Quiz 9

Answer the questions in the spaces provided. If you run out of room for an answer, continue on the back of the page.

Question:	1	2	3	4	Total
Points:	10	10	5	0	25
Score:					

Name: _____

1. (10 points) State versus process
   (a) Circle all of the following that are **state variables**. If you don't know what a particular variable represents, please ask. For example, p is pressure.

   Solution: p, V, μ, N, T, U, S

   (b) Circle all of the following that are **process (or path-dependent) variables**.

   Solution: q, w

2. (10 points) Intensive versus extensive
   (a) Circle all of the following that are **intensive variables**.

   Solution: p, μ, T

   (b) Circle all of the following that are **extensive variables**.

   Solution: V, N, U, S and you could include q and w, but they aren't really defined in an intensive or extensive fashion, generically.

3. (5 points) Fill in the blanks in the following sentences with the correct words or variables.

   ___**Energy**___ is the capacity to do work. ___**Entropy**___ governs the tendency of matter or energy to flow. The flow of energy (with or without work being done) is ___**heat**___.

   ___**Pressure**___ is a "force" for volume change. Chemical potential is a "force" for **particle number** change.

4. For fun if you finish early: We have a system that has an extensive property X that is conserved: $\mathrm{d}X = 0$. For a system partitioned into parts A and B with a partition that allows equilibration of X between A and B, what is the condition of equilibrium for this system if

$$\frac{\partial S}{\partial X} = -y \tag{1}$$

   where y is some intensive property of the system.

   If A and B are not initially in equilibrium with each other, is the process of A and B equilibrating reversible? quasistatic? adiabatic? Can it be described by some other term?

   Solution: