

# Physics 2130 Additional Problems

Week 10

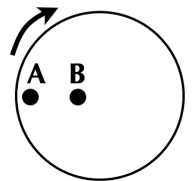
## Questions

- a) If a problem asks, "How many times does the wheel go around?" it is asking for  
A)  $\Delta\theta$       B)  $\omega$       C)  $\alpha$

- b) A wheel has  $\omega = -4\text{rad/s}$  and an angular acceleration of  $\alpha = -3\text{rad/s/s}$ . The wheel is  
A) **slowing down**    B) **speeding up**

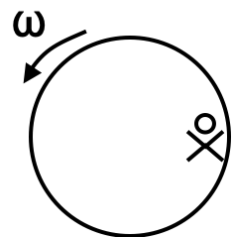
- c) Two points are marked on a spinning wheel. Which of the following is true about the points' linear velocities  $v$  and angular velocities  $\omega$ ?

- A)  $v_A = v_B$ ,  $\omega_A > \omega_B$       B)  $v_A = v_B$ ,  $\omega_B > \omega_A$   
C)  $v_A > v_B$ ,  $\omega_A = \omega_B$       D)  $v_A < v_B$ ,  $\omega_A = \omega_B$



- d) A person rides on a merry-go-round that is slowing down. What direction does the rider's acceleration point?

- A)  $\uparrow$     B)  $\nwarrow$     C)  $\leftarrow$     D)  $\swarrow$     E)  $\downarrow$



- e) If a disk turns around exactly once, its angular displacement  $\Delta\theta$  is

- A) **1 rad**      B)  **$\pi$  rad**      C)  **$2\pi$  rad**      D) **360 rad**

## Problems

1. A wheel is spinning so that it goes around 6 times every second. A brake is then applied to the wheel, causing it to slow to a frequency of 3 times per second in 5 seconds. What is the angular acceleration of the wheel during the braking?

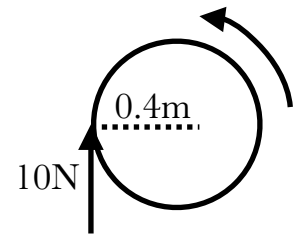
$\Delta\theta$	
$\omega_i$	
$\omega_f$	
$\alpha$	
$\Delta t$	

2. A wheel takes 5s to come to a stop, during which it goes around 8 times. How fast was the wheel spinning initially?

$\Delta\theta$	
$\omega_i$	
$\omega_f$	
$\alpha$	
$\Delta t$	

**3.** A wheel with a radius of 0.4m and moment of inertia  $I = 45 \text{ kg} \cdot \text{m}^2$  is spinning counterclockwise, when an upward force of 10N is applied to the wheel as shown, causing the wheel to come to a stop. If the wheel makes 5 complete revolutions before stopping, how long does it take to stop?

	$x$
$\Delta\theta$	
$\omega_i$	
$\omega_f$	
$\alpha$	
$\Delta t$	



4. The tire of a car has a radius of 0.26m. As the car travels down the street, the wheel spins with an angular velocity of  $\omega=80\text{rad/s}$ .

a. How many times does the wheel spin per second?

b. How fast is the car moving down the street?