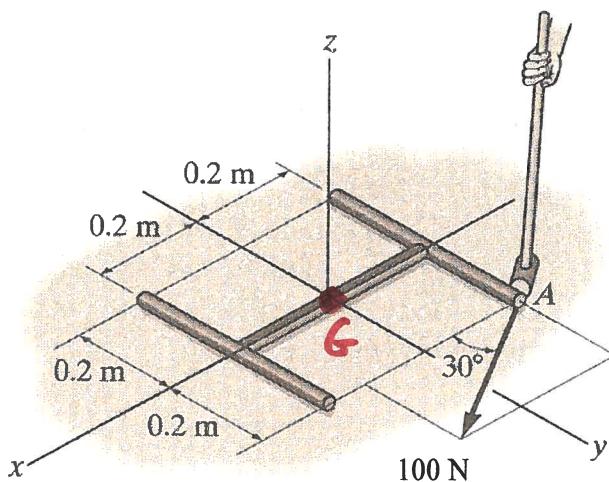**Problem 1: Impulse Momentum II**

The smooth rod assembly shown is at rest when it is struck by a hammer at A with a 100 N force applied for 0.1 seconds. Determine the angular velocity of the assembly and the magnitude of the velocity of its mass center immediately after it has been struck. The rods have a mass per unit length of 6 kg/m.
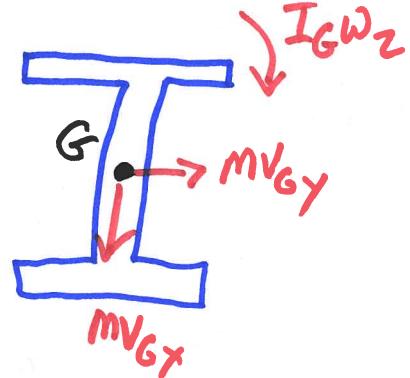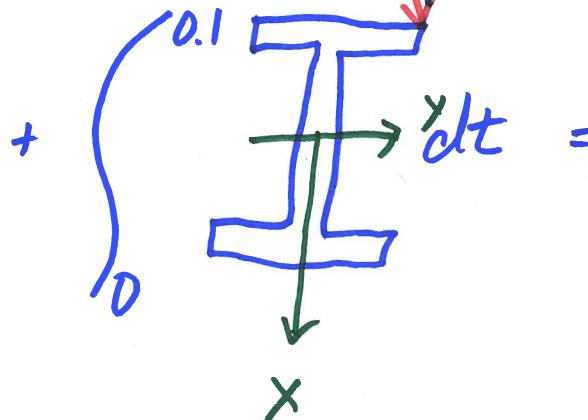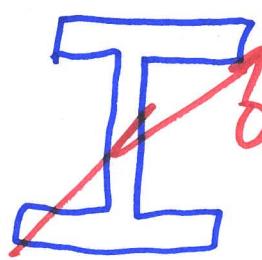

CLASSIFY MOTION
GPM

PROPERTIES

$m = 0.4m\,(3\ bars)\ 6kg/m = 7.2\ kg$

$I_G = ?$

SHAPE	MASS kg	I_G kg·m²	md^2	$I_G + md^2$
▭	ALL $0.4m \times 6\,kg/m$ = 2.4	ALL $\frac{1}{12}ml^2$ = $\frac{1}{12}(2.4)(0.4)^2$ = 0.032	$2.4\,(.2)^2$ = 0.096	0.128
▯			O	0.032
▭			$2.4(.2)^2$	0.128
				$\Sigma\ 0.0288\ kg\cdot m^2$

Problem 1: Impulse Momentum II

$$\text{MOMENTUM 1} + \text{IMPULSE} = \text{MOMENTUM 2}$$

$$\downarrow \Sigma X \quad 0 \quad + \int_0^{.1} (100\cos30)\,dt = 7.2\, V_{GX} \qquad V_{GX} = 1.2\, \text{m/s} \downarrow$$

$$\rightarrow \Sigma Y \quad 0 \quad + \int_0^{.1} (100\sin30)\,dt = 7.2\, V_{GY} \qquad V_{GY} = 0.694\, \text{m/s} \rightarrow$$

$$|V_G| = \sqrt{1.2^2 + 0.694^2} = 1.39\, \text{m/s}$$

$$\zeta\, \Sigma M_G \quad 0 \quad + \int_0^{.1} \left(-100\cos30(0.2) + 100\sin30(0.2)\right) dt = -0.288\, \omega_2$$

$$\omega_2 = 9.49\, \text{rad/s} \quad \downarrow$$