September 16th, 2003 NAME_____

AE3120 - TEST#1

Question # 1 (15 points)

Definitions:

1- What is the difference between the type of stress and stress distribution in a beam subject to uniform bending moment as compared to a beam subject to an axial force?

2- What is the Neutral axis?

3- Which principle is used in deriving the shear stress in a beam subject to non-uniform bending?

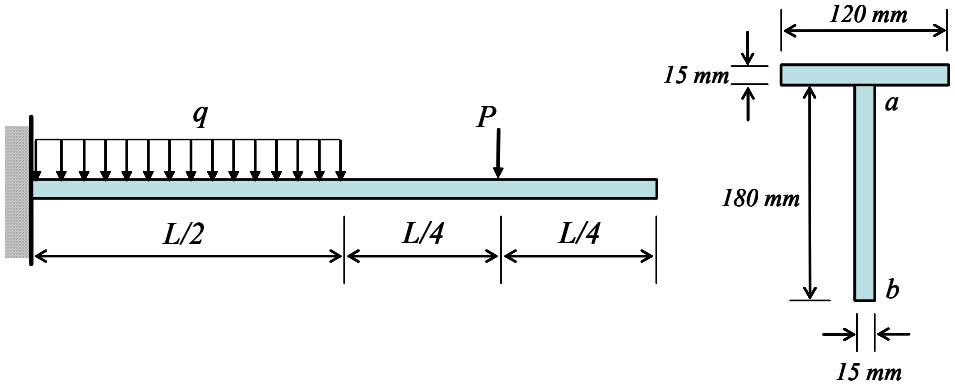
Question # 2 (85 points)

In the cantilever beam shown below given that q = 10 N/m, P = 5 N and L = 10 m

1- Determine the shear force and bending moment diagrams. (derive equations and sketch distribution).

2- Sketch the distribution of normal stress over the cross-section located at L/2 from the support. Determine the neutral axis and the maximum stress values.

3- Sketch the distribution of shear stress over the web (portion *a*-*b*) cross-section at the support and determine its maximum value.



BONUS: Comment on the relationship between maximum axial stress and maximum shear stress in the beam.