DEPARTMENT OF CIVIL ENGINEERING
UNIVERSITY OF TORONTO

CIV416F REINFORCED CONCRETE II

Final Examination

December 18, 2001

Last Name: **Initials**

Student Number:

Read the following instructions carefully

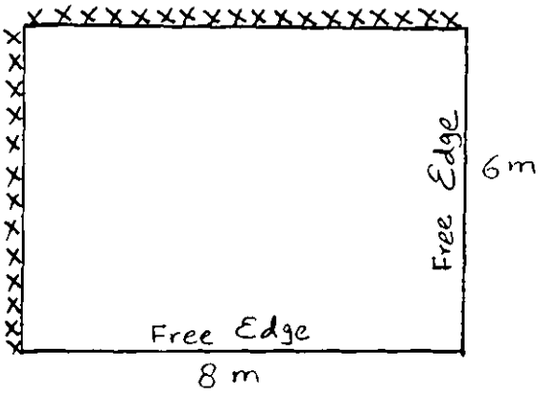
1. **This is an open book, open notes examination.**
2. **Write your name on all sheets.**
3. **Use back of the sheets if necessary.**
4. **Marks for each question are shown in parenthesis.**
5. **Make any assumptions required and state them clearly.**

Question	Marks
1	/25
2	/25
3	/25
4	/25
Total	/100

Name _____

1. Design the slab shown below using strip method. Use f'_c =30 MPa and f_y = 400 MPa. The superimposed dead load is 2.5 kN/m² and live load is 6 kN/m². Use slab thickness of 190 mm. Does this thickness satisfy the A23.3-94 code. Sketch the details of slab reinforcement clearly.

(25)



Name _____

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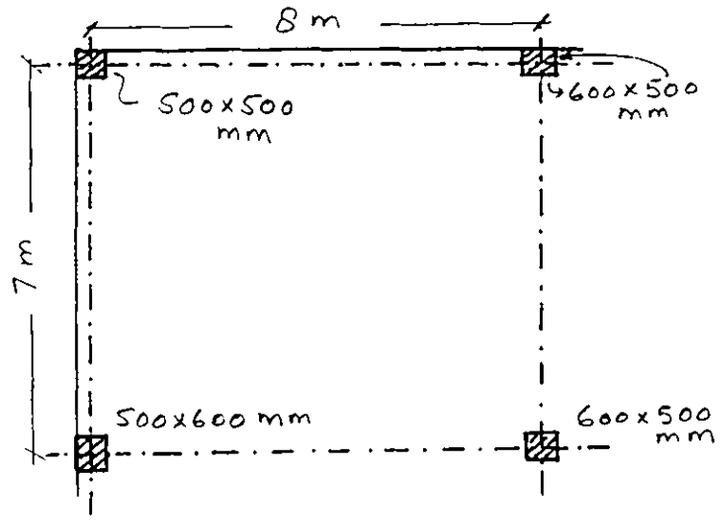
2. A corner panel of a slab system in a building is shown below. The concrete strength is 35 MPa and steel yield strength is 400 MPa. Calculate the uniformly distributed load that the floor can carry safely considering the two-way shear in the corner column according to the A23·3-94 Code. Assume the only dead load is that of the 190 mm slab. Assume effective depth of slab to be equal to 160 mm.

   What is the maximum load that the slab can carry without failing in punching shear around the corner column?

(25)



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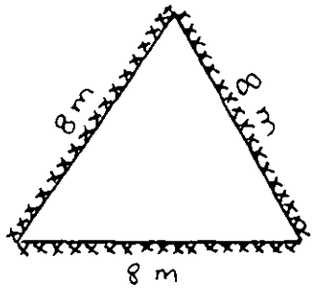
3. The slab shown below failed under a uniformly distributed load. The slab was 160 mm thick and fixed on all edges. The concrete strength f'_c was found to be 30 MPa and steel strength was 420 MPa. Calculate the load that the slab carried before it failed. You can assume effective depth of 130 mm. The flexural reinforcement at the bottom was 10 M @ 300 mm in both directions and the top reinforcement was 10 M @ 200 mm. All the reinforcement was anchored into the supports appropriately.

(25)



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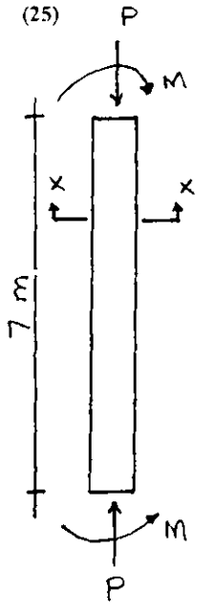
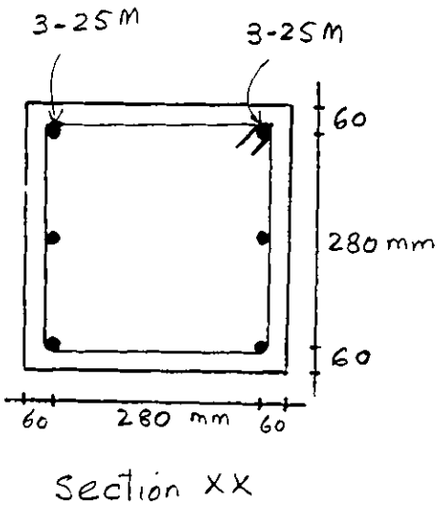
4. A 400 mm square and 7 m long column was tested in the Structures Laboratories of the University of Toronto. The applied axial load was 2,200 kN and the moments at the ends were applied as shown in the figure below. Calculate the moment M at failure. The column section is also shown in the figure. Use f'_c = 30 MPa and f_y = 400 MPa.

(25)





Section XX

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