

CE 3202 Spring 2011 Exam 1

Name _____

Closed Book; Closed Notes

Calculator Make and Model _____

3"x5" Note Card Allowed;

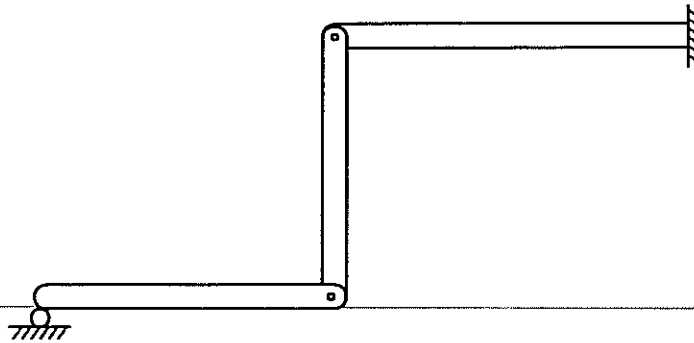
Scientific Calculator Allowed (Graphing Calculators are Banned)

100 points are possible

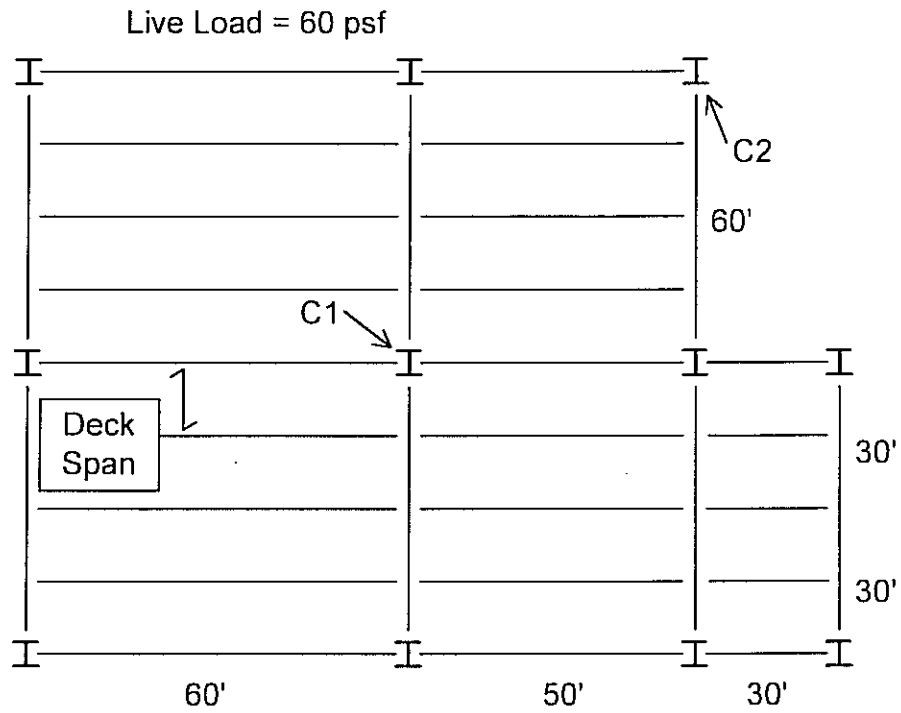
Answer all questions to the best of your ability. State any assumptions you feel are necessary. Attach extra sheets, if used. **Show your work!**

Problem 1.

For the structure shown, state if the structure is unstable, stable-determinate, or stable-indeterminate (if stable-indeterminate, state the degree of indeterminacy). Defend your answers! Frame structure (members carry internal shears, moments and axial loads). Joints are pinned connections. (5 points)

