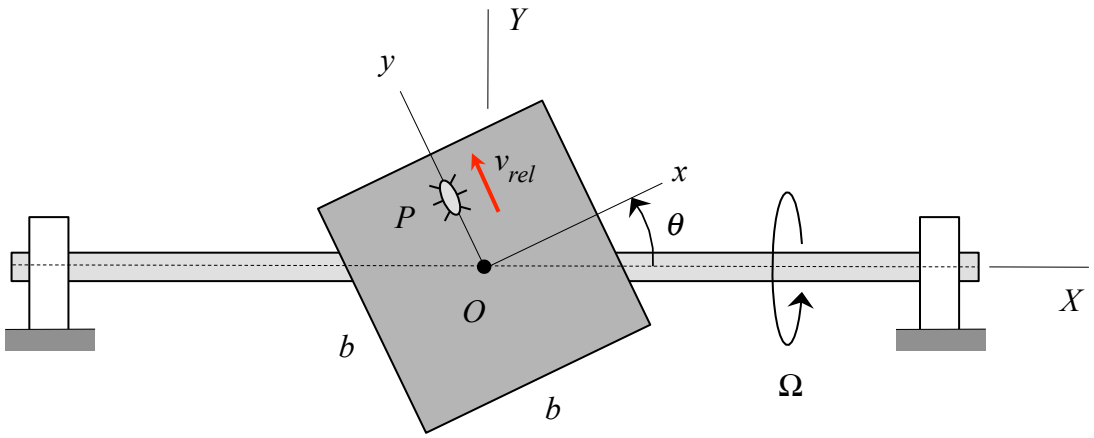
Homework H.3.I

Given: A shaft is rotating about the fixed X-axis at a constant rate of Ω. A square plate is pinned at its center O to the centerline of the shaft and is rotating relative to the shaft about O at a constant rate of $\dot{\theta}$. A set of xyz axes are attached to the plate with its origin at O. An insect on the plate is walking along the y-axis with a constant speed of v_{rel} relative to the plate.

Find: Determine the velocity and acceleration of the insect when the insect has reached the edge of the plate. The insect reaches the edge of the plate when $\theta = 0°$.



Use the following parameters in your analysis: $b = 6$ in, $v_{rel} = 12$ in/s, $\Omega = 3$ rad/s and $\dot{\theta} = 5$ rad/s.