

Thermodynamics (MEL2020)
Indian Institute of Technology Jodhpur

Assignment-6

Date: 17th February 2022

Maximum points: 1

Instructions:

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- *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 20-02-22*
 - *This will give you **1 point** towards your total evaluation,*
 - ***Late submission lead to deduction of half mark. (This is Very Important)***
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1. A frictionless piston-cylinder device initially contains 50 L of saturated liquid refrigerant-134a. The piston is free to move, and its mass is such that it maintains a pressure of 500 kPa on the refrigerant. The refrigerant is now heated until its temperature rises to 70°C. Calculate the work done during this process. **(0.2 P)**
2. A mass of 2.4 kg of air at 150 kPa and 12°C is contained in a gas-tight, frictionless piston-cylinder device. The air is now compressed to a final pressure of 600 kPa. During the process, heat is transferred from the air such that the temperature inside the cylinder remains constant. Calculate the work input during this process. **(0.2 P)**
3. A fixed mass of saturated water vapor at 300 kPa is isothermally cooled until it is a saturated liquid. Calculate the amount of heat rejected during this process, in kJ/kg. **(0.2 P)**
4. Air is contained in a cylinder device fitted with a piston-cylinder. The piston initially rests on a set of stops, and a pressure of 300 kPa is required to move the piston. Initially, the air is at 100 kPa and 27°C and occupies a volume of 0.4 m³. Determine the amount of heat transferred to the air, in kJ, while increasing the temperature to 1200 K. Assume air has constant specific heats evaluated at 300 K. **(0.4 P)**