CBE 218-CHEMICAL ENGINEERING-II

Homework#2
(Due by Fri Feb 4th)

Q1 Estimate the necessary wall thickness for a horizontal cylindrical pressure vessel with a diameter of 1 m, a working pressure of 300 psig and design tensile stress of 25,000 psig.

Q2 A storage tank has a flat, horizontal, circular roof 5 m in diameter. What force does the atmosphere exert on the roof?

Q3 An open tank containing a liquid 15 ft deep is sitting on an elevator. Calculate the absolute and gauge pressure at the bottom of the tank when a) the elevator is standing still, b) the elevator is accelerating upward at the rate of 15 ft/s², and c) the elevator is accelerating downward at 15 ft/s².

Q4 A sample of methane is confined in a water manometer. The temperature of the system is 30.0 °C and the atmospheric pressure is 98.70 kPa. What is the pressure of the methane gas, if the height of the water in the manometer is 30.0 mm higher on the confined gas side of the manometer than on the open to the atmosphere side. (Density of Hg is 13.534 g/cc).