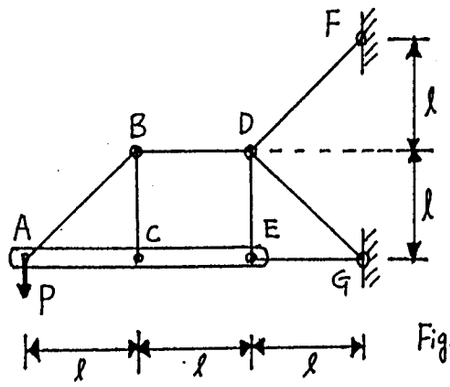

Fig. 1.

1. A planar truss system has the dimensions shown in Fig. 1. Member AE is continuous and can resist bending. All joints are pinned. Determine forces in
   a) member BD
   b) member DE
   c) member EG

(20%)

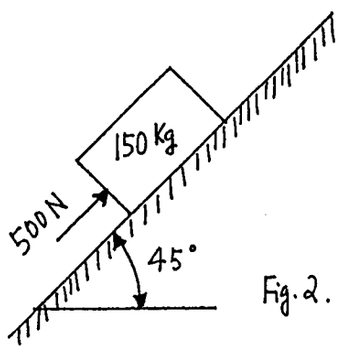

Fig. 2.

2. A 500-N force acts on a 150-Kg block placed on an inclined plane. (Fig. 2.). The coefficients of friction between the block and the plane are $\mu_s = 0.25$ and $\mu_k = 0.20$. (μ_s : coefficient of static friction) (μ_k : coefficient of kinetic friction). Determine whether the block is in equilibrium, and find the value of the friction force. (15%)

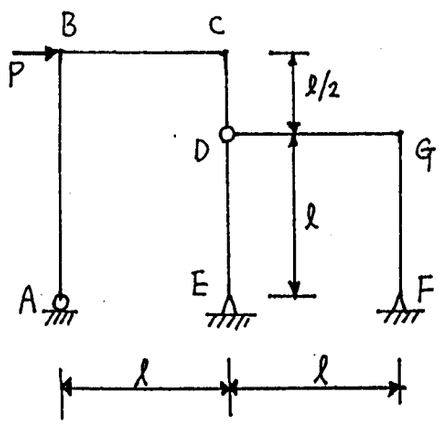

Fig. 3.

3. The system shown in Fig. 3 is subjected to a point load P at B. Point D is a hinge joint. Determine the reaction at support A.

(15%)

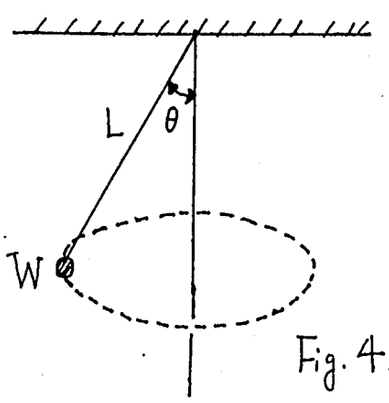

Fig. 4.

4. A conical pendulum ball of weight W attached to a cord of length L, as shown in Fig. 4., is revolving in a horizontal circle at a constant speed v_0. Let the angle formed by the cord with the vertical be θ. Neglecting the weight of the cord, determine (a) the tension in the cord and (b) the speed v_0, in terms of W, L, and θ. (20%)

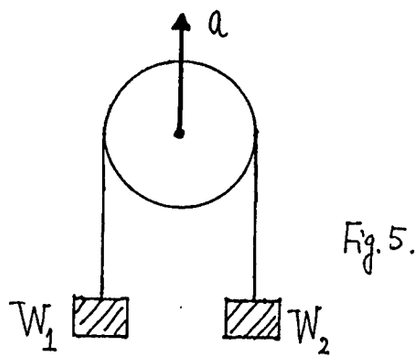

Fig. 5.

5. Two weights W_1 and W_2 are hung from a flexible, but inextensible, cord over a frictionless pulley which moves upward with an acceleration a (Fig. 5.). Assuming that $W_2 > W_1$ and neglecting the rotating inertia of the pulley, derive an expression for the tension in the cord. (15%)

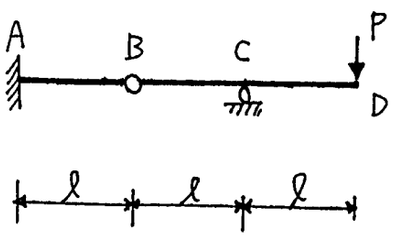

Fig. 6.

6. Draw the shear and bending moment diagrams for the problem shown in Fig. 6. (15%)