Arab Academy for Science, Technology & Maritime Transport.
College of Engineering & Technology,
Mechanical Engineering Department.

Stress analysis (ME 276)
Sheet No. 8.

(1) A cylindrical pressure vessel has an inner diameter of 1.2 m and a thickness of 12 mm. Determine the maximum internal pressure it can sustain so that neither its circumferential nor its longitudinal stress component exceeds 140 MPa. Under the same conditions, what is the maximum internal pressure that a similar-diameter spherical vessel can sustain?

(2) A spherical gas tank has an inner radius of r = 1.5 m. If it is subjected to an internal pressure of P = 300 KPa, determine its required thickness if the maximum normal stress is not to exceed 12 MPa.

(3) A pressurized spherical tank is to be made of 12-mm-thick steel. If it is subjected to an internal pressure of P = 1.4 MPa, determine its outer radius if the maximum normal stress is not to exceed 105 MPa.