ME 201
Thermodynamics

First Law Practice Problems Set #2

1. A student living in a 4m x 6m x 6m dormitory room turns on her 150 W fan before leaving the room on a summer day. The room is initially at 100 kPa and 15°C. Assuming that the room is adiabatic, determine the room temperature 10 hours later.

2. Ethylene Glycol at 90 kPa and 10°C enters a pump with an inlet area of 10 cm² and exits at 140 kPa though an outlet area of 5 cm². For a mass flow rate of 0.2 kg/s determine
   a. the exit temperature
   b. the required power

3. Steam enters one side of a heat exchanger at 10 kPa and a quality of 0.95 and exits at 45°C. Cooling water enters the other side of the heat exchanger at 100 kPa and 20°C and exits at 35°C. Determine the ratio of the mass flow rate of steam to cooling water.