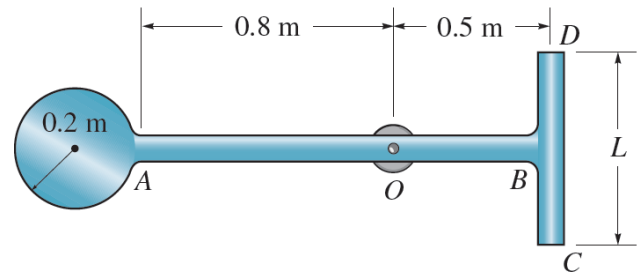**Problem 3 – Intro to Kinetics**
MASS MOMENT OF INERTIA

The assembly consists of a disk having a mass of
6 kg and slender rods *AB* and *DC* which have a
mass of 2 kg/m. Determine the length *L* of *DC* so
that the center of mass is at the bearing *O*. What
is the moment of inertia of the assembly about an
axis perpendicular to the page and passing
through *O*?

FROM RIGHT SIDE

SHAPE	MASS (kg)	$\tilde{X}$ (m)	$\tilde{X} m$ (kg·m)
⬭	6	1.5	9
⌶	$2(1.3) = 2.6$	0.65	1.69
⊥	$\dfrac{2L}{8.6 + 2L}$	0	$\dfrac{0}{\Sigma\ 10.69}$

$$\bar{X} = \frac{\Sigma \tilde{X}m}{\Sigma m} \qquad 0.5 = \frac{10.69}{8.6 + 2L} \implies \underline{L = 6.3\ m}$$

SHAPE	I_G Kg·m²	md^2 kg·m²	$I + md^2$ kg·m²
⊙	$\frac{1}{2}mr^2$ $\frac{1}{2}(6)(.2)^2 = 0.12$	$6(1)^2 = 6$	6.12
▭	$\frac{1}{12}ml^2$ $\frac{1}{12}(1.3\times2)(1.3)^2$ $= 0.366$	$(1.3\times2)(.15)^2$ $= 0.0585$	0.42
⊥	$\frac{1}{12}ml^2$ $\frac{1}{12}(6.3\times2)(6.3)^2$ $= 43.49$	$(6.39\times2)(.5)^2$ $=$ 3.195	46.69

$$\Sigma\ \underline{53.2\ Kg\cdot m^2 = I_o}$$