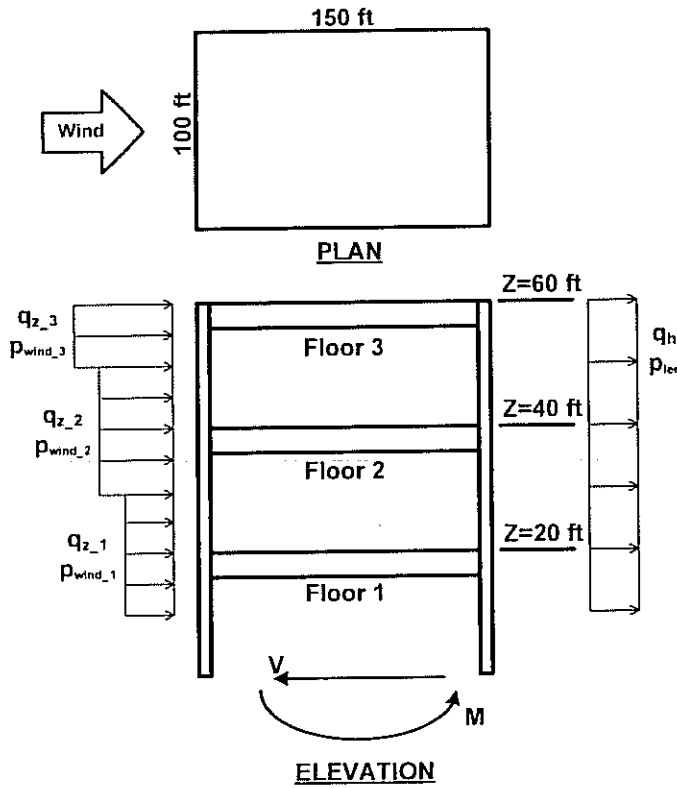


Problem 2. For the structure below, find the reduced live load (in psf) for column C1. The columns support multiple floors. (10 points)



FLOOR PLAN

Problem 3. Wind loads.

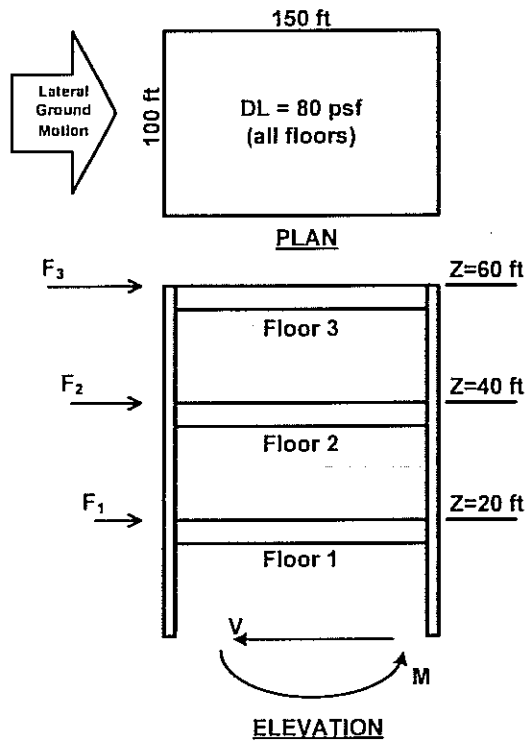


Mixed retail/apartments
 Steel Frame Structure
 $V = 90$ mph
 Exposure B
 Flat Ground

- (a) For the structure shown above, find the pressure coefficients q_z (at each floor) and q_h . Take $z_1 = 20$ ft, $z_2 = 40$ ft, and $z_3 = 60$ ft. Use the appropriate value for h . (15 points)

(b) Using the q_z and q_h values you calculated in part (a), find the design windward and leeward wind pressures, $p_{wind,1}$, $p_{wind,2}$, $p_{wind,3}$, and p_{lee} . (10 points)

(c) Using your design pressures, Find the base shear, V , and overturning moment, M . (5 points)

Problem 4. Seismic Loads.

Mixed retail/apartments
Steel Frame Structure
Site Class D
Seismic Design Category (??)
 $S_s = 0.30$
 $S_1 = 0.08$

- (a) For the above structure, find the seismic design category. Then find the seismically induced base shear, V . Be sure to check minimum and maximum values. (20 points).

(b) Using your answer from part (a), find the design seismic equivalent static forces applied to each floor, F_1 , F_2 , and F_3 . (10 points).

Problem 5.

For the structure shown, find the reactions. For full credit, clearly indicate the direction of your reactions. (25 points)

