

Problem Session #3

- 1) Calculate the temperature increase and final pressure of helium if a mole is compressed adiabatically and reversibly from 44.8 L at 0°C to 22.4 L.
- 2) A mole of argon is allowed to expand adiabatically and reversibly from a pressure of 10 bar and 298.15 K to 1 bar. What is the final temperature, and how much work is done on the argon?
- 3) A tank contains 20 liters of compressed nitrogen at 10 bar and 25°C. Calculate W when the gas is allowed to expand reversibly to 1 bar pressure
 - a) isothermally
 - b) adiabatically ($\bar{C}_p = 29.125$)
- 4) An ideal monatomic gas at 298.15 K and 1 bar is expanded in a reversible adiabatic process to a final pressure of $\frac{1}{2}$ bar. Calculate Q per mole, W per mole and ΔE per mole.
- 5) Consider 1 mole of an ideal gas at an initial pressure of 1.00 atm and initial temperature of 273.15 K. Assume it expands adiabatically against a pressure of 0.435 atm until its volume doubles. Calculate the work, the final temperature, and the ΔE of the process.