QUIZ 1
Fall 2012-13
(November 5, 2012)
CIVE210 – STATICS
CLOSED BOOK, 1 HR 30 MN

Name: _____ **ID#:** _____

NOTES

- 4 PROBLEMS– 13 PAGES.
- ALL YOUR ANSWERS SHOULD BE PROVIDED ON THE QUESTION SHEETS.
- **TWO EXTRA SHEETS ARE 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

Problem I:	_ _ _ /15
Problem II:	_ _ _ /30
Problem III:	_ _ _ /25
Problem IV:	_ _ _ /30
Bonus/Extras – Organization, Neatness, Special, …:	_ _ _
TOTAL:	/100

Problem I: *(15 points)*

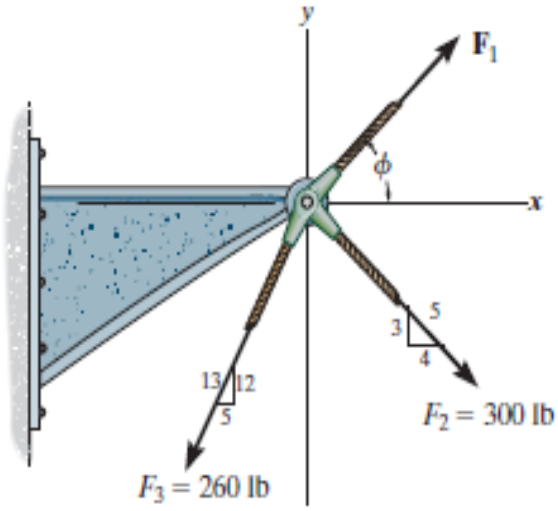

Figure I

Tick Boxes to check that you solved all questions ☐

Referring to Figure I, if the magnitude of the resultant force acting on the bracket is 400 lb directed along the positive *x* axis, determine the magnitude of $\mathbf{F}_1$ and its direction ϕ. *(15 points)*

Calculations and/or Diagrams:

Calculations and/or Diagrams (cont'd):

Problem II: *(30 points)*

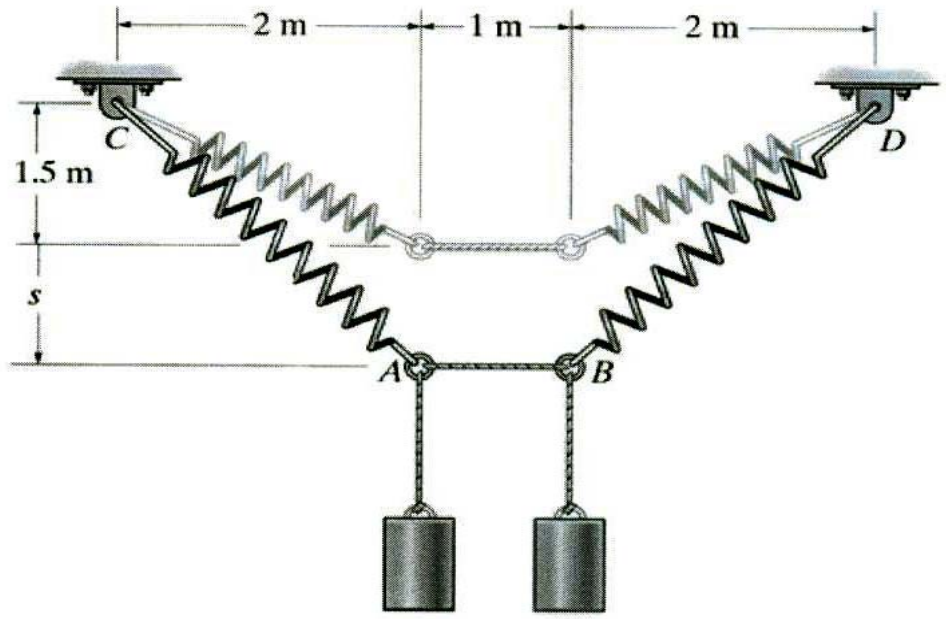

Figure II

1- Referring to Figure II, the identical cylinders weighing 20 N each cause a sag of s = 0.5m in the system when suspended from the rings at *A* and *B*. Determine the stiffness ***k*** of the identical springs. Note that ***s*** = 0 when the cylinders are removed. *(15 points)* ☐

2- Using the stiffness ***k*** obtained earlier, if the cylinder weights are now 40 N each, compute the new sag ***s***. Compare with ***s*** = 0.5m and very briefly comment (1 or 2 lines). *(15 points)* ☐

Calculations and/or Diagrams:

Calculations and/or Diagrams (cont'd):

