1. Draw the shear, axial force, and moment diagrams for the beam ACB shown in Fig. 1. (20%)

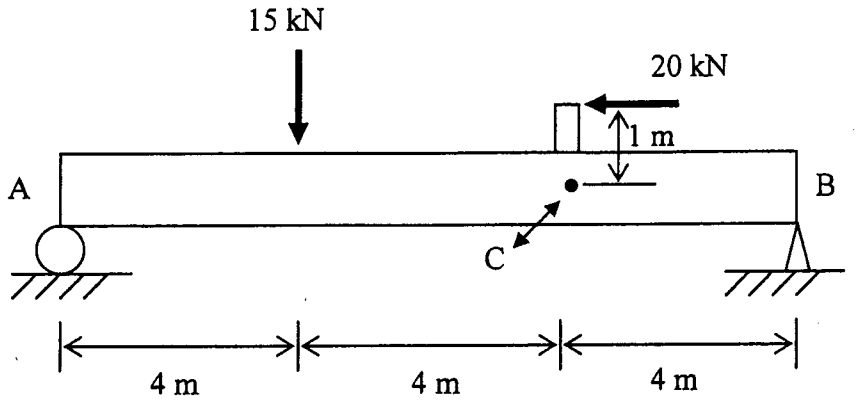

Fig. 1

2. If the above beam is to be designed as a reinforced concrete member, where will you place the main reinforcement (鋼筋) against tensile stress in the beam. Show your reinforcement location in a drawing and explain why. (20%)

3. A truss structure with two different member cross sections, A_1 equals to 0.5 in^2 and A_2 equals to 1.0 in^2, is shown in Fig. 2. Assuming that the Young's Modulus is E, calculate the vertical translations of joint 1 on the top left corner. (30%)

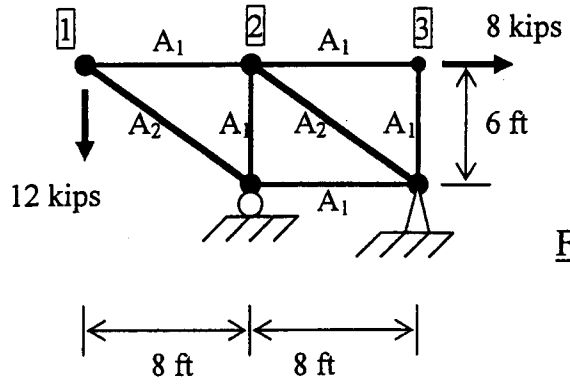

Fig. 2

4. In the above question, the member between joint 2 and 3 is in tension and will be designed as a steel member. Describe the design criteria considered in the Steel Design Code for a tension member. (20%)

5. Explain why the building structure design in Taiwan requires a structure capable of large ductility when under earthquake loads? (10%)