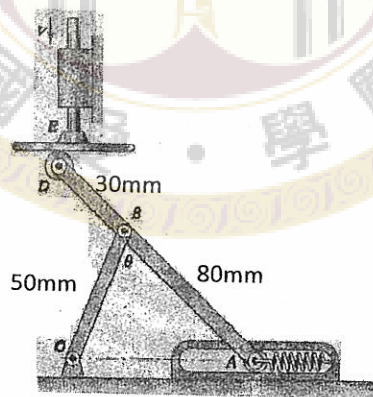


1. (35%) Based on the Dynamics course, please describe the following:
 - A. (6%) Describe the equation of motion of a mechanical system.
 - B. (6%) Describe the potential energy and work.
 - C. (7%) Describe the principle of virtual work.
 - D. (8%) Describe the relationship of kinetic energy of a particle and work done by the forces acting on the particle?
 - E. (8%) To solve the dynamics problems, in general there are two methods, one is the called Newton's method and another is called energy method. Please briefly describe both methods and compare differences between them.

2. (15%) Consider to analyze dynamics of a four bar linkage, assume the linkage is driven by one bar by a moment M . You can apply the dynamics to answer the following questions.
 - A. (7%) Describe the procedure to find the static forces acting on each bar.
 - B. (8%) Describe the procedure to find the inertia forces acting on each bar. The inertia force of a bar is defined by the mass of the bar times its acceleration at the center of mass of the bar.

3. (25%) Motion of the roller A against its restraining spring is controlled by the downward motion of the plunger E. For an interval of motion the velocity of E is $v = 0.5$ m/s. Determine the velocity of A when θ becomes 90° . (The spring constant of the spring in the graph is 0.35 N/m)



4. (25%) The uniform square block with the perimeter $4b$ is dropped from rest from the position shown. Corner A strikes the ledges at B and becomes latched to it.

見背面

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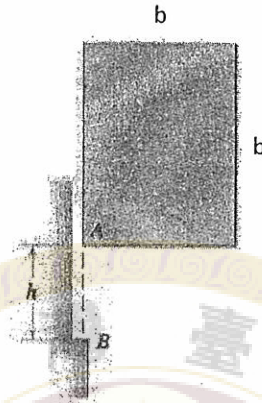
國立臺灣大學101學年度碩士班招生考試試題

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(A). Determine the angular velocity ω of the block immediately after it becomes attached to B. Also find the percentage n of energy loss during the corner attachment.

(Moment of inertia of the rectangular plane is $I = \frac{m(a^2 + b^2)}{12}$)

(B). What factor will affect the energy loss during the corner attachment for this square block?

試題隨卷繳回