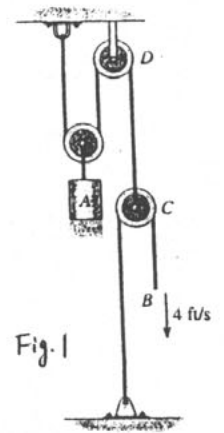
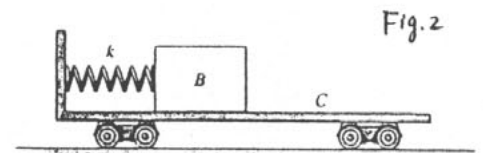


(每題 25 分)

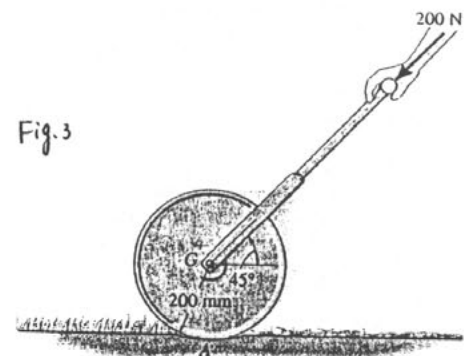
1. The cable at B is pulled downwards at 4 ft/s, and is slowing at 2 ft/s<sup>2</sup>. Determine the velocity and acceleration of block A at this instant.



2. The block has a mass of 50 kg and rests on the surface of the cart having a mass of 75 kg. If the spring which is attached to the cart and not the block is compressed 0.2 m and the system is released from rest, determine the speed of the block after the spring becomes undeformed. Neglect the mass of the cart's wheels and the spring in the calculation. Also neglect friction. Take  $k = 300 \text{ N/m}$ .



3. The lawn roller has a mass of 80 kg and a radius of gyration  $k_G = 0.175 \text{ m}$ . If it is pushed forward with a force of 200 N when the handle is at 45 degree, determine its angular acceleration. The coefficients of static and kinetic friction between the ground and the roller are  $\mu_s = 0.12$  and  $\mu_k = 0.1$ , respectively.



4. The uniform pole has a mass of 15 kg and falls from rest when  $\theta = 90$  degree until it strikes the edge at A,  $\theta = 60$  degree. If the pole then begins to pivot about this point after contact, determine the pole's angular velocity just after the impact. Assume that the pole does not slip at B as it falls until it strikes A.

