

Quiz #2

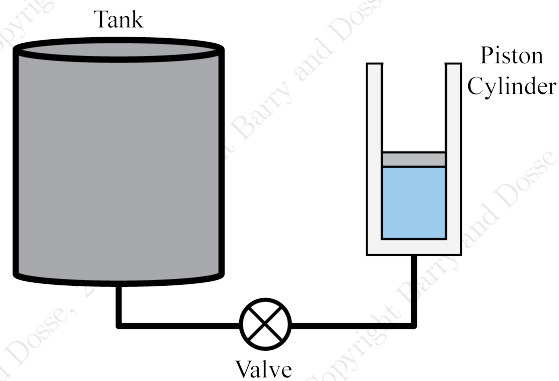
MEMS 0051 - Introduction to Thermodynamics

Assigned: May 28th, 2020

Due: May 29th, 2020, 11:59 pm

Problem #1

A piston-cylinder device is connected to a tank by a valve as shown in the figure below. The tank has a volume of $0.5 \text{ [m}^3\text{]}$ and initially contains water at $1,000 \text{ [kPa]}$ and $200 \text{ }^\circ\text{C}$. The piston-cylinder is initially evacuated and the piston has an area of $0.2 \text{ [m}^2\text{]}$ and requires 200 [kPa] to float above the bottom of the cylinder (i.e. any pressure greater than 200 [kPa] will cause the piston to rise upwards). The valve is now opened and water flows into the piston-cylinder until the piston rises to a height of 5.5 [m] , where the valve is then closed. If the water in the tank is now saturated vapor/steam and is at a pressure of 500 [kPa] , determine the following:



- The final temperature of the water in the tank, $T_{2,T}$;
- The final specific volume of the water in the piston-cylinder, $\nu_{2,P}$;
- The final temperature of the water in the piston-cylinder, $T_{2,P}$.

Academic Integrity Statement:

I hereby attest that I have received no assistance (from a friend, from another student, from an on-line resource, such as Chegg, etc.), and that I have provided no assistance to another student, during this examination. All the work presented within is solely my own work.

Signature: _____

Date: _____