MM 203 Assignment 2

Q1. A long, thin plate of width b, thickness t and length L is placed between two rigid walls a distance b apart and is acted on by an axial force P, as shown in Fig. Find the deflection of the plate parallel to the force P.



Q2. A pressurized steel tank is constructed with helical weld that makes an angle α= 55° with the longitudinal axis (see fig.). The tank has radius r= 0.6 m, wall thickness t= 18 mm, and internal pressure p = 2.8 MPa. In addition, the steel has modulus of elasticity E = 200 GPa and Poisson’s ratio v= 0.30.

Determine the following quantities for the cylindrical part of tank.

1. The circumferential and longitudinal stresses
2. The maximum in-plane and out-of-plane shear stresses
3. The circumferential and longitudinal strains



Q3. A composite hoop consists of a brass hoop of 300 mm internal radius and 3 mm thickness, a steel hoop of 303 mm internal radius and 6 mm radial thickness. Both hoops are 6mm thick normal to the plane of hoop. If a radial pressure of 1.4 MN/m3 is put in the brass hoop, estimate the tangential forces in brass and steel hoops.



Q4. A long, thin- walled cylindrical tank of length L, wall thickness t and radius r just fits between two rigid end walls when there is no pressure in the tank. Estimate the force exerted on the rigid walls by the tank when the pressure in the tank is p and the material of which the tank is made follows Hook’s Law.

