# Problem Session#1

**1)** Consider an ideal gas in a piston chamber, where the initial volume is 2 L and the initial pressure is 8 atm. Assume that the piston is moving up (that is, the system is expanding) to a final volume of 5.5 L against a constant external pressure of 1.75 atm. Also assume constant temperature for the process.
**a)** Calculate the work for the process.
**b)** Calculate the final pressure of the gas.

**2)**  One mole of an ideal gas expands from 5 bar to 1 bar at 298 K. Calculate w
**a)** for a reversible expansion and
**b)** for an expansion against a constant external pressure of 1 bar.

**3)** One mole nitrogen at 25°C and 1 bar is expanded reversibly and isothermally to a pressure of 0.132 bar.
**a)** How much work W is done on the gas?
**b)** How much work W is done on the gas if it is expanded against a constant pressure of 0.132 bar?

**4)** An ideal gas is expanded reversibly and isothermally from 10 bar to 1 bar at 298.15 K. What are the values of
**a)** W per mole
**b)** Q per mole
**c)** $\overline{\Delta E}$
**d)** $\overline{\Delta H}$
**e)** If the ideal gas expands isothermally against a constant pressure of 1 bar, how much work is done on the gas?