Homework 3

Strength of Materials

Fall 2015

Name: Student ID No.: 

1. The rigid lever arm is supported by two A-36 steel wires having the same diameter of 4 mm. Determine the smallest force $P$ that will cause (a) only one of the wires to yield; (b) both wires to yield. Consider A-36 steel as an elastic-perfectly plastic material.

2. The three suspender bars are made of A-36 steel and have equal cross-sectional areas of 450 mm$^2$. Determine the average normal stress in each bar if the rigid beam is subjected to the loading shown.

3. The rigid bar supports the 4 kN load. Determine the normal stress in each A-36 steel cable if each cable has a cross-sectional area of 25 mm$^2$. 

4. The three suspender bars are made of the same material and have equal cross-sectional areas \( A \). Determine the average normal stress in each bar if the rigid beam \( ACE \) is subjected to the force \( P \).

5. The linkage is made of two pin-connected A-36 steel members, each having a cross-sectional area of 1000 mm\(^2\). Determine the magnitude of the force \( P \) needed to displace point \( A \) 0.625 mm downward (vertical displacement of point \( A \) is 0.625 mm).