Quiz 8

Name:_____

Answer each of the following questions. Show all work for full credit.

1. Express the following angles in radians: (a) 60.0° and (b) 445°. Give as numerical values and as fractions of $\pi$.

(a)

(b)

2. The platter of the hard drive of a computer rotates at 7200 rpm, rpm=revolutions per minute=rev/min.

(a) What is the angular velocity (rad/s) of the platter?

(b) If the reading head of the drive is located 3.00 cm from the rotation axis, what is the linear speed of the point on the platter just below it?

(c) If a single bit requires 0.50 μm of length along the direction of motion, how many bits per second can the writing head write when it is 3.00 cm from the axis?

(a)    We convert rpm to rad/s.

(b)    To find the speed, we use the radius of the reading head location along with Eq. 8–4.

(c)    We convert the speed of the point on the platter from m/s to bits/s, using the distance per bit.

3. A 61-cm-diameter wheel accelerates uniformly about its center from 120 rpm to 280 rpm in 4.0 s. Determine

(a) its angular acceleration

(b) the radial and tangential components of the linear acceleration of a point on the edge of the wheel 2.0 s after it has started accelerating.

Convert the rpm values to angular velocities.

(a)    The angular acceleration is found from Eq. 8–9a.

(b)    To find the components of the acceleration, the instantaneous angular velocity is needed.

The instantaneous radial acceleration is given by

The tangential acceleration is given by