

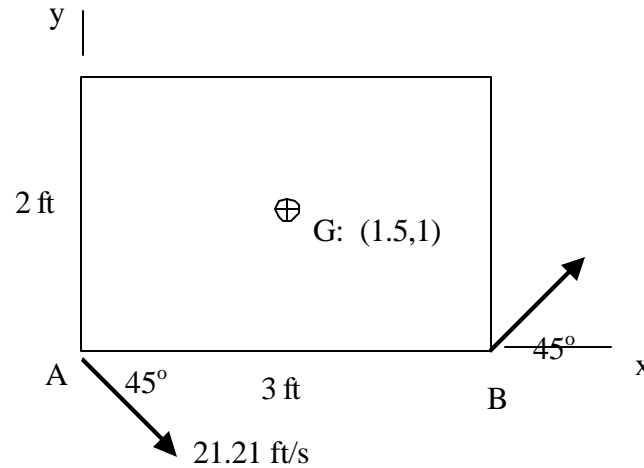
Name _____ Section _____

ES204
Examination II
January 21, 2000

Problem	Score
1	/30
2	/30
3	/40
Total	/100

Show all work for credit
AND
Turn in your signed help sheet
AND
Stay in your seat until the end of class

The rectangular 3 ft x 2 ft plate has mass of 3 slugs. Its moment of inertia about mass center G is $3.25 \text{ slug}\cdot\text{ft}^2$. As the plate experiences general plane motion, the velocities of corners A and B have the directions indicated. The velocity of A is $15\sqrt{2}$ or 21.21 ft/s.

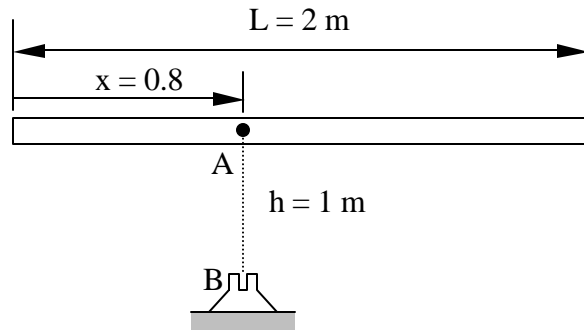


Calculate the following system variables and properties. Give units. For full credit, show all work.

- The location of the instant center of rotation using the x-y coordinates shown.
- The angular velocity of the plate. Magnitude and direction.
- The linear momentum vector for the plate. Magnitude and direction.
- The angular momentum of the plate about G. Magnitude and direction.
- The angular momentum of the plate about A. Magnitude and direction.
- The kinetic energy of the plate.

The slender bar of mass $m = 1.2$ kg and length $L = 2$ m is released from rest in the horizontal position shown. If point A of the bar becomes attached to the pivot at B upon impact, determine immediately after the impact:

- a) the angular velocity, ω , of the bar
- b) the impulse exerted on the rod at A during the impact.



Save the numerical calculations until the end of the exam to make sure you get a solution to all the other problems.

The rod AB is attached to two uniform disks as shown below. A constant force, F , is applied to point B causing the disks to roll without slipping on the ground. Knowing that all the objects are initially at rest, determine the equations necessary to determine the angular velocities of each of the objects after disk 1 rotates through 90 degrees. **DO NOT SOLVE THE EQUATIONS.** Your answer should consist of a list of unknowns and clearly labeled equations.

