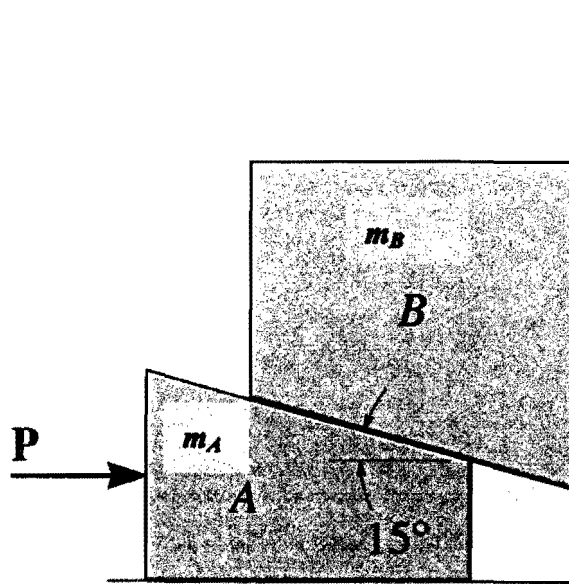
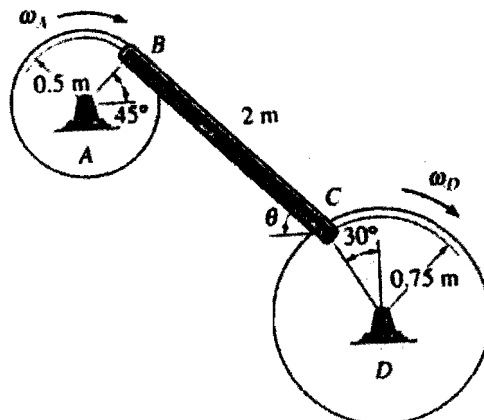


1. If a horizontal force of P is applied to block A, determine the acceleration of block B. Each of the two blocks has a mass m_A and m_B , respectively. Neglect friction. (20%)
 - (1) Draw the free body diagrams to analyze the problem and show every necessary unknown force.
 - (2) Write down equations for solving the unknown forces. (It's not necessary to solve these equations)



Problem 1

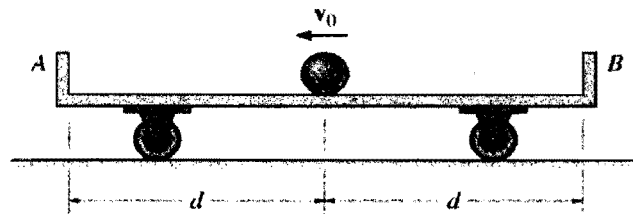
2. If disk D has a constant angular velocity $\omega_D = 2 \text{ rad/s}$, determine the angular velocity of disk A at the instant $\theta = 60^\circ$. (20%) (1) Using relative-motion analysis of rigid body; (2) Using instantaneous center of zero velocity method



Problem 2

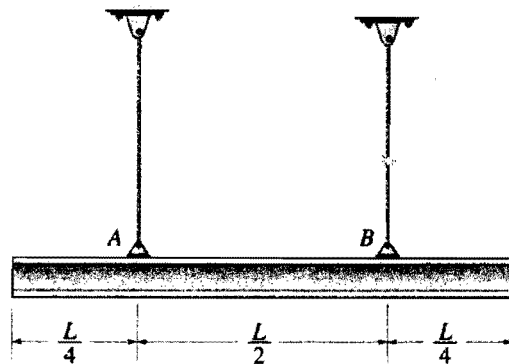
(背面仍有題目,請繼續作答)

3. A ball of negligible size and mass m is given a velocity of v_0 on the center of the cart which has a mass M and is originally at rest. If the coefficient of the restitution between the ball and the walls A and B is e , determine the velocity of the ball and the cart just after the ball strikes A. Also, determine the total time needed for the ball to strike A, rebound, then strike B, and rebound and then return to the center of the cart. Neglect friction. (20%)



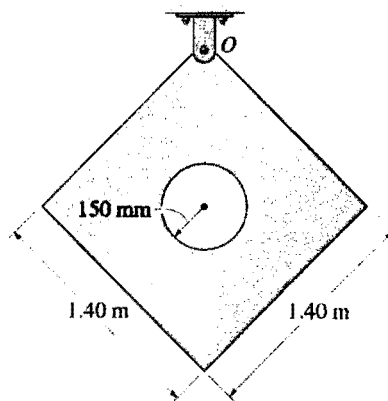
Problem 3

4. The uniform beam has a weight W . If it is originally at rest while being supported at A and B by cables, determine the tension in cable A if cable B suddenly fails. Assume the beam is a slender rod. (20%)



Problem 4

5. Determine the Moment of inertia of the plate with respect to point O. Plate thickness t and density ρ . (20%) Use $R=150\text{mm}$, $a=1.4\text{m}$.



Problem 5