**Angular Dynamics Noteguide**

**Angular Quantities:**

|  |  |
| --- | --- |
| Linear:(m) s(m/s) u(m/s) v(m/s/s) a(s) t(N) F(kg) m | Angular:θ - Angle (Radians) ωi - Initial angular velocity (Rad/s)ω f  - Final angular velocity (Rad/s) α - Angular acceleration (Rad/s/s) t - Uh, time (s)Γ - Torque (mN)I - Moment of Inertia (kg m2) |

**Angular Kinematics:**

|  |  |
| --- | --- |
| Linear:u + at = vut + 1/2at2 = su2 + 2as = v2(u + v)t/2 = sma = F | Angular:ωf = ωi + αtθ = ωit + 1/2αt2ωf 2 = ωi2 + 2αθ θ = (ωi + ωf)t/2Γ = Iα |

**Torque - twisting force that can cause angular acceleration**

Γ = rxF = rFsin(θ)

Γ - Torque (mN)

r - radius (m)

F - force (N)

Example:

If r = 0.50 m, and F = 80 N





**Moment of Inertia:**

F = ma

Γ = Iα

Example: Three 40. kg children are sitting 1.2 m from the center of a merry-go-round that is a uniform cylinder with a mass of 240 kg and a radius of 1.5 m. What is its total moment of inertia?

Example: A string with a tension of 2.1 N is wrapped around a 5.2 kg uniform cylinder with a radius of 12 cm. What is the angular acceleration of the cylinder? How many rotations will it make before it reaches a speed of 2300 RPM from rest?

1. Find torque: 2. Find I:

3. Find α: 3. Solve suvat: