**CE C30/ME C85, Section 2, Midterm Examination**

Open books and notes, online, 1 hour

Maximum of 3 one-sided pages per problem

October 21, 2020

LAST NAME: _____

FIRST NAME: _____

LAST 4 DIGITS OF STUDENT ID #: ___ ___ ___ ___

**BOX YOUR ANSWERS**

**NUMBER PAGES PER PROBLEM**

**Page 1.1**, **Page 1.2**, ...

**Page 2.1**, ...

...

| | |
|---|---|
| **Problem 1:** | **/40** |
| **Problem 2:** | **/25** |
| **Problem 3:** | **/35** |
| **TOTAL:** | **/100** |

**CE C30/ME C85, Section 2, Fall Semester 2020**

**Online Examinations Honor Code Statement**

LAST NAME: _____

FIRST NAME: _____

LAST 4 DIGITS OF STUDENT ID #: ___ ___ ___ ___

**By signing below, I acknowledge that, following the earlier established and agreed rules for online examinations in this course:**

**(1) I have worked out this examination individually,**

**(2) I have not discussed nor communicated about any part of the exam with anybody, in any way, during the exam,**

**(3) I have complied with the time assigned to the exam and its submission, acknowledging that no late submissions are accepted, and**

**(4) The pages included in the PDF file that I am submitting form the totality of my exam, complying with the limitation of three one-sided pages maximum per problem.**

SIGNATURE: _____

DATE & TIME: _____

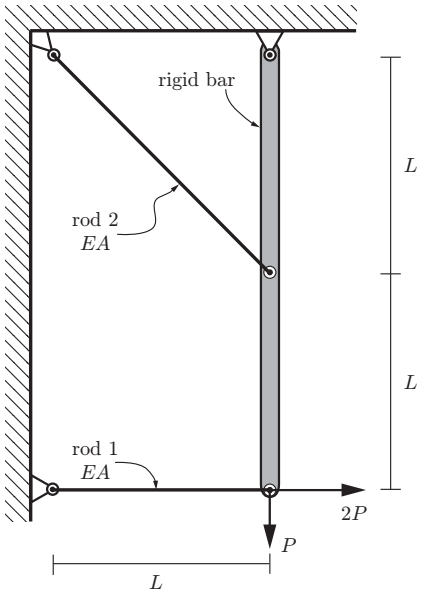
Please sign, date and upload with your examination
as PDF to the `bcourses` website.

**Problem #1** (40%)

A rigid bar hangs vertically from the ceiling held by two elastic rods as shown in the figure. The rods have the same Young modulus $E$ and cross section area $A$. All connections are pinned, and all members can be considered weightless.

A vertical load $P$ and a horizontal force $2P$ are applied at the bottom tip of the bar, as shown. Determine:

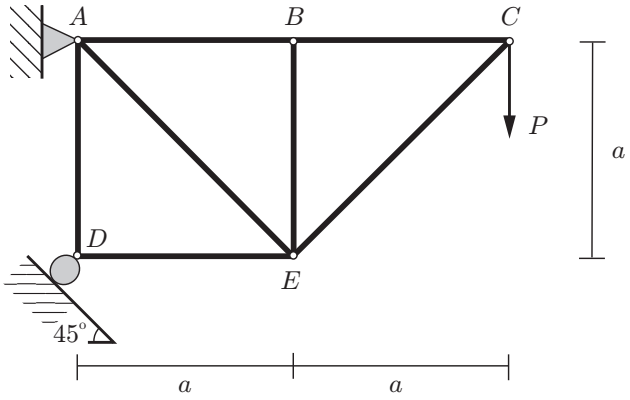
1. The forces in the rods.
2. The displacement of the bottom tip of the bar.




---

**Problem #2** (25%)

1. Determine the forces in all the members in the truss of the figure when the vertical load of value $P$ shown in the figure is applied. Indicate clearly if the member is in tension or compression.
2. If all the members have the same $0.1 \times 0.1\ m^2$ square cross section, determine the maximum load value $P$ that can be applied with a factor of safety of 1.5 if the material can only take $10MPa$ in tension or compression.




---

**Problem #3** (35%)

Draw the axial force, transversal shear force and bending moment diagrams for the beam shown in the figure. Indicate the characteristic values (min/max values, values at the ends and supports, slopes, linear/parabolic/cubic distributions,...).