

Thermodynamics (MEL2020)
Indian Institute of Technology Jodhpur

Tutorial-10

Date: 6th April 2022

Instructions:

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- *Answer all the questions*
 - *Please write your solutions/explanations on an A4 size paper with your own handwriting*
 - *Scan all pages as a single pdf file and upload in google classroom before 8 PM same day*
 - *This will give you **1 point** towards your total evaluation*
 - *No late submission please! (zero marks for late submission)*
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1. A 25-kg iron block initially at 350 °C is quenched in an insulated tank that contains 100 kg of water at 18 °C. Assuming the water that vaporizes during the process condenses back in the tank, determine the total entropy change during this process.
2. A 50-kg iron block and a 20-kg copper block, both initially at 80 °C, are dropped into a large lake at 15 °C. Thermal equilibrium is established after a while as a result of heat transfer between the blocks and the lake water. Determine the total entropy change for this process.
3. Liquid water enters an adiabatic piping system at 15°C at a rate of 8 kg/s. If the water temperature rises by 0.2°C during flow due to friction, the rate of entropy generation in the pipe is
4. Determine the change in entropy when 2 kg of a gas at 277 K is heated at constant volume to a temperature of 368 K. Take the specific heat at constant volume = 1.42 kJ/kg K.
5. What is the change in entropy when 0.7 m³ of CO₂ and 0.3 m³ of N₂, each at 1 bar and 25 °C blends to form a gas mixture at the same conditions? Assume ideal gases.