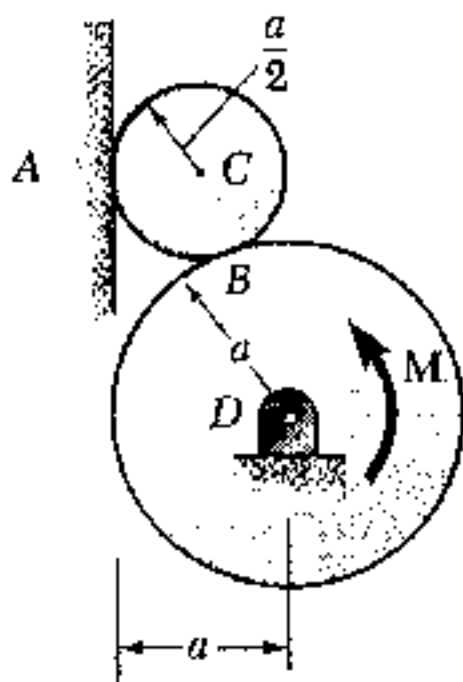


八十五學年度 動力機械系(所)丙、丁組碩士班研究生入學考試

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2702

1. Explain the following terminology in detail: (20%, 5% each)
- rolling resistance
 - Coriolis acceleration
 - principal axis of inertia
 - principle of work and energy

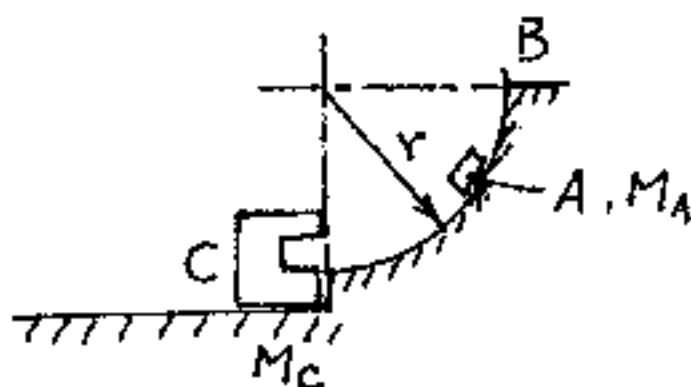
2. Cylinder C of weight W rests on cylinder D and against the vertical wall as shown. Knowing that the coefficient of static friction is 0.25 at A and B , determine the largest counterclockwise couple M which can be applied to cylinder D if it is not to rotate. (20%)



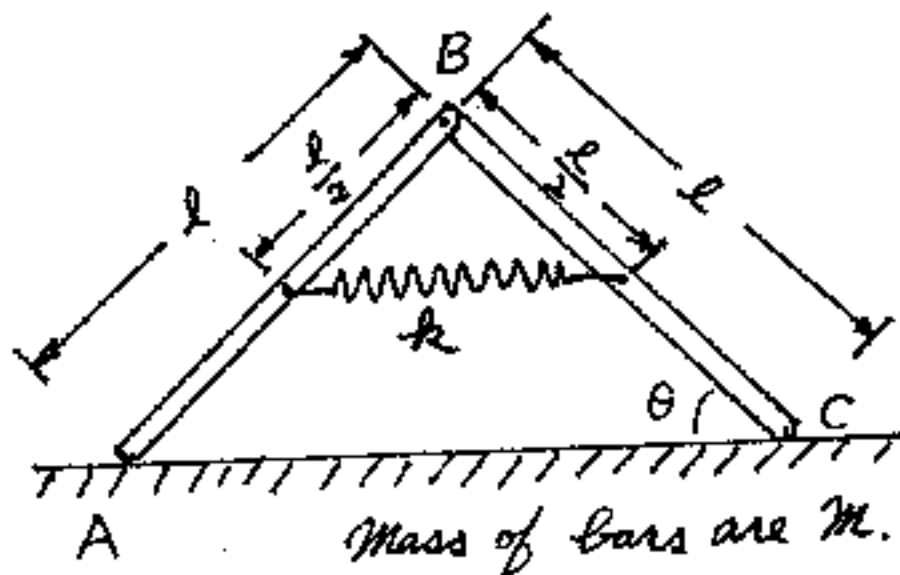
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3. The cylindrical plug A of mass M_A released at B with initial velocity v_0 and slides down the circular guide (the friction coefficient is μ). The plug strikes the block C of mass M_C and becomes embedded in it. Find the velocity of C after it is struck by the plug A . Neglect the effect of centrifugal force. (20%)



4. The uniform slender bars each of mass m are confined to move in the vertical plane. If they are released from rest position shown. Determine the expression for the velocity v_B with which the angle θ becomes θ_0 . Neglect all friction. The spring is unstretched before bars are released. (20%)



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5. A homogeneous square plate with uniform thickness and of weight 10-kg suspended by a ball-and-socket joint is at rest when it is struck by a hammer. The impulsive force F generated by the hammer is normal to the surface of the plate, and its average value during the 4 ms interval that it acts is 5,000 N. Determine (a) the angular velocity of the plate at the instant following the impact, and (b) the average reaction at the support during the interval of impact. (20%)

