本試題是否可以使用計算機： ☑可使用 ， □不可使用 　（請命題老師勾選）

25% 1. A uniform horizontal beam *OD* is fastened by a three-dimensional pin to a vertical wall at point *O* in figure 1. The beam weights 4 kN. Determine the tensions in the supporting cables *AB* and *AC* and the support reaction at point *O*.

25% 2. In figure 2, the rod has a weight *W* and resets against the floor and wall for which the coefficients of static friction are μ_A and μ_B, respectively. Determine the smallest value of θ for which the rod will not move.

25% 3. In figure 3, two bars *AB* and *BC*, each of mass 5 kg, are connected by a pin at *B* and by a spring *DE*. When unstretched, the spring is 150 mm long and the constant of the spring is 1000 N/m. Determine the value of *x* corresponding to equilibrium.

25% 4. In figure 4, cylinder *A* has a mass of 4 kg and cylinder *B* has a mass of 8 kg. Determine the speed of *A* after it moves upward 2 m starting from rest. Neglect the mass of the cord and pulleys.
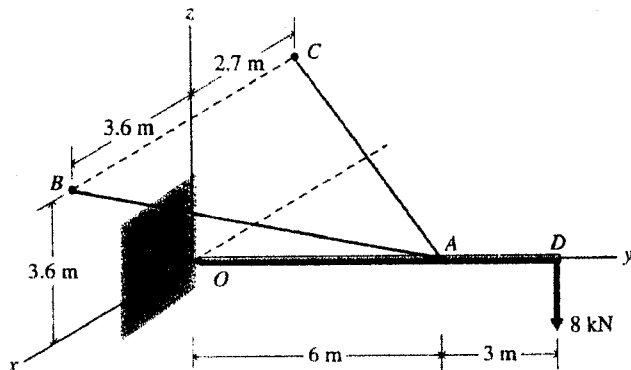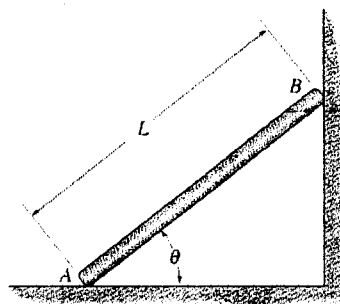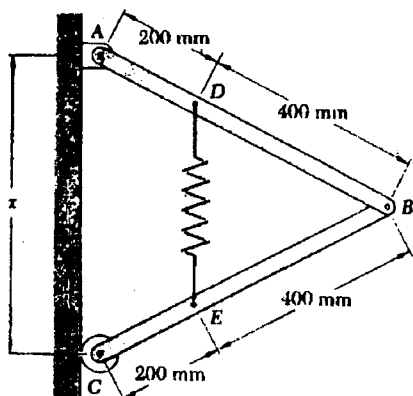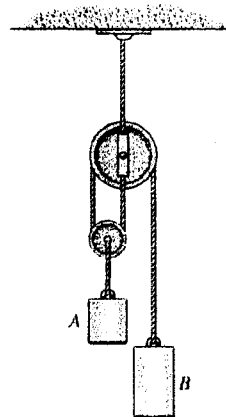

Figure 1.

Figure 2.

Figure 3.

Figure 4.