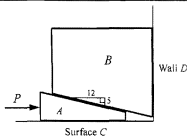系所組別 航空太空工程學系乙組
考試科目： 工程力學　　　　　　　　　　　　　　　　　考試日期：0307，節次：2

※ 考生請注意：本試題 ☑可 □不可 使用計算機

1. (20%) Block B has a weight W The coefficients of static friction between wedge A and block B, and between A and surface C, are $\mu = 1/5$. The wall D is smooth. Neglect the weight of the wedge. Determine the smallest force P needed to lift the block.

2. (20%) For the beam loaded as shown, (a) determine the reactions; and (b) draw the shear-force and bending-moment diagram
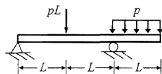
3. (20%) In the four-bar linkage shown, control link OA has a counterclockwise angular velocity $\omega_0 = 10$ rad/s during a short interval of motion. When link CB passes the vertical position shown, point A has coordinates $x = -60$ mm and $y = 80$ mm. Determine the angular velocities of AB and BC, and calculate the angular acceleration of link AB for this position.
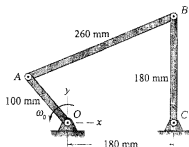
4. (20%) A uniform rod of weight W and length L is supported by a pin connection at A and a wire at B.
   (a) What is the force on pin A at the instant that the wire is released?
   (b) What is the force at A when the rod has rotated 45°?
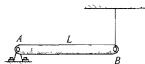
5. (20%) A circular rigid body of mass m and radius of gyration k is released from stationary in an incline plane of incline angle θ and coefficient of friction μ. Determine the normal reaction force, friction force, linear and angular accelerations when it is in
   (a) pure rolling motion,
   (b) rolling with slipping motion, and
   (c) Compare a cylinder ($k = 1/\sqrt{2}$) and a hoop ($k = 1$) of the same mass, which one travels faster along the incline plane? Indicate what kind of motion condition (pure rolling or rolling with slipping) you use.