

QUIZ 2
Fall 2011-12
 (December 20, 2011)
CIVE210 – STATICS
CLOSED BOOK, 2 HOURS

Name: _____

ID#: _____

NOTES

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



YOUR COMMENT(S)

DO NOT WRITE IN THE SPACE BELOW

MY COMMENT(S)

YOUR GRADE

<i>Problem I:</i>	___ /10
<i>Problem II:</i>	___ /15
<i>Problem III:</i>	___ /30
<i>Problem IV:</i>	___ /30
<i>Problem V:</i>	___ /15

<u>TOTAL:</u>	/100
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Problem I: (10 points)

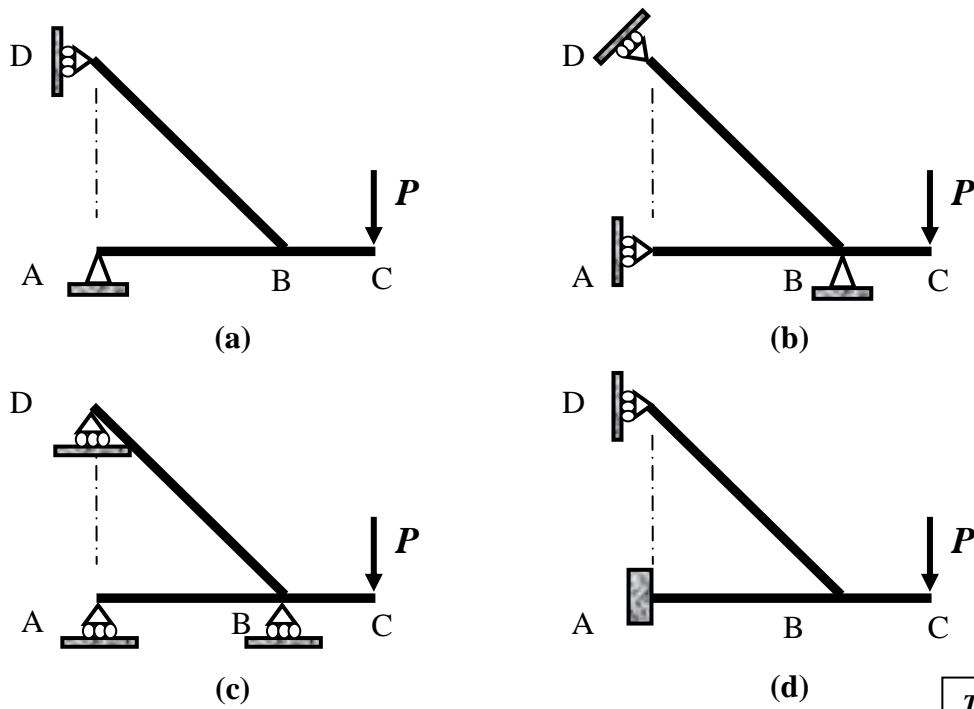


Figure I

Tick Boxes to check that you solved all questions

Discuss very briefly the EXTERNAL stability and determinacy of each of the structural systems shown in Figure I (maximum of 2 lines each). (10 points)

Calculations and/or Diagrams:

Problem II: (15 points)

