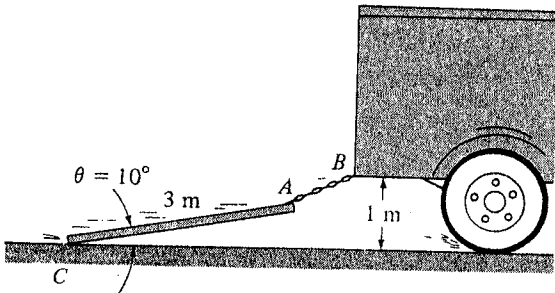


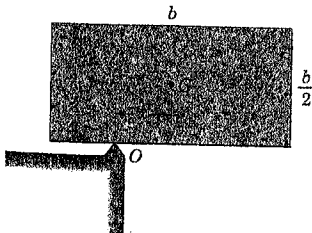
所別： 機械工程學系碩士班甲丁組

科目： 動力學

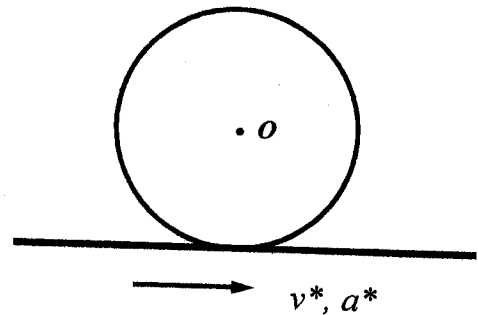
1. (25%) The beam has a length of 3 m and a mass of 500 kg. It is attached to the back of a truck using a 0.6-m-long chain  $AB$ .
- (a) If the coefficient of friction at  $C$  is  $\mu = 0.4$ , determine the acceleration of the truck when the beam is supported at  $\theta = 10^\circ$  with the road as shown. (15%)
- (b) According to above calculation, please give a brief discussion how the beam can be supported at  $15^\circ$  with the road! (10%)



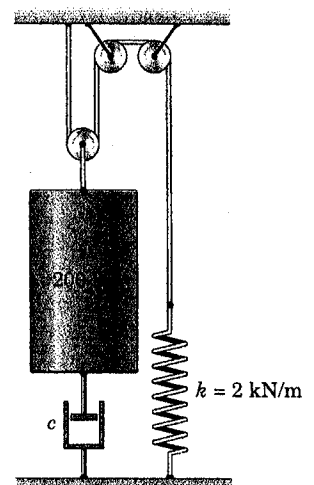
2. (25%) The uniform rectangular slab is released from rest in the position shown. Determine the value of  $x$  for which the angular acceleration  $\alpha$  is a maximum, and determine the corresponding angular acceleration.



3. (25%) A wheel, with mass  $m$  and mass inertia about the center  $I_O$ , rolls without slipping on the conveying belt. The belt is moving with velocity  $v^*$  and acceleration  $a^*$ . Please derive the relations between
- (a) the angular velocity  $\omega$  and the center velocity  $v_O$  of the wheel, and
- (b) the angular acceleration  $\alpha$  and the center acceleration  $a_O$  of the wheel.



4. (25%) For the damped spring-mass system shown, determine the viscous damping coefficient for which critical damping will occur.



參考用