

Quiz 3

Date: Wednesday, 04/18

Time: 11:00 AM~ 11:50 AM

(This is an open-book, open-note quiz. You must sign your name on this sheet and return it with your examination book. Academic misconduct (any type of cheating) will result in a failing grade in ENGN 2070-201 *Dynamics*.)

Name: _____

1. (20%) A block at C is moving downward at 5 ft/s. Please determine the angular velocity at bar AB at the instant shown in Figure 1.

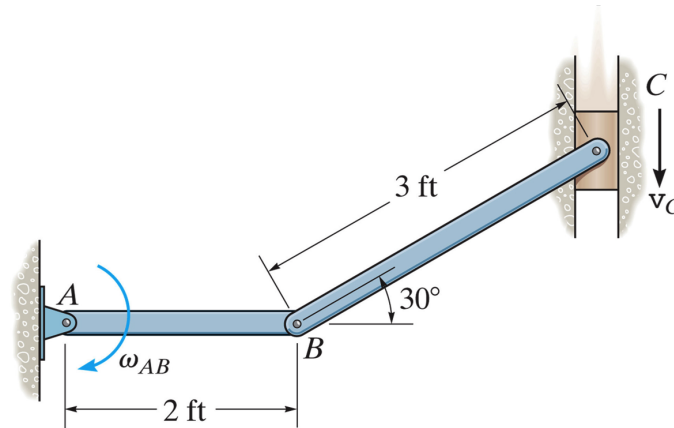


Figure 1: A moving block

2. (30%) In Figure 2, a rectangular plate with thickness d has been machined to create a rectangular hole at the center. Please determine the mass moment of inertia of this rectangular plate with a triangular hole with respect to the x axis, I_x . Assume constant density ρ . $A = 0.5$, $B = 0.6$, $C = 0.4$, $D = 0.3$, and $E = 0.25$.
3. (50%) A pendulum consists of a 20-kg uniform disk and a 5-kg uniform slender rod. If it is released from rest in the position shown in Figure 3. Please determine i) its **angular velocity** when it rotates clockwise 60° , $\omega(\theta = 60^\circ)$ (20%), ii) vertical reaction at point A, O_y (15%), and iii) horizontal reaction at point A, O_x (15%).

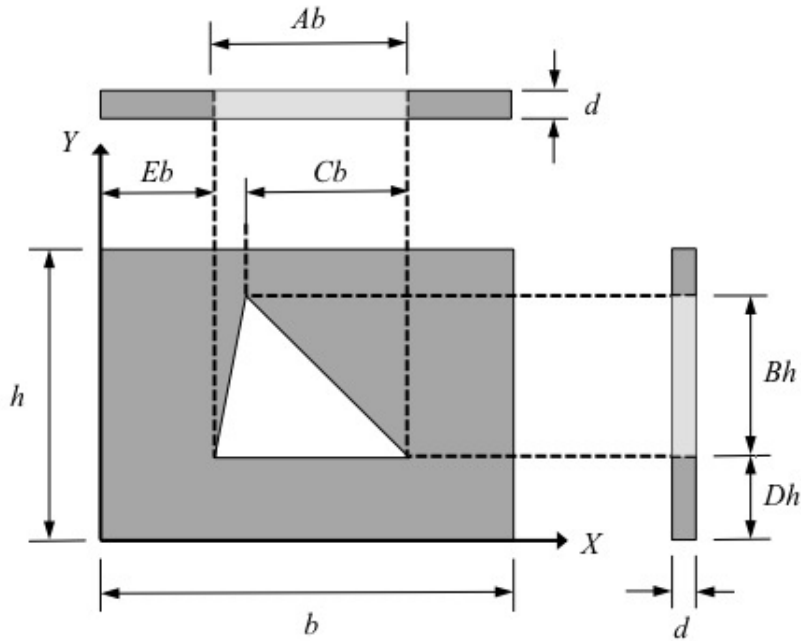


Figure 2: Mass moment of inertia

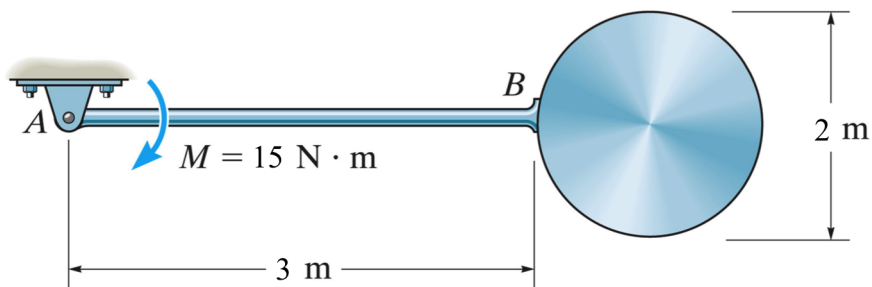


Figure 3: Angular motion of a pendulum