

**CE 203 STRUCTURAL MECHANICS I**

First Semester 2012 / 2013 (121)

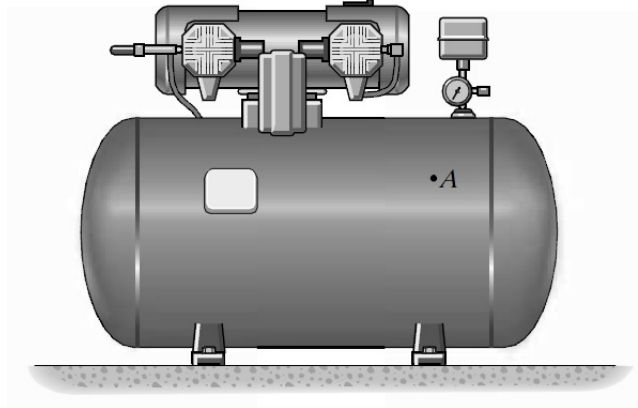
**HOMEWORK NO. 14**

- **Textbook Sections Covered:** Chapter 9 (Transformation of Stress)
- **DUE DATE:** Monday, 24 December 2012

1 - Solve problem 9-23 in your textbook, but make the following changes : **point A is located at 50 mm from the bottom (instead of 75mm) , and the angle of inclination of grain is 40 degrees (instead of 25 degrees).** Use Transformation equations to solve this problem.

2 – The cylindrical tank of the air compressor has an internal radius of 60mm and the wall thickness is 4 mm. Determine the largest value of internal pressure that can be applied. Given: allowable normal stress is 50 MPa , and the allowable shear stress is 12 MPa.

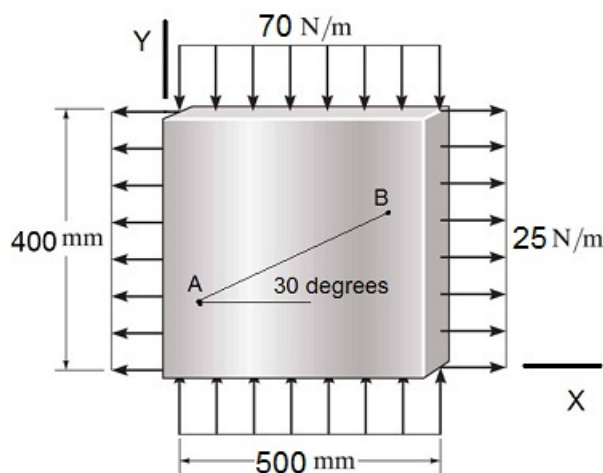
Use Transformation equations to solve this problem.



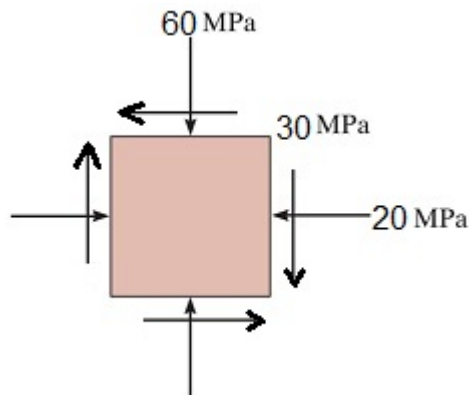
3 – A rectangular plate ( thickness = 15 mm) is subjected to the given distributed loads.

- Determine the normal and shear stresses acting on plane AB. Show the results on an element.
- Determine the maximum shear stress obtained by rotating the element . Show the results on an element.

Use Transformation equations to solve this problem.



4- Using the element shown below: i) determine the equivalent state of stress if the element is rotated by 50 degrees clockwise, ii) determine the principal normal stresses and orientation, iii) determine the maximum shear stress and orientation. Show the result of each part on a properly-oriented element. *Use Mohr's Circle to solve this problem.*



4- Using the element shown below: i) determine the state of stress normal and tangent to line AB, ii) determine the principal normal stresses and orientation, iii) determine the maximum shear stress and orientation. Show the result of each part on a properly-oriented element.

*Use Mohr's Circle to solve this problem.*

