TEST – MEN211 (Thermodynamics II)

May 09, 2006

1. A refrigerator with R-12 as the working fluid has a minimum temperature of −10°C and a maximum pressure of 1 MPa. The actual adiabatic compressor exit temperature is 60°C. Assume no pressure loss in the heat exchangers. **Find the refrigerating capacity, the heat rejected to the hot space, the coefficient of performance and the isentropic efficiency of the compressor.** (*50 pts*)

2. A steady supply of $1 m^3/s$ air at 25°C, 1 atm and 50% relative humidity is needed to heat a building in the winter. The outdoor ambient is at 10°C, 1 atm and 50% relative humidity. **Is a simple heating process enough to raise the temperature from the outdoor value to the indoor value while maintaining the relative humidity constant? Determine the heat transfer rate required.** (*50 pts*)