<u>QUIZ 2</u>

Spring 2003-2004 (Thursday, May 13, 2004) CIVE 311 – STRUCTURES I CLOSED BOOK, 1 HOUR & 45 MN

Name:

ID#:

<u>NOTES</u>

- 2 PROBLEMS 13 PAGES.
- ALL YOUR <u>ANSWERS</u> SHOULD BE PROVIDED ON THE QUESTION SHEETS.
- TWO EXTRA SHEETS ARE PROVIDED AT THE END.
- ASK FOR <u>ADDITIONAL</u> SHEETS IF YOU NEED MORE SPACE.
- SOME ANSWERS MAY REQUIRE <u>MUCH LESS</u> THAN THE SPACE PROVIDED.
- **DO NOT** USE THE <u>BACK</u> OF THE SHEETS FOR ANSWERS.
- <u>DRAFT</u> BOOKLET WILL BE PROVIDED; BUT DO NOT USE FOR ANSWERS.
- BOTH QUESTION SHEETS AND DRAFT BOOKLET SHOULD BE <u>RETURNED</u>.
- CHECK BOXES ARE FOR YOU TO CONFIRM THAT HAVE SOLVED A QUESTION

YOUR COMMENT(S)

DO NOT WRITE IN THE SPACE BELOW

<u>MY COMMENT(S)</u>	
YOUR GRADE	
	<i>Problem I:</i> /65
	<i>Problem II:</i> /35
	Other:

TOTAL: /100

Problem I: (65 points)



Figure I

Referring to <u>Figure I</u>, let $EI=200,000 \text{ kN.m}^2$ throughout the beam. Neglect the own weight of the beam.

NOTE: THE SYSTEM IS SYMMETRICAL; YOU MAY TAKE ADVANTAGE OF THIS.

1. Calculate the reactions, and draw the shear and bending moment diagrams. (15 points) Sketch a reasonable deflected shape showing important features (deflections, slopes, inflections, ...). (5 points)

Calculations and Diagrams:

2. Indicate how you would solve for the deflected shape using the method of INTEGRATION (Do not compute or write detailed equations; show an outline of the steps required). (10 points)

Calculations and Diagrams:

3. Draw the CONJUGATE BEAM with the corresponding load. Explain in *two lines* how you would solve for a deflection and slope at a point (Do not solve). (5 points)

Calculations and Diagrams:

4. Using the MOMENT-AREA METHOD, compute the vertical deflections and slopes at points B and D (Again, symmetry can help here). Is the vertical deflection at B maximum between A and C; why or why not? (*30 points*)

Calculations and Diagrams:

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Figure II

Referring to <u>Figure II</u>, the frame members have AB, BC, CD, and BE have the same length L. Neglect the own weight of the frame.

Let all members have the same EI. Predict, without calculations, the direction of deflections/rotations of joints B and C (up or down, left or right, cw or ccw), and sketch your predicted deflected shape of the frame. (5 points)
 Neglecting axial deformations, compute the deflections/rotations in all joints, and compare with your predictions. (15 points)

Calculations and Diagrams:

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2.	Sk a. b. c. d.	etch the deflected shapes for the frames under the following conditions: (15 points) Member ABC is very stiff (all other members are normal). Member CD is very stiff (all other members are normal). Member BE is very stiff (all other members are normal). All members are very stiff.
		Calculations and Diagrams:
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EXTRA SHEET: Continued from page _____

Name:	<u>ID#:</u>
Calculations and/or Diagrams:	

EXTRA SHEET: Continued from page _____

<u>Name:</u> <u>ID#:</u>	
	Calculations and/or Diagrams: