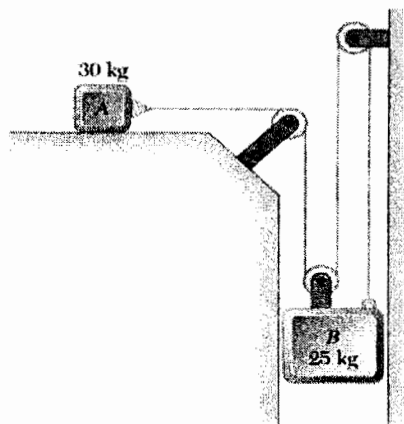※ 考生請注意：本試題不可使用計算機

1. (25%) Two students, each of weight W, A and B holding together, intend to jump off the bridge from rest using an elastic cord having stiffness k. They wish to just safely reach the surface of the river, when A, attached to the cord, lets go of B at the instant they touch the water.

(a) Determine the proper unstretched length L of the cord to do the stunt.

(b) Calculate the maximum acceleration a of student A, and

(c) Find the maximum height H student A reaches above the water after the rebound.
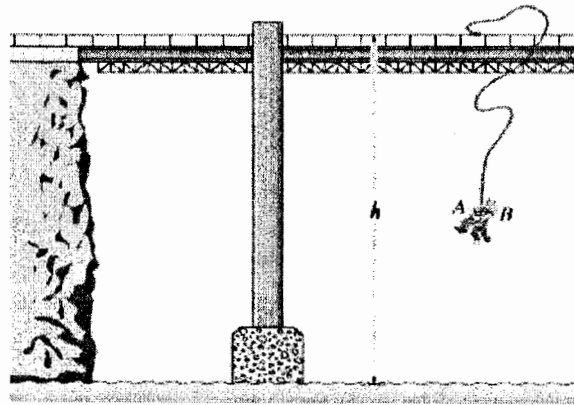
2. (25%) The two blocks shown are originally at rest. Neglect the masses of the pulleys and the effect of friction in the pulleys and assume that the cable is inextensible and the coefficients of friction between block A and the horizontal surface are $\mu_s = 0.25$ and $\mu_k = 0.2$.

(a) Determine if the blocks will move from at rest.

(b) If the blocks move, find the relationship between a_A and a_B, which are the accelerations of block A and block B, respectively.

(c) How can you find the acceleration of each block and the tension in the cable? (Just list the equations and explain.)

※ 考生請注意：本試題不可使用計算機。　請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

3. Consider the following mechanics questions:

   a. What are the Newton's three laws of motion? (9%)

   b. Give each law an example to explain its meaning. (16%)

4. The cable BC supports the L pipe with a tensile force 750-N.

   a. What is the equivalent moment applied at point O? (5%)

   b. What is the mass per meter for the pipe, if the pipe is uniform and can freely rotate about OA line? (20%)