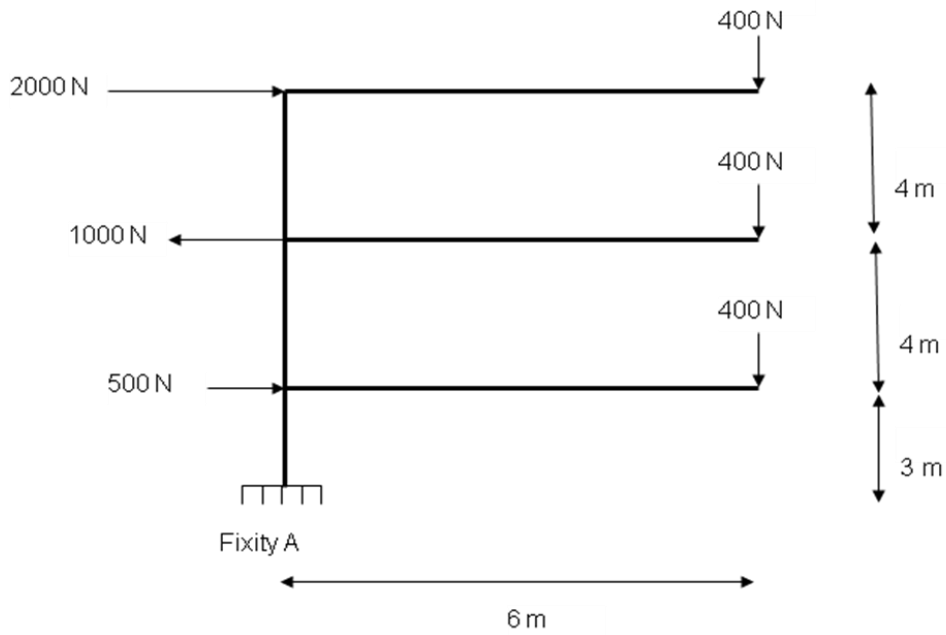


Figure II

Figure II shows a section of a building with 3 floors. Only the balcony section is shown for simplicity. There are 6 forces acting on the building as shown. If the building is in equilibrium, determine the reactions at foundation level (Fixity A). (15 points)

Calculations and/or Diagrams:

Problem III: (30 points)

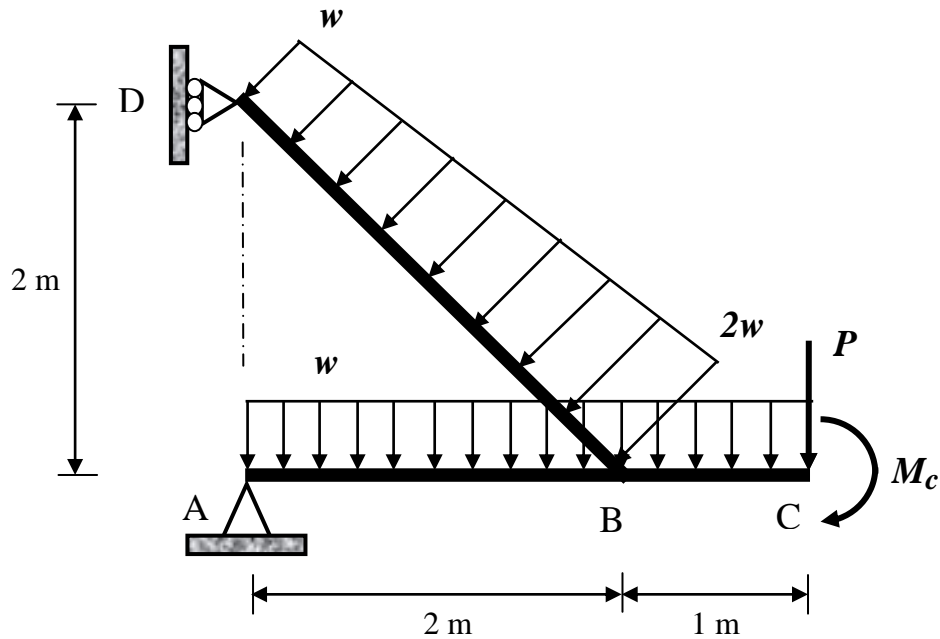


Figure III

The structural system shown in Figure III is stable and statically determinate.

Let $w=500 \text{ N/m}$, $P=1,000 \text{ N}$, and $M_C=2,000 \text{ Nm}$.

- 1- Find a single resultant force (magnitude and direction) that is equivalent to the loads applied. (15 points)
- 2- Determine the location of this force on AC. (8 points)
- 3- Deduce the reactions at A and D. (7 points)

Calculations and/or Diagrams:

Calculations and/or Diagrams (cont'd):

Calculations and/or Diagrams (cont'd):

Problem IV: (30 points)

