



FINAL EXAMINATION ENGR 242/2 Statics Sections: T,V,X,YY Date: December 14, 2002

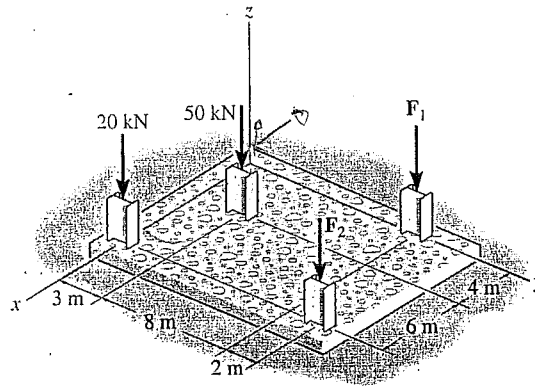
Instructors: Professors Dargahi, Rivard, Sabour, Stathopoulos (coordinator)

Materials allowed: Non-programmable calculators

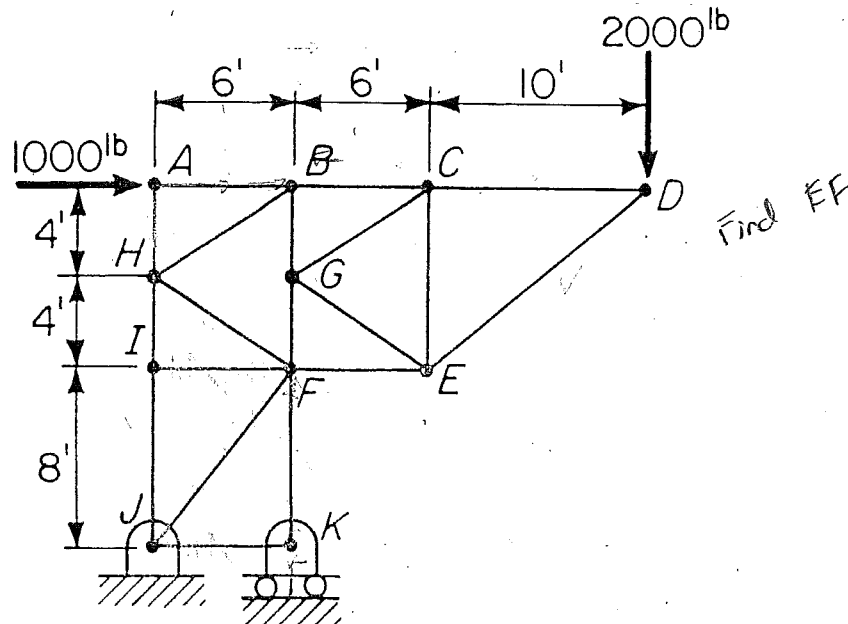
Time allowed: 3 hours

Special instructions: Problems carry equal weights. Solve any FIVE of the given 6 problems.

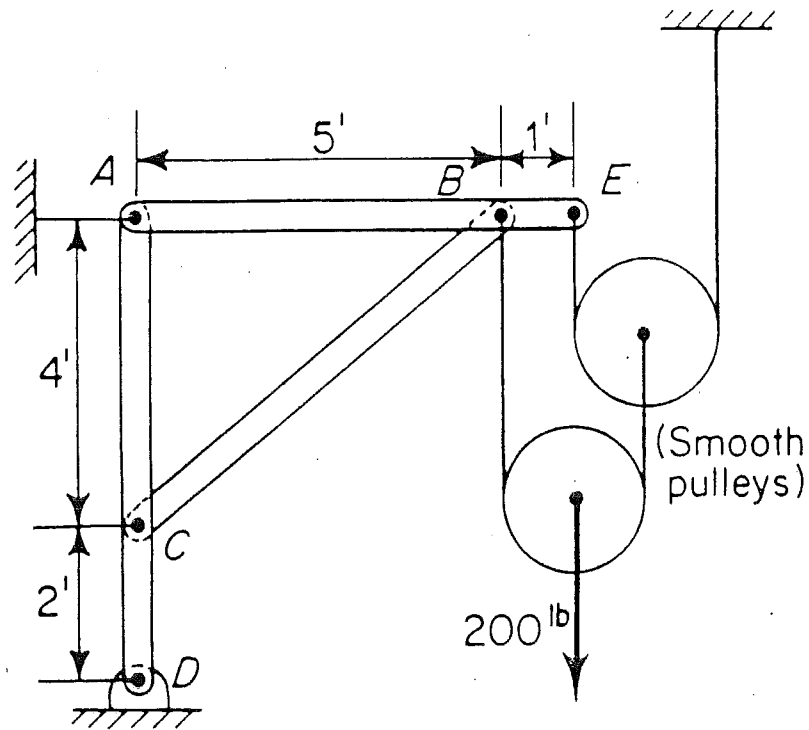
1. The building slab is subjected to four parallel column loadings. Determine the equivalent resultant force and specify its location (x, y) on the slab, if $F_1 = 20 \text{ kN}$ and $F_2 = 50 \text{ kN}$.



