

1. Determine the tensions developed in wires CD , CB , and BA and the angle θ required for equilibrium of the 30-kg cylinder E and the 60-kg cylinder F . (20%)

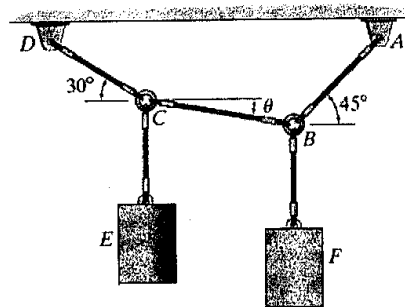


Figure 1

2. Determine the force in member ED , EH , and GH of the truss, and please state if the members are in tension or compression (20%).

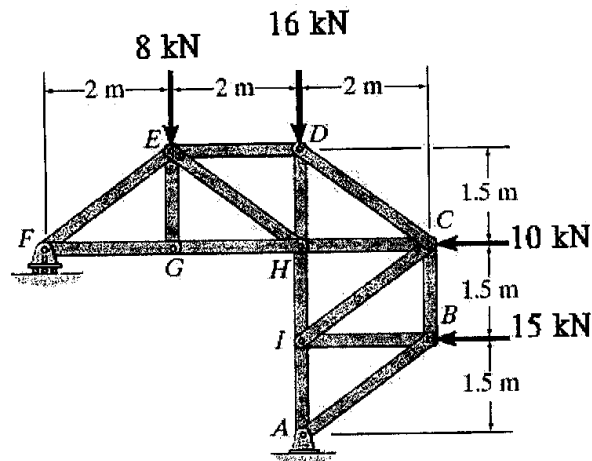


Figure 2

3. The square plate is constrained within the slots at A and B. When $\theta = 30$ degree, point A is moving at $v_a = 8$ m/s, determine the velocity vector (magnitude and the direction) at point C and D. (20 %)

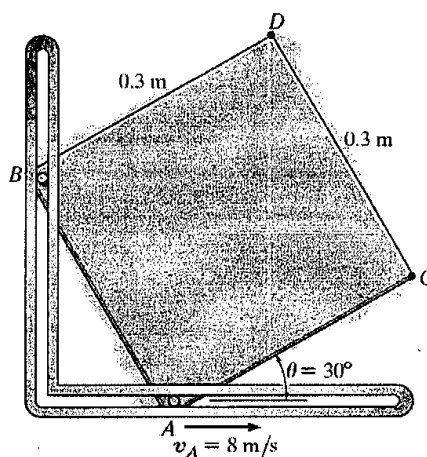


Figure 3

4. A rod with mass 6 kg is released from rest at $\theta = 30$ degree, determine the angular velocity of the rod at the instant $\theta = 0$ degree. The spring has a stiffness of $k = 600$ N/m, with an unstretched length of 300 mm. (20 %)

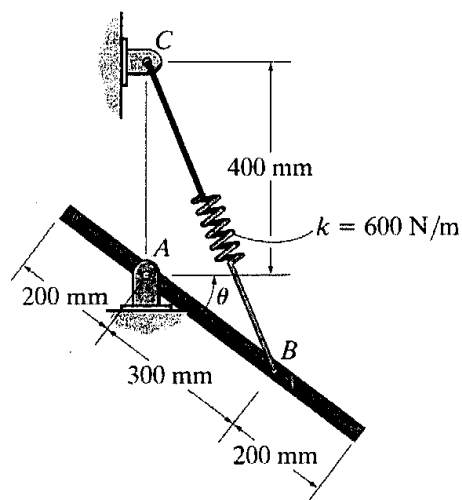


Figure 4

5. A rod is attached on the xy plane, which rotates with a constant angular velocity ω about its y axis, as shown in Fig. 5. End A of the rod of length l slides along the x axis with constant speed v_0 , while end B slides along the y axis. Find the velocity vector and acceleration vector of the midpoint P of the rod when θ is 60 degree. (20%)

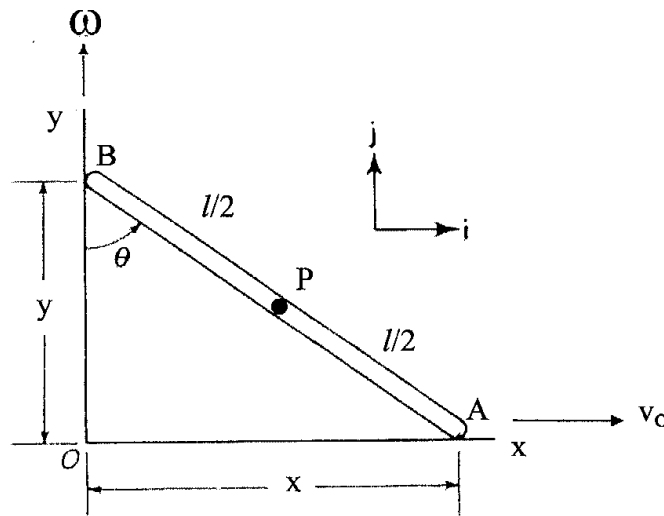


Figure 5