For a given angular velocity of the CD, which pit has a higher angular velocity? Which has a higher tangential velocity?

a. The point near the center would have the greater angular velocity and the point near the outer edge would have the higher linear velocity.
b. The point near the edge would have the greater angular velocity and the point near the center would have the higher linear velocity.
c. Both have the same angular velocity and the point near the outer edge would have the higher linear velocity.
d. Both have the same angular velocity and the point near the center would have the higher linear velocity.

56.

What happens to tangential velocity as the radius of an object increases provided the angular velocity remains the same?

a. It increases because tangential velocity is directly proportional to the radius.
b. It increases because tangential velocity is inversely proportional to the radius.
c. It decreases because tangential velocity is directly proportional to the radius.
d. It decreases because tangential velocity is inversely proportional to the radius.

6.2 Uniform Circular Motion   57.

Is an object in uniform circular motion accelerating? Why or why not?

a. Yes, because the velocity is not constant.

b. No, because the velocity is not constant.
   c. Yes, because the velocity is constant.
   d. No, because the velocity is constant.

58.

An object is in uniform circular motion. Suppose the centripetal force was removed. In which direction would the object now travel?

   a. In the direction of the centripetal force
   b. In the direction opposite to the direction of the centripetal force
   c. In the direction of the tangential velocity
   d. In the direction opposite to the direction of the tangential velocity

59.

An object undergoes uniform circular motion. If the radius of curvature and mass of the object are constant, what is the centripetal force proportional to?

   a. F_c \propto \frac{1}{v}
   b. F_c \propto \frac{1}{v^2\!}
   c. F_c \propto v
   d. F_c \propto v^2

6.3 Rotational Motion   60.

Why do tornadoes produce more wind speed at the bottom of the funnel?

   a. Wind speed is greater at the bottom because rate of rotation increases as the radius increases.
   b. Wind speed is greater at the bottom because rate of rotation increases as the radius decreases.
   c. Wind speed is greater at the bottom because rate of rotation decreases as the radius increases.
   d. Wind speed is greater at the bottom because rate of rotation decreases as the radius increases.

61.

How can you maximize the torque applied to a given lever arm without applying more force?

   a. The force should be applied perpendicularly to the lever arm as close as possible from the pivot point.
   b. The force should be applied perpendicularly to the lever arm as far as possible from the pivot point.
   c. The force should be applied parallel to the lever arm as far as possible from the pivot point.
   d. The force should be applied parallel to the lever arm as close as possible from the pivot point.

62.

When will an object continue spinning at the same angular velocity?

    a. When net torque acting on it is zero
    b. When net torque acting on it is non zero
    c. When angular acceleration is positive
    d. When angular acceleration is negative