

1. Using method of joints, determine the force in each member of the truss shown in Fig. 1. [5]

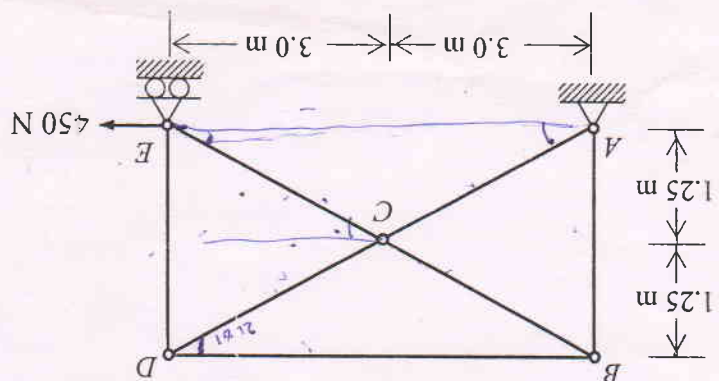


Fig. 1

Fig. 2

2. A rod is held by a cord at one end as shown in Fig. 2. If the force $F = 200$ N, and if the rod weighs 450 N, what is the maximum angle θ that the rod can be placed if the coefficient of static friction μ_s between the rod and the floor is 0.4? The rod is 1 m in length. Assume that the pulleys are frictionless. [5]

3. For the unequal-leg rolled channel section shown in Fig. 3 determine (i) the location of the centroid C (a , b) and (ii) the second moments of area I_{xx} , I_{yy} and the product of area I_{xy} about the centroidal XY -axes. The section has a uniform width of 10 mm. [5]

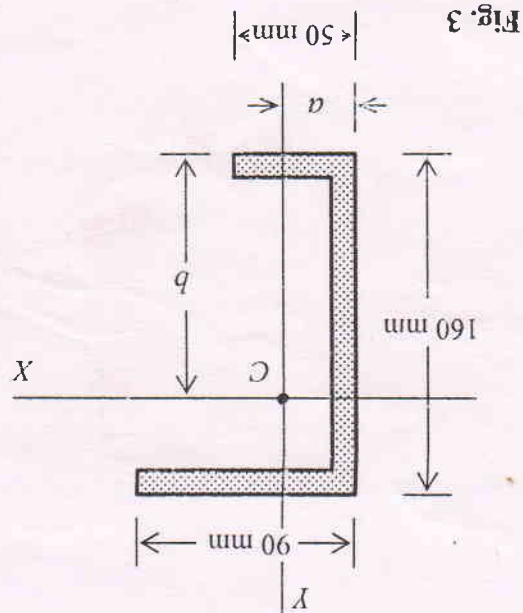


Fig. 3

4. A jet of water shown in Fig. 4 has a speed at the nozzle of 20 m/s. At what position does it hit the parabolic hill? What is the speed at that point? Neglect air friction. [5]

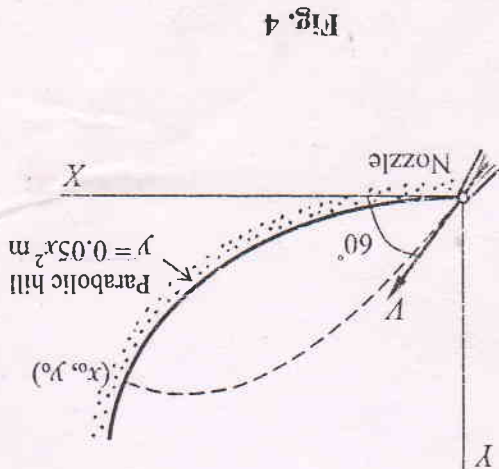


Fig. 4