This print-out should have 16 questions. Multiple-choice questions may continue on the next column or page – find all choices before answering. The due time is Central time.

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001 (part 1 of 2) 10 points
A record has an angular speed of 28.9 rev/min.

What is its angular speed? Answer in units of rad/s.

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002 (part 2 of 2) 10 points
Through what angle does it rotate in 0.66 s? Answer in units of rad.

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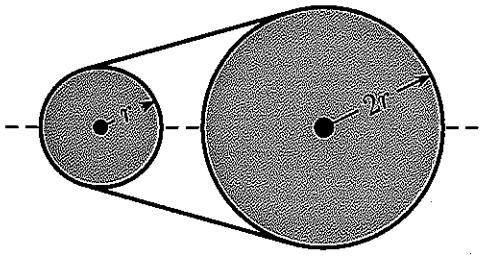
003 (part 1 of 1) 10 points
A large wheel is coupled to a wheel with half the diameter as shown.



How does the rotational speed of the smaller wheel compare with that of the larger wheel? How do the tangential speeds at the rims compare (assuming the belt doesn't slip)?

1. The smaller wheel has twice the rotational speed and the same tangential speed as the larger wheel.

2. The smaller wheel has four times the rotational speed and the same tangential speed as the larger wheel.

3. The smaller wheel has twice the rotational speed and twice the tangential speed as the larger wheel.

4. The smaller wheel has half the rotational speed and half the tangential speed as the larger wheel.

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004 (part 1 of 1) 10 points
Harry and Sue cycle at the same speed. The tires on Harry's bike have a larger diameter than those on Sue's bike.

Which tires have the greater rotational speed?

1. Sue's tires

2. It depends on the speed.

3. Harry's tires

4. The rotational speeds are the same.

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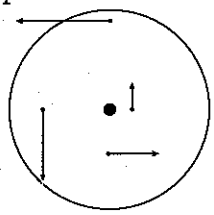
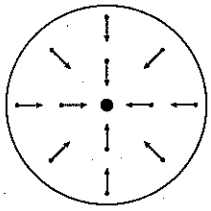
005 (part 1 of 1) 10 points
A rigid circular wheel spins at constant angular velocity about a stationary axis. Choose the picture below that correctly describes the relative magnitudes and directions of the velocity vector of points on the wheel.

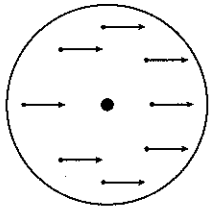
1.



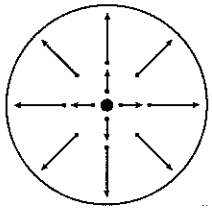
2.



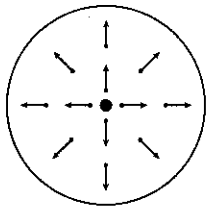
3.



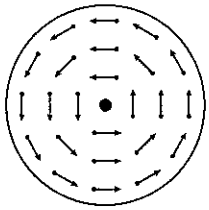
4.



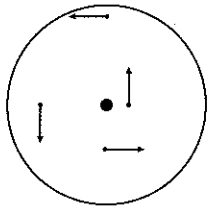
5.



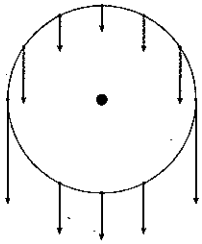
6.



7.



8.



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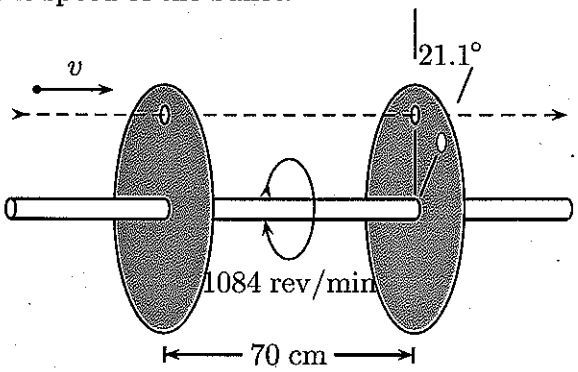
006 (part 1 of 1) 10 points

The speed of a moving bullet can be determined by allowing the bullet to pass through two rotating paper disks mounted a distance 70 cm apart on the same axle. From the angular displacement 21.1° of the two bullet holes in the disks and the rotational speed 1084 rev/min of the disks, we can determine the speed of the bullet.



What is the speed of the bullet? Answer in units of m/s.

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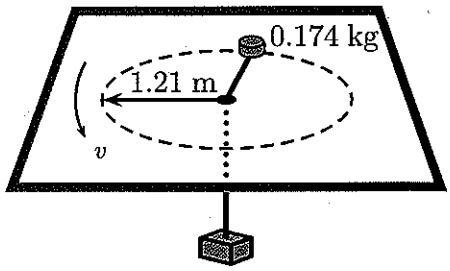
007 (part 1 of 3) 10 points

An air puck of mass 0.174 kg is tied to a string and allowed to revolve in a circle of radius 1.21 m on a horizontal, frictionless table. The other end of the string passes through a hole in the center of the table and a mass of 0.68 kg is tied to it. The suspended mass remains in equilibrium while the puck revolves.

The acceleration of gravity is 9.8 m/s^2.



What is the tension in the string? Answer in units of N.

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008 (part 2 of 3) 10 points

What is the horizontal force acting on the puck? Answer in units of N.

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009 (part 3 of 3) 10 points

What is the speed of the puck? Answer in units of m/s.

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010 (part 1 of 1) 10 points

A tire placed on a balancing machine in a service station starts from rest and turns through 4.12 rev in 0.53 s before reaching its final angular speed.

Find its angular acceleration. Answer in units of rad/s^2.

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011 (part 1 of 1) 10 points

A wheel rotating with a constant angular acceleration turns through 13 revolutions during a 7 s time interval. Its angular velocity at the end of this interval is 13 rad/s.

What is the angular acceleration of the wheel? Note that the initial angular velocity is *not* zero. Answer in units of rad/s^2.

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012 (part 1 of 1) 10 points

The driver of a car traveling at 31.8 m/s ap-

plies the brakes and undergoes a constant deceleration of 1.84 m/s^2.

How many revolutions does each tire make before the car comes to a stop, assuming that the car does not skid and that the tires have radii of 0.376 m? Answer in units of rev.

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013 (part 1 of 2) 10 points

An electric motor rotating a workshop grinding wheel at a rate of 240 rev/min is switched off. Assume constant angular deceleration of magnitude 2.17 rad/s^2.

How long does it take for the grinding wheel to stop? Answer in units of s.

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014 (part 2 of 2) 10 points

Through what angle has the wheel turned before it finally comes to rest? Answer in units of rad.

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015 (part 1 of 2) 10 points

A grinding wheel, initially at rest, is rotated with constant angular acceleration of 3.49 rad/s^2 for 9.63 s. The wheel is then brought to rest with uniform deceleration in 6.8 rev.

Find the angular deceleration required to bring the wheel to rest. Answer in units of rad/s^2.

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016 (part 2 of 2) 10 points

Determine the time needed to bring the wheel to rest. Answer in units of s.