Problem III: *(25 points)*

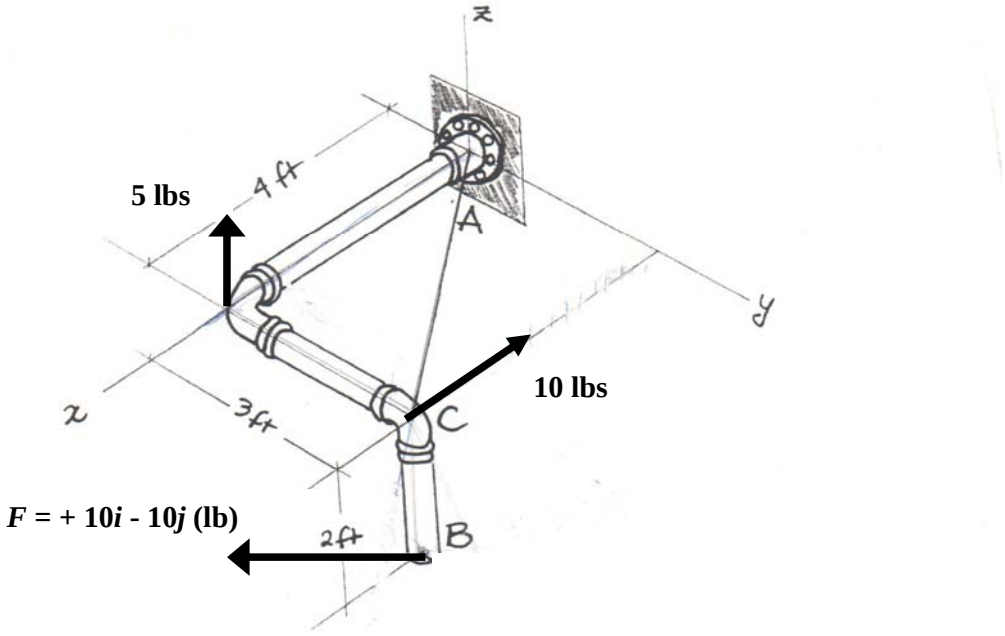

Figure III

The rigid pipe system is subjected to the forces shown in Figure III.

1. Use a cross-product approach, compute the moment from the three forces at the support A in Cartesian vector form. *(12 points).* ☐
2. Re-compute the three components Mx, My, and Mz at A due to the three forces using a simple scalar approach, and compare with question 1. *(6 points)* ☐
3. Determine the component of this moment about an axis extending between points A and C. Express the results as Cartesian vectors. *(7 points)* ☐

Calculations and/or Diagrams:

Calculations and/or Diagrams (cont'd):

Calculations and/or Diagrams (cont'd):

Problem IV: *(30 points)*

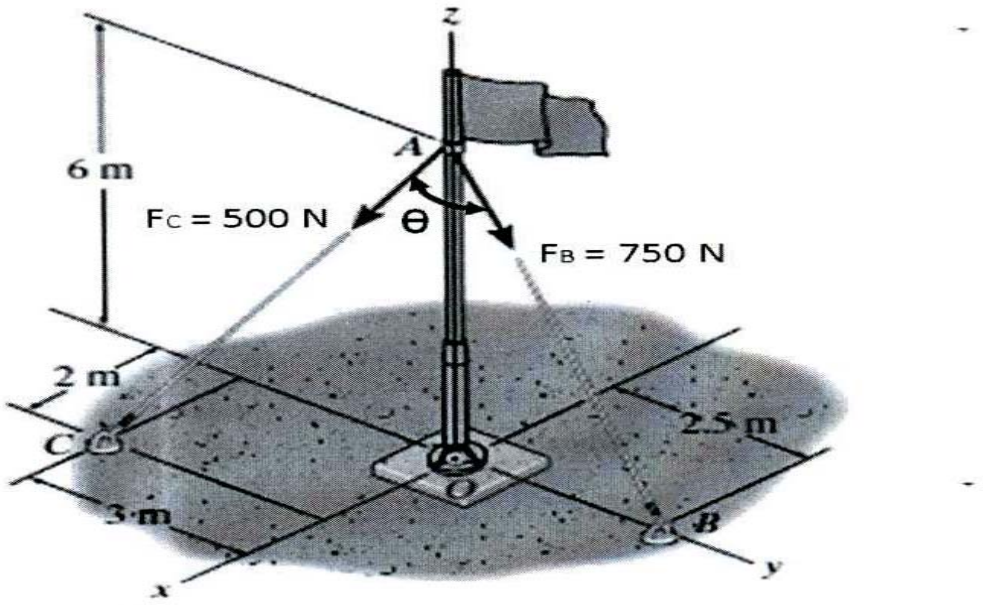

Figure IV

The two forces F_C and F_B are acting on the pole at point A as shown in Figure IV.

1. Determine the projection of the resultant force F_R of F_C and F_B acting along CB and perpendicular to it. Write the results in vector Cartesian form. *(20 points)* ☐
2. Determine the angle θ between the two forces. *(10 points)* ☐

Calculations and/or Diagrams:

Calculations and/or Diagrams (cont'd):

Calculations and/or Diagrams (cont'd):

EXTRA SHEET 1: Continued from page _____

Name: _____ **ID#:** _____

Calculations and/or Diagrams:

EXTRA SHEET 2: Continued from page _____

Name: _____ **ID#:** _____

Calculations and/or Diagrams: