ASSIGNMENT 4

DUE: July 21 Noon.

#Problem 1:
Read Chapter 5 (only the parts corresponding to the lecture). Time yourself.

#Problem 2:
5.1

#Problem 3:
5.4

#Problem 4:
5.8

#Problem 5:
A boiler is to be fed with high pressure water to produce steam. 40 Kg/sec of this steam is to be used in a backpressure turbine, discharging vapor to a steam reforming process that consumes it. The discharge pressure is at 1Mpa. The other part of the steam (50 Kg/s) is sent to a turbine discharging at atmospheric pressure. This outlet steam is then condensed and fed to the boiler through a pump.

a) Draw a flowsheet of this system.
b) What is the total amount of work produced?
c) What is the temperature of the steam entering the steam reforming process?
d) Calculate the amount of heat from fuel needed if the efficiency of the boiler is 80%.

#Problem 6:
Design a vapor-compression refrigeration system to cool a room which is at -10°C, with up to 20 KW of capacity. You can consider you can use cooling water at 20°C to reject heat. You must choose a refrigerant (Go to http://webbook.nist.gov/chemistry/fluid to get the saturation properties in pressure increments).