**Rotation 2**

1. Fill in the following table.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Rotational Quantity | Name | Linear Analog | Formula (linear to rotational) | Formula(other) | Units | Description |
| θ |  |  |  |  |  |  |
| ω |  |  |  |  |  |  |
| α |  |  |  |  |  |  |
| I |  |  |  |  |  |  |
| τ |  |  |  |  |  |  |

1. Describe two things that affect the rotational inertia of an object. How do they affect the rotational inertia of an object?



1. Two masses are connected by a rod of negligible mass.
	1. Find the inertia of each mass.
	2. Find the rotational inertia of each mass about the pivot point.
	3. Does the mass with the greatest inertia have the greatest rotational inertia? Explain why/why not.
	4. Find the total inertia of the system.
	5. Find the total rotational inertia of the system of two masses.



1. Two masses. m1 and m2 are connected by light cables to the perimeters of two cylinders of radii r1 and r2, respectively. as shown in the diagram above. The cylinders are rigidly connected to each other but are free to rotate without friction on a common axle.
	1. If the mass of the small front cylinder is 10 kg, what is its moment of inertia?
	2. If the mass of the large back cylinder is 40 kg, what it its moment of inertia?
	3. What is the total moment of inertia of the cylinder?
	4. If m­­1 is 20 kg, find mass 2 such that the cylinder remains in equilibrium.



1. A bug of mass 3M lands on a mass connected to another mass by a light (negligible mass) rod. The rod is free to rotate around an axis as shown.
	1. Find the total rotational inertia of the system.
	2. Find the torque from each mass and the bug.
	3. What is the net torque on the system?
	4. What is the initial angular acceleration of they system?