Summary: First Midterm Exam (6 October 2005)

What you should know or be able to do...

1) Calculate partial derivatives and complete differentials.

2) Integrate simple polynomials and exponential functions.

3) State the postulates of Callen (in English, of course).

4) Calculate quasi-static work and heat ($đQ$ and $đW$) associated with different types of processes shown on a *P–V* diagram (adiabatic, isochor, isobaric, isothermal or other processes, given the equation of the curve).

5) Evaluate the formula of an adiabat (give the equation of the curve in the *P–V* plane for which $đQ=0$).

6) Check if a fundamental equation fulfils the criteria of the II-IV postulates of Callen.

7) Derive equations of state from the fundamental equation, both in energy and in entropy representation.

8) Work with molar quantities (u, s, v).

9) Calculate the equilibrium properties of a composite system, given the initial state, the initial and the final internal constrains: thermal and mechanical(&thermal) equilibrium (know the reason, why there is no mechanical equilibrium in an adiabatic system).

10) Transform a fundamental equation into Euler form. Reconstruct the fundamental equation from the equations of state using the Euler equation.