每題 20分，共計100分.

(Prob. 1) 20 pt.

Members AB and BC weighing, respectively, 50 N and 200 N are connected to each other by a pin. BC connects to a disc K on which a torque $T_K = 200$ N-m is applied. What torque T is needed on AB to keep the system in equilibrium at the configuration shown?

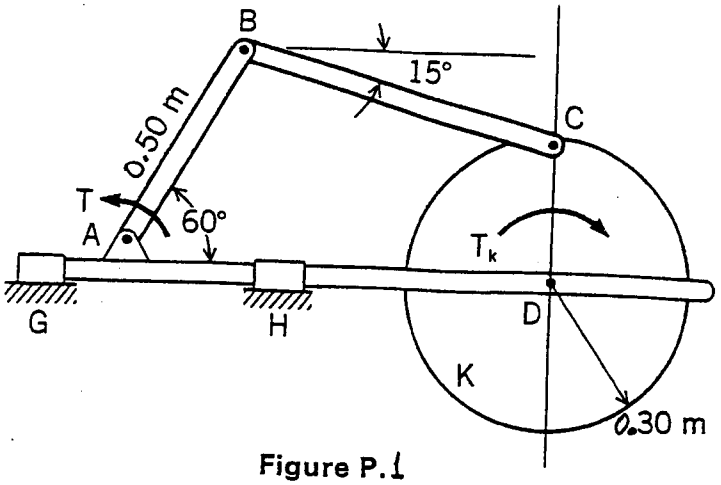

Figure P.1

(Prob. 2) 20 pt.

An embossing device imprints an image at D on metal stock. If a force F of 200 N is exerted by the operator, what is the force at D on the stock? The lengths of AB and BC are each 150 mm.

Notice : Use the method of Virtual Work, other methods are not acceptable!

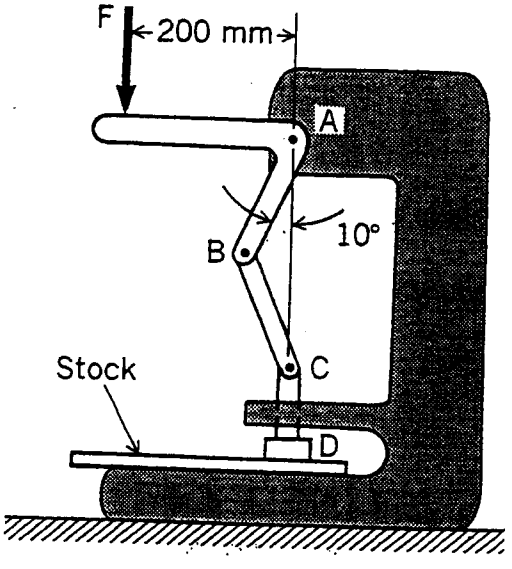

Figure P.2

(Prob. 3) 20 pt.

A rigid body A rests on a spring with stiffness K equal to 8.80 N/mm. A lead pad B falls onto the block A with a speed on impact of 7 m/sec. If the impact is perfectly plastic, what are the frequency and amplitude of the motion of the system, provided that the lead pad sticks to A at all times? Take $W_A = 134$ N and $W_B = 22$ N. What is the distance moved by A in 0.02 sec? (*Caution:* Be careful about the initial conditions.)

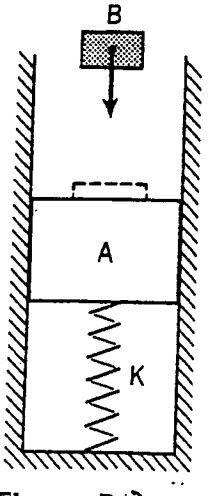

Figure P.3

(背面仍有題目，請繼續作答)

(Prob 4) 20pt.

A mechanism shown in Fig. P. 4 consists of two weights W, four pinned linkage rods of length a, and a spring K connecting the linkage rods. The spring is unextended when $\theta = 45°$. If friction and the weights of the linkage rods are negligible, what are the equilibrium configurations for the system of linkage rods and weights?

Notice: Use the method of Potential Energy, other methods are not acceptable!

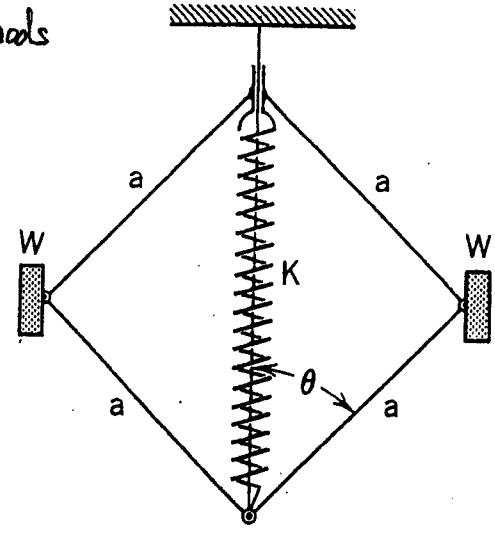

Figure P. 4　A mechanism.

(Prob. 5) 20pt.

Particles A and B are confined to always be in a circular groove of radius 5 ft. At the same time, these particles must also be in a slot which has the shape of a parabola. The slot is shown dashed at time $t = 0$. If the slot moves to the right at a constant speed of 3 ft/sec, what are the speed and rate of change of speed of particles toward each other at $t = 1$ sec?

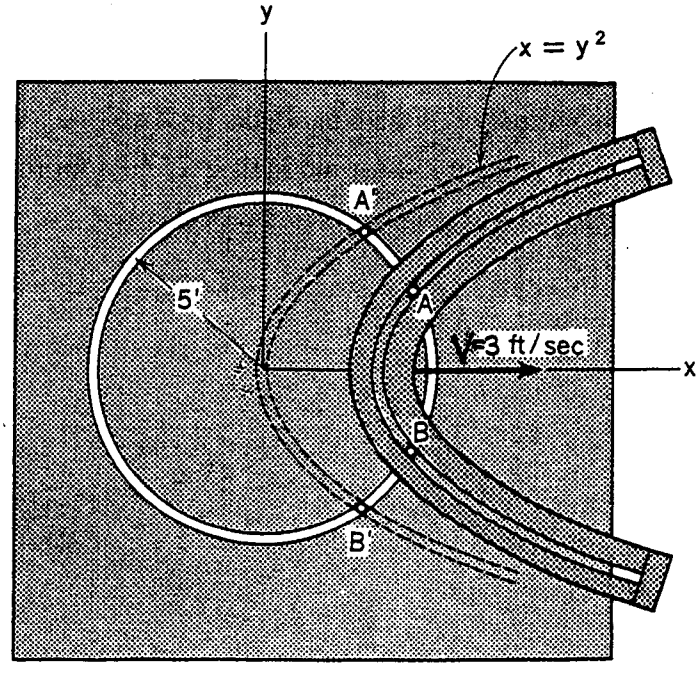

Figure P. 5