**1. (20pts)** Please define the following terms:
(a) percent elongation, (b) idealized elastoplastic material, (c) thermal strain, (d) bulk modulus, (e) dilatation, (f) shear strain, (g) pure bending, (h) elastic section modulus, (i) shear flow, (j) strain energy density.

2. (20pts) The rigid rod ABC is supported from three wires of the same material. The cross-sectional area of the wire at B is equal to half of the cross-sectional area of the wires at A and C. Determine the tension in each wire caused by the load P.
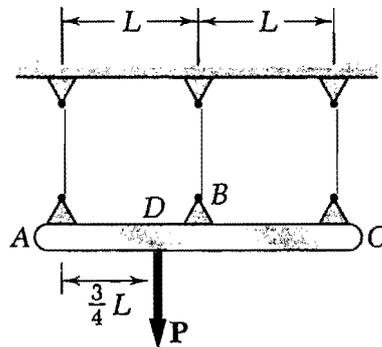
3. (10pts) Draw the shear and bending-moment diagrams for the beam and loading shown.


Dimensions in mm
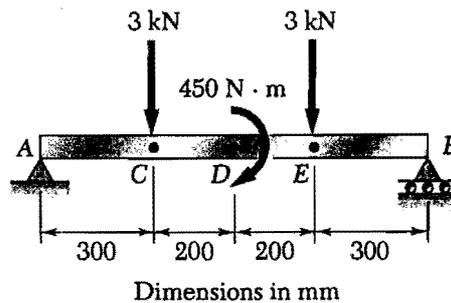
4. (10pts) The bulk storage tank shown has as outer diameter of 3.3 m and a wall thickness of 18 mm. At a time when the inter pressure of the tank is 1.5 MPa, determine the maximum normal stress and the maximum shearing stress in the tank.
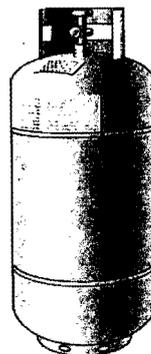
(背面仍有題目,請繼續作答)

5.(25pts) The steel pipe AB has a 72-mm outer diameter and a 5-mm wall thickness. Knowing that arm CDE is rigidly attached to the pipe, determine the principal stresses, principal planes, and maximum shearing stress at point H.
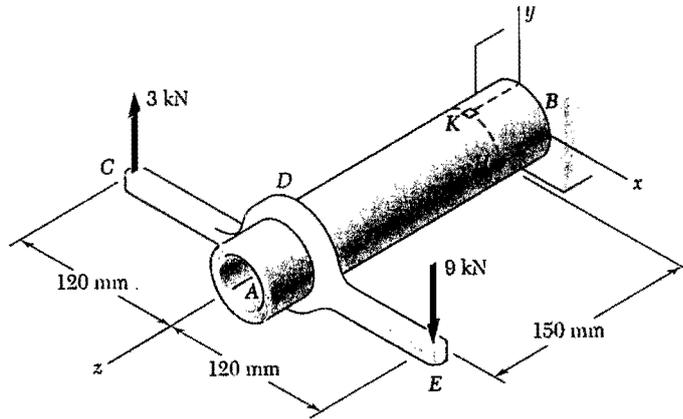
6.(15pts) For the beam and loading shown, determine the reaction at the roller support, knowing that a is equal to $L/3$.