Assignment 2

1. Boiling point of liquid bromine and liquid hydrogen sulphide is +60 C and -60 C. Calculate the latent heat of vaporization per mole (Assume Trouton's Rule that Molar Entropy of vaporization is 85 kJ/M).

2. A solid of heat capacity 100 J/K is allowed to cool from 100 C to 27 C in air. Calculate total entropy change (system + surrounding) assuming the heat capacity of the solid is constant.

3. Briefly justify the statement- "Molar Entropy change is of the order melting < boiling < sublimation."

4. 1 mole of a gas in a sealed container is taken from ground floor to the top of a 100 ft tower. Does it thermodynamic state change?

5. For isothermal expansion of an ideal gas $dE = C_V dT = 0$. As a result, Q=W, i.e. heat is totally converted into work. Does it violate Second law of Thermodynamics?

6. Consider two chambers each containing 1 mole of ideal gas with kinetic energy (KE) distribution- 3000 J (50%), 4000 J (30%), 5000 J (10%), 6000 J (6%), 7000 J (4%). Calculate average KE and hence, temperature (R=8 J). Suppose a ghost (Maxwell's Demon) picks up the molecules and rearrange them as follows – 100% having KE 3000 J in one chamber and rest in other chamber. Calculate temperature of the two chambers.
Is it possible to create such temperature differences?

7. Explain why Molar entropy of vaporization of water (107 kJ/M) is higher than that of liquid bromine (85 kJ/M).