淡江大學九十四學年度碩士班招生考試試題 1024

系別：航空太空工程學系　　科目：動　力　學

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V	簡單型計算機

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本試題雙面印製

1. Block A in *Figure* 1 is moving downward at 5 *ft/sec* at a certain time when the spring is compressed 6 *in*. The coefficient of friction between block B and the plane is 0.2, the pulley is light, and the weight of A and B are 161 and 193 *lb*, respectively.

(a) Find the distance that A falls from its initial position before coming to zero speed. (15%)

Hint: It is known that Work (W)= Kinetic Energy of final position (T_f) - Kinetic Energy of initial position (T_i)=0- T_i, and $W_{spr}+W_{g\ on\ A}+W_{friction}= \Delta T$

(b) Determine whether or not body A will start to move back upward. (15%)

Hint: **If** it stayed in this position, the force in the cable would be 161 *lb*, which would leave A in equilibrium. What would be the free-body-diagram of B in this position…

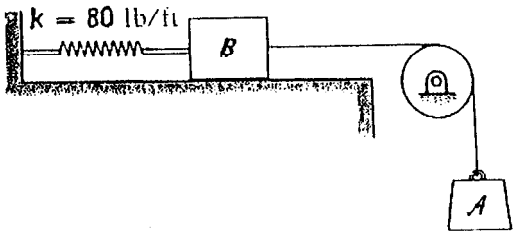

Figure 1.

2. *Figure* 2 shows a circular cam B_1 and an oscillating roller follower consisting of the roller B_2 (which rolls on B_1) and the follower bar B_3. If the cam turns at the constant angular velocity 0.3 *rad/sec* (counter-clock-wise), find the angular velocity of the follower bar and of the roller at the given instant. (20%)

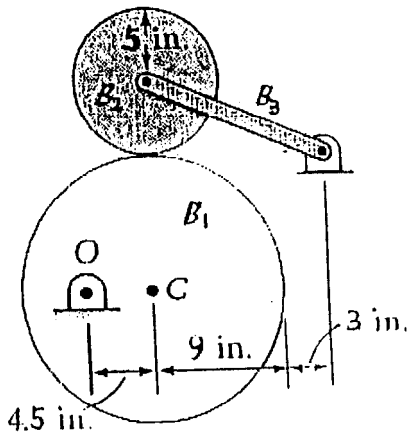

Figure 2.

本試題背面尚有試題▶

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3. The uniform slender bar of mass m is released from rest in the position shown in *Figure* 3. Find the angular acceleration when the bar has turned through 45°. (20%)

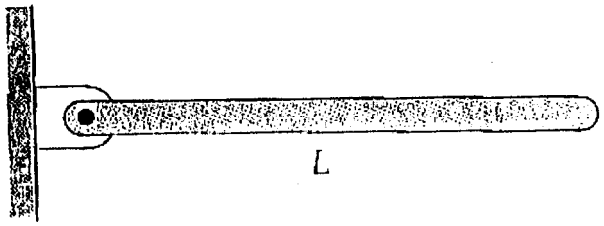

Figure 3.

4. Cylinder B in *Figure* 4 is moving up the plane with v_c=0.3 *m/sec* at an initial instant when the spring is stretched 0.2*m*. If B does not slip at any time, determine how far ***down*** the plane the point C will move in the subsequent motion. Note: The spring, connected to the cord, cannot be in compression. (30%)

Hint: Let t_i be the instant when C is back in same position given in problem. There, its center velocity is now 0.3 *m/sec* down the inclined surface, since no energy was lost, Therefore, $W = \Delta T$ is still available…

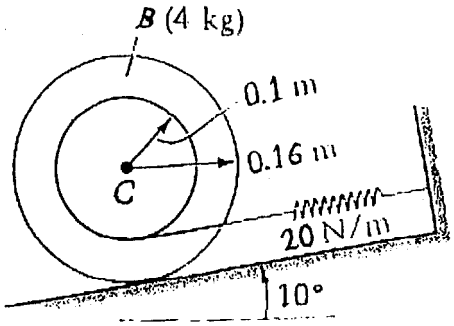

Figure 4.