1. When can a vessel be considered thin-walled?

2. Draw free body diagrams of a cylindrical vessel that highlight the relevant stresses. Write the equations for these stresses and define all the variables.

3. Which of the equations from the cylindrical vessel is also relevant to spherical vessels?

4. A pressurized spherical tank is made of 0.5 in thick steel with an inner radius of 18 inches. How much internal pressure can the tank handle if the maximum normal stress cannot exceed 10 ksi?

5. A pressurized spherical tank is made of steel has an inner radius of 18 inches. The tank is subjected to an internal pressure of 300 psi and cannot exceed a maximum normal stress of 10 ksi. Determine the minimum required thickness.

6. A pressurized spherical tank is made of 0.5 in thick steel. The tank is subjected to an internal pressure of 300 psi and cannot exceed a maximum normal stress of 10 ksi. Determine the minimum internal radius.

7. A cast iron water pipe has an inner diameter of 16 in. and a wall thickness of 0.75 in. If the water pressure is 400 psi as it passes through the pipe, determine the longitudinal and hoop stress developed in the wall of the pipe. Draw the state of stress on a volume element located on the wall of the pipe.

8. A cast iron water pipe has an inner diameter of 16 in. and a wall thickness of 0.75 in. A blockage occurs at one end causing the water to build up in the pipe. If the water pressure is 500 psi as it sits in the pipe, determine the longitudinal and hoop stress developed in the wall of the pipe. Draw the state of stress on a volume element located on the wall of the pipe.

9. An inner ring has a radius of 10 mm and an outer radius of 12 mm. An outer ring has an inner radius of 11.5 mm and an outer radius of 14 mm. The outer ring is heated and fitted over the inner ring. Both rings are made of A992 steel. Once both rings reach the same temperature, determine the pressure between the two rings.