1. The framework is supported by the member AB which rests on the smooth floor. (Fig. 1) When loaded, the pressure distribution on AB is linear as shown. Determine the smallest size d of member AB so that it will not cause the frame to tip over. What is the intensity w for this case? (20%)

2. The distributed loading $w=w_0\sin\theta$, measured per unit length, acts on the curved rod. (Fig. 2) Determine the normal force, shear force, and moment in the rod at $\theta=45°$. (20%)

3. The coefficient of static friction for all contact surfaces in Fig. 3 is 0.2. Does the 50-lb force move the block A up, hold it in equilibrium, or is it too small to prevent A from coming down and B from moving out? The 50-lb force is exerted at the midplane of the blocks so that we can consider this a coplanar problem. ($\sin15°=0.259$ and $\cos 15°=0.966$) (20%)

4. A block weighing 50-lb is shown on an inclined surface. (Fig. 4) The block is released at the position shown at a rest condition. What is the maximum compression of the spring. The spring has a spring constant K of 10 lb/in., and the coefficient of friction between the block and the incline surface is 0.3. (20%)

5. Find the horizontal and vertical components of the deflection of end C of the frame ABC shown in Fig. 5, assuming EI is constant. Neglect the effects of axial deformation and consider only the effects of bending. (20%)
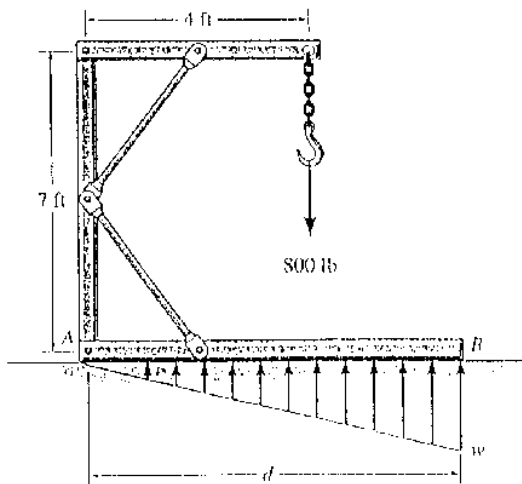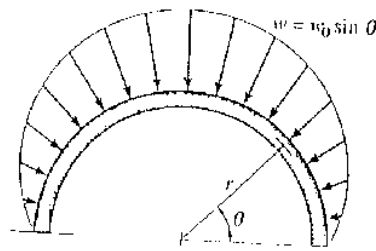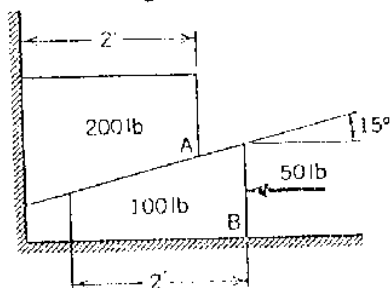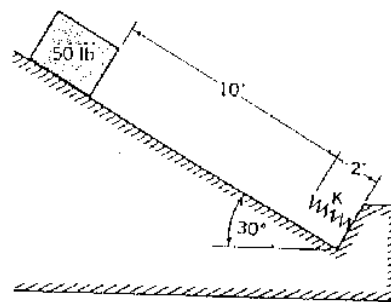

Fig. 1

Fig. 2

Fig. 3

Fig. 4

Fig. 5