Homework H2.I

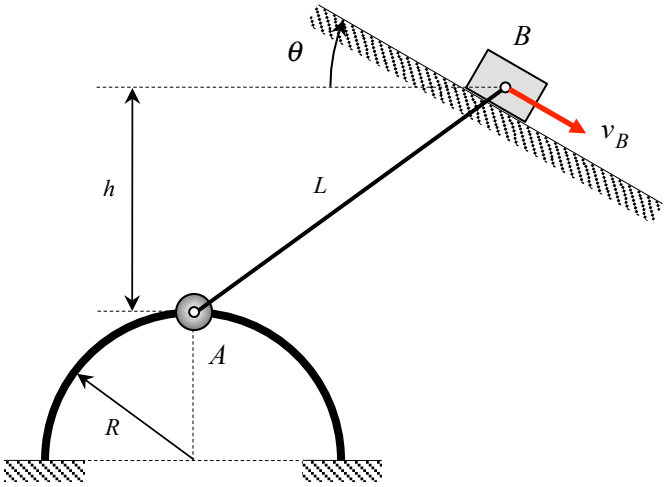
Given: Particle A is constrained to move on a semi-circular guide of radius R. Block B is constrained to move along an inclined ramp that is oriented at an angle of θ relative to horizontal, as shown in the figure below. A and B are each pinned to ends of a rigid bar AB. At the instant shown, particle A is directly above the center of the semi-circular guide, block B is at a vertical distance of h above A and block B is traveling with a constant speed of v_B.

Find: For the position shown:

(a) Determine the angular velocity and angular acceleration of link AB. Write your answers as vectors.

(b) Determine the velocity and acceleration of particle A. Write your answers as vectors.

(c) Locate the instant center for link AB (assume that the figure provided has been drawn to scale). Does the location of this instant center agree with your results above for the direction of the velocity of particle A? Explain.



Use the following parameters in your analysis: $v_B = 4000$ mm/s, $L = 200$ mm, $R = 150$ mm and $h = 120$ mm.