PHYS 201 Rotational Kinematics Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Due 10/24

1. The equations of kinematics for linear motion are given below. Write down the corresponding equations for rotational motion.

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|  | MOTION | |
|  | LINEAR | ROTATIONAL |
| Time | t |  |
| Displacement | x; |  |
| Velocity | v = Δx/Δt; |  |
| Acceleration | a = Δv/Δt; |  |
| Kinematic Equations | v = v0 + at |  |
|  | v2 = v02 + 2ax |  |
|  | x = v0t + ½ at2 |  |
|  | x = ½(v + v0)t |  |

2. (P15) The drawing shows a device that can be used to measure the speed of a bullet. The device consists of two rotating disks, separated by a distance of http://edugen.wileyplus.com/edugen/courses/crs6407/cutnell9780470879528/c08/math/math385.gif, and rotating with an angular speed of http://edugen.wileyplus.com/edugen/courses/crs6407/cutnell9780470879528/c08/math/math386.gif. The bullet first passes through the left disk and then through the right disk. It is found that the angular displacement between the two bullet holes is http://edugen.wileyplus.com/edugen/courses/crs6407/cutnell9780470879528/c08/math/math387.gif. From these data, determine the speed of the bullet.

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| --- | --- |
| |  | | --- | | image | |
|  |

3. (P20) A figure skater is spinning with an angular velocity of http://edugen.wileyplus.com/edugen/courses/crs6407/cutnell9780470879528/c08/math/math426.gif. She then comes to a stop over a brief period of time. During this time, her angular displacement is http://edugen.wileyplus.com/edugen/courses/crs6407/cutnell9780470879528/c08/math/math427.gif. Determine

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| (a) | her average angular acceleration and |
| (b) | the time during which she comes to rest. |