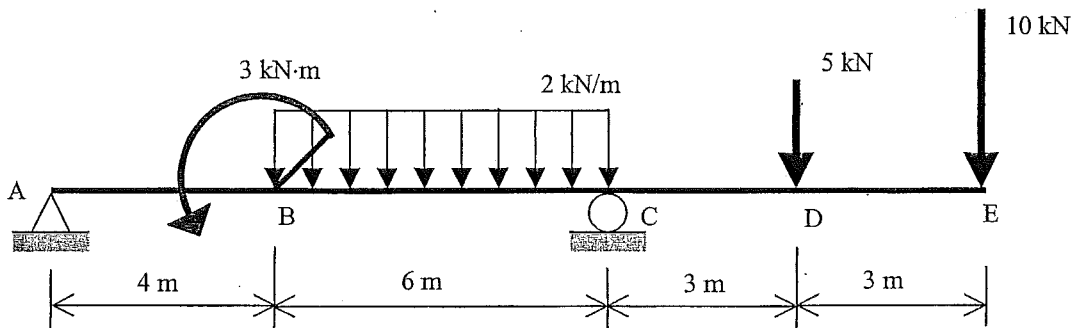
2. Determine the axial forces in members CD, EF, FJ and IF of the pin-connected truss shown. Indicate whether these members are in tension or compression.



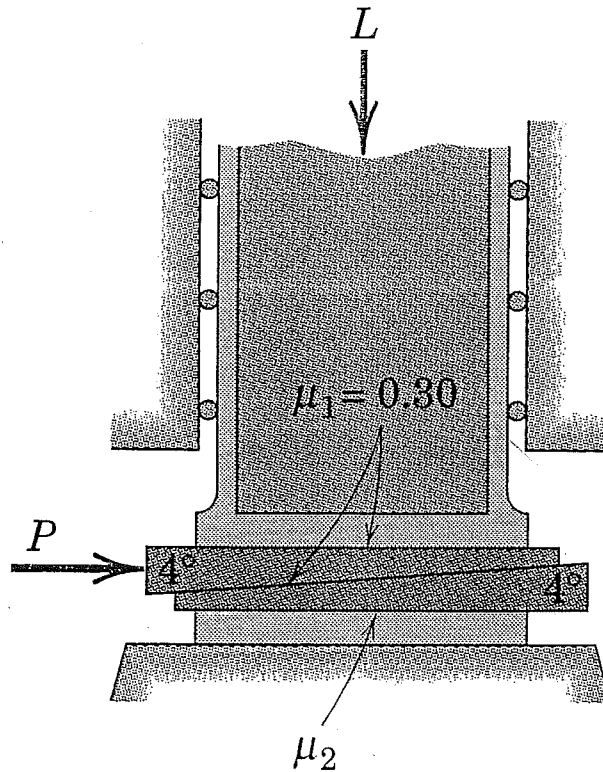
- 3) Cables are attached to pins at A, B, and E, as shown. Determine the horizontal and vertical components of the pin reaction at C on member DCA. Neglect all weights (members and pulleys).



- 4) Draw the shear force and bending moment diagram for the beam and loading shown. The loading consists of an applied moment (3 kNm) at B, a uniformly distributed load (2 kN/m) between B and C, a point load (5 kN) at D and another one (10 kN) at E.



5. The two 4° wedges are used to position the vertical column under a load L . What is the minimum value of the coefficient of friction μ_2 for the bottom pair of surfaces for which the column may be raised by applying a single horizontal force P to the upper wedge.



6. Determine the moment of inertia of the shaded area with respect to aa axis.

