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 , and rotating with an angular speed of . 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 . From these data, determine the speed of the bullet.

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3. (P20) A figure skater is spinning with an angular velocity of . She then comes to a stop over a brief period of time. During this time, her angular displacement is . Determine

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