※ 注意：請於試卷內之「非選擇題作答區」依序作答，並應註明作答之大題及小題題號。

1. **[15 points]** Define and describe the following terms:
   (1) Statically indeterminate. (2) Polar moment of inertia. (3) Instantaneous center of rotation.

2. **[15 points]** (1)(2) Multiple-choice questions and (3) short-answer question.
   (1) How many zero-force members are in the right structure? (a) 0 (b) 2 (c) 3 (d) 4.
   (2) A rectangular plate swings from arms of equal length as shown below. What is the magnitude of the angular velocity of the plate? (a) 0 rad/s (b) 1 rad/s (c) 2 rad/s (d) 3 rad/s (e) Need to know the location of the center of gravity
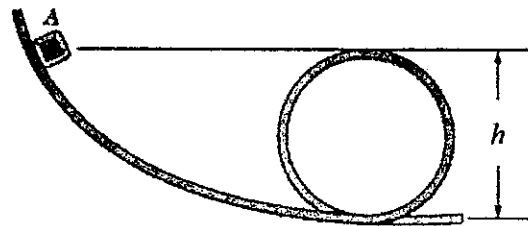   (3) Block A is released from rest and slides down the frictionless ramp to the loop. The maximum height h of the loop is the same as the initial height of the block. Will A make it completely around the loop without losing contact with the track? Why?
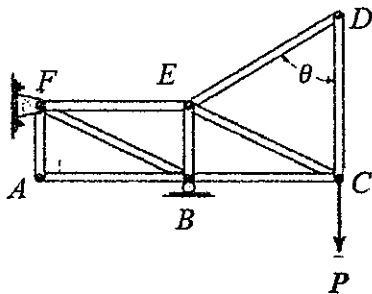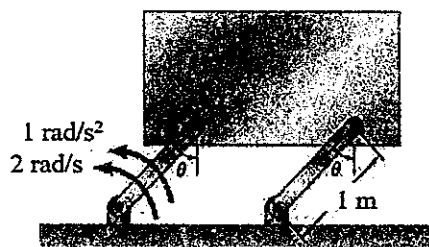
Problem 2(1)　　　　　　　Problem 2(2)　　　　　　　Problem 2(3)

3. **[15 points]** A 6.5-m ladder AB leans against a wall as shown. Determine the smallest value of μ_s at A for which equilibrium is maintained under the following two conditions: (1) the coefficient of static friction μ_s is zero at B; (2) the coefficient of static friction μ_s is the same at A and B.

4. **[15 points]** A counterclockwise moment $M = 150$ N·m is applied to the flywheel. If the coefficient of friction between the band and the wheel is 0.2, compute the minimum force P necessary to prevent the wheel from rotating.

5. **[20 points]** At the instant under consideration, the rod of the hydraulic cylinder is extending at the rate $v_A = 2$ m/s. Determine the corresponding (1) angular velocity and (2) angular acceleration of link OB.

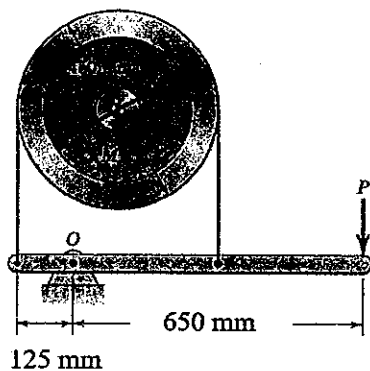6. **[20 points]** The system shown is in equilibrium when $\varphi = 0°$.
   (1) What is the spring length when it is unstretched?
   (2) What is the δ_{spring} when $\varphi = 90°$? (3) If the initial $\varphi = 90°$, block C is given a slight nudge when the sys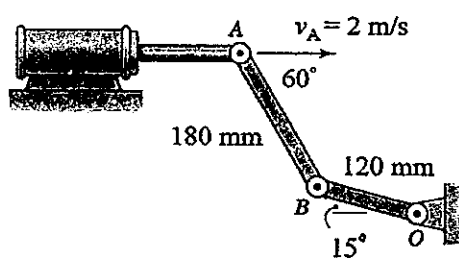tem is in that position. Determine the speed of the block as it passes through the equilibrium position $\varphi = 0$. Neglect the weight of the rod.
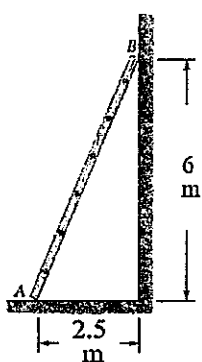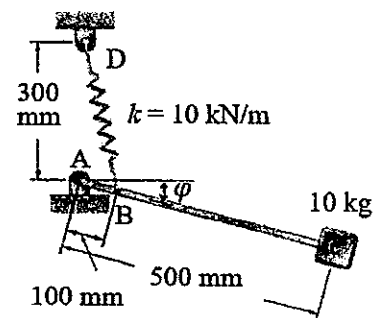

Problem 3　　　　　Problem 4　　　　　Problem 5　　　　　Problem 6

試題隨卷繳回