

## Quiz #2

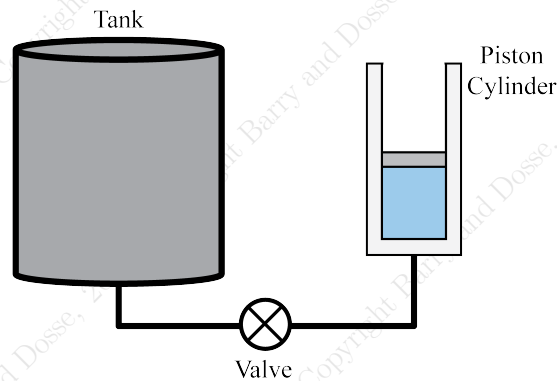
MEMS 0051 - Introduction to Thermodynamics

Assigned: May 28<sup>th</sup>, 2020

Due: May 29<sup>th</sup>, 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  $200 \text{ [kPa]}$  to float above the bottom of the cylinder (i.e. any pressure greater than  $200 \text{ [kPa]}$  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  $5.5 \text{ [m]}$ , where the valve is then closed. If the water in the tank is now saturated vapor/steam and is at a pressure of  $500 \text{ [kPa]}$ , 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: \_\_\_\_\_