ADDIS ABABA UNIVERSITY

ADDIS ABABA INSTITUTE OF TECHNOLOGY, AAiT

SCHOOL OF CIVIL AND ENVIRONMENTAL ENGINEERING

Engineering Mechanics I (statics) (Ceng 1051) **Exam Date: Feb 13, 2017**

Final Examination **Time Allowed:** 3**hrs**

Instruction:

- Attempt all questions
- Show clearly the steps of your works
- Cheating is strictly forbidden

1) Write shear and moment equations for the beam given in fig.1. Let x be the distance measured from left end of the beam. Also, draw shear and moment diagrams, specifying values at all change of loading positions and at points of zero shears. Neglect the mass of the beam. (20pts)

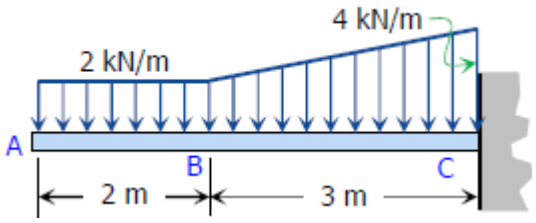


Fig.1

2) For the truss shown in fig.2 below: (20pts)
   a) Determine the member forces of **AB**, **BC** and **CJ**
   b) Identify zero force members
   c) Explain why zero force members provide in truss.

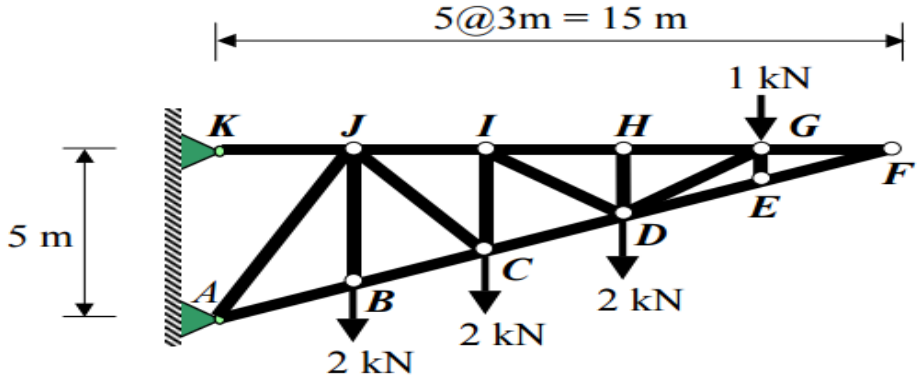


Fig.2

3) Determine the moment of inertia, product of inertia and the radius of gyration of the shaded area shown in fig.3 with respect to the x and y axes and with respect to the centroid axes. (20pts)

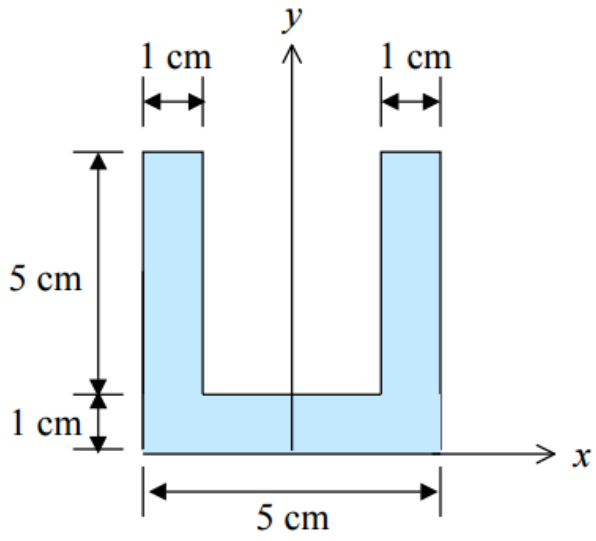


fig.3

Good Luck!