

# ME 201

## Thermodynamics

### Homework 13 Due Friday, March 17, 2006

1. A reversible process has been defined as a process, which having taken place, can be reversed and in so doing leaves no change in either the system or the surroundings. Six restrictions were imposed

- a. no friction
- b. heat transfer occurs only for infinitesimal temperature differences
- c. unrestrained expansion does not occur
- d. no mixing
- e. no turbulence
- f. no combustion

Choose a process for which one of these restrictions is relaxed and discuss how this process is not reversible.

2. Thirty five (35) kilograms of chicken is to be frozen in a household freezer. The chicken is at  $15^{\circ}\text{C}$  when it is placed in the freezer and reaches  $-20^{\circ}\text{C}$  (well below the freezing point) in 3 hours. If the COP of the freezer is 4.3 during this process, determine the required power input (in kW).