Thermodynamics (MEL2020)
Indian Institute of Technology Jodhpur

Assignment-5 Date: 3rd February 2022

Maximum points: 1 **Instructions:**

- *Answer all the questions*
- *Please write your solutions/explanations on a paper with your handwriting*
- *Scan all pages as a single pdf file and upload in google classroom before 06-02-22*
- *This will give you **1 point** towards your total evaluation,*
- ***Late submission lead to deduction of half mark. (This is Very Important)***

1. One kilogram of water fills a 150-L rigid container at an initial pressure of 2 MPa. The container is then cooled to 40°C. Determine the initial temperature and the final pressure of the water. **(0.2 P)**

2. Determine the specific volume, internal energy, and enthalpy of compressed liquid water at 80°C and 20 MPa using the saturated liquid approximation. Compare these values to the ones obtained from the compressed liquid tables. **(0.2 P)**

3. A rigid tank contains water vapor at 250°C and an unknown pressure. When the tank is cooled to 124°C, the vapor starts condensing. Estimate the initial pressure in the tank. **(0.2 P)**

4. A piston-cylinder device initially contains 1.4-kg saturated liquid water at 200°C. Now heat is transferred to the water until the volume quadruples and the cylinder contains saturated vapor only. Determine ***(a)*** the volume of the tank, (*b*) the final temperature and pressure, and *(c)* the internal energy change of the water. **(0.2 P)**

5. Ethylene is heated at constant pressure from 5MPa and 20°C to 200°C. Using the compressibility chart, determine the change in the ethylene's specific volume as a result of this heating. **(0.2 P)**