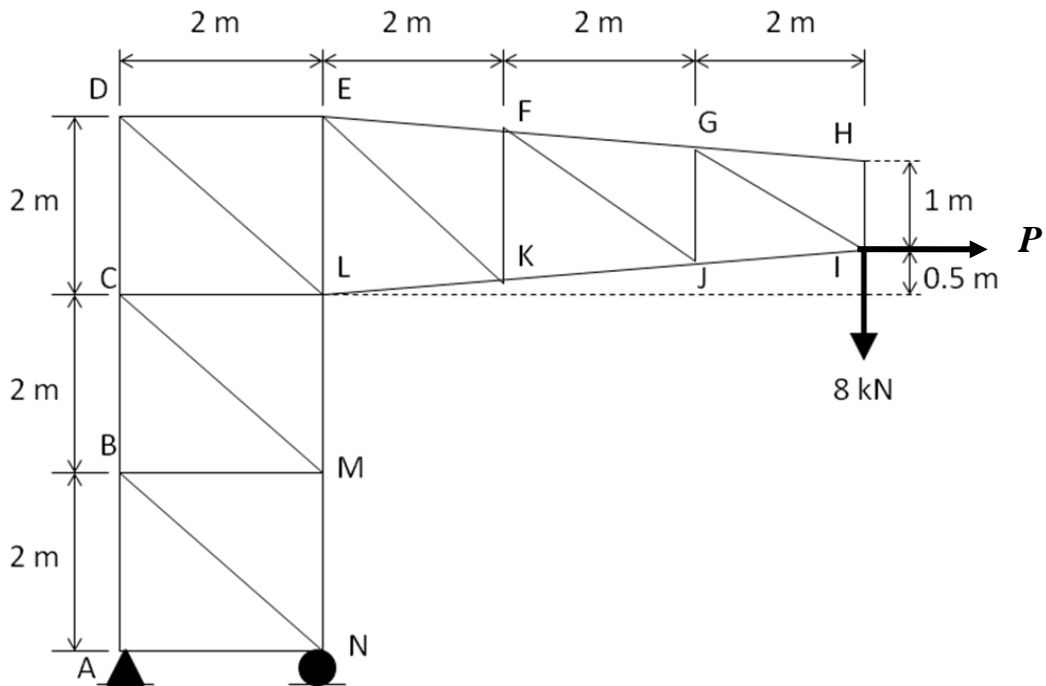


Figure IV

The plane truss shown in Figure IV is stable and statically determinate externally and internally.

- 1- Confirm the determinacy. (3 points)
- 2- Let $P=0$.
Use the method of sections to compute the internal axial forces in members DE, EL, and LK, for the 8 kN load shown, and determine whether these members are in tension or compression. (15 points)
- Deduce the forces in members DL and DC using one appropriate joint. (5 points)
- 3- Calculate the maximum horizontal force P that can be applied at joint I to the right (in addition to the existing 8 kN vertical load) so that member DE does not fail. Assume that the maximum load in tension that the truss members can take is 26 kN, while the maximum compression force is 38 kN. (7 points)

Calculations and/or Diagrams:

Problem V: (15 points)

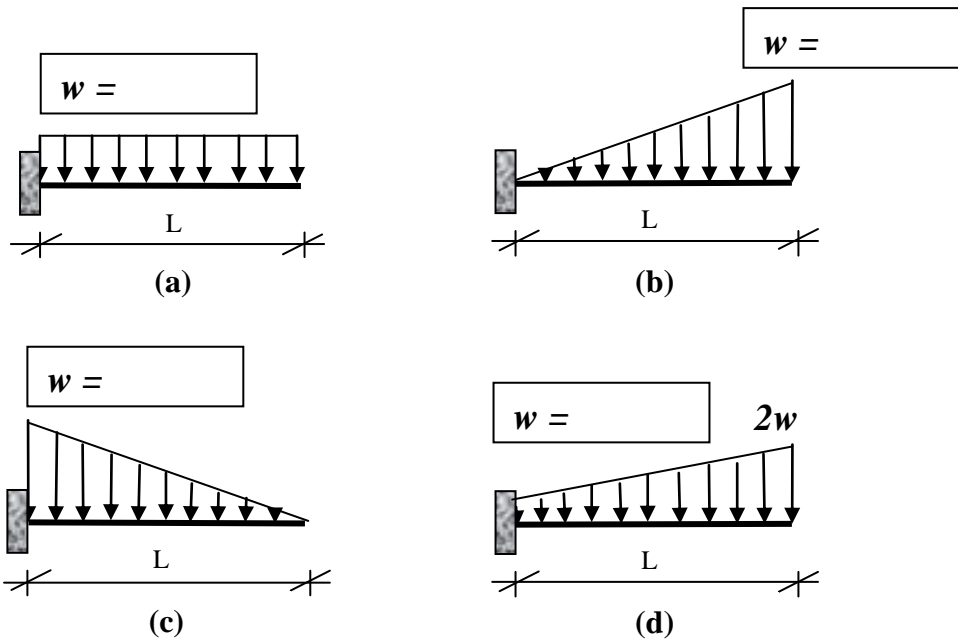


Figure V

The fixed-end cantilever beams shown in Figure V are loaded with different types of distributed loads in (a), (b), (c), and (d).

- 1- If the equivalent load on each of these beams is the same and equal to P , determine the value of w for each the cases and write it on the figures above. (8 points)
- 2- Knowing therefore that the vertical reactions at the fixed ends are equal to P upward in all beams, estimate, without calculations, which beam has the largest (counter-clockwise) moment reaction to smallest; write them down in the order as below and explain the reason of your choice VERY briefly in 2-3 lines maximum. (7 points)

$$M() > M() > M() > M()$$

Calculations and/or Diagrams:

EXTRA SHEET 1: Continued from page _____

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Calculations and/or Diagrams:
