ASSIGNMENT

1. Determine the following unit conversions to SI units: Example 1.1

a. a density value of 60 lbm/ft3 to kg/m3

b. an energy value of 1.7 x 103 Btu to kJ

c. an enthalpy value of 2475 Btu/lbm to kJ/kg

d. a pressure value of 14.69 psig to kPa

e. a viscosity value of 20 cp to Pa s

2. Starting with Newton's second law of motion, determine units of force and weight in SI and English units.

3. The sugar solution is prepared by dissolving 10 kg of sucrose in 90 kg of water. The density of the solution is 1040 kg/m3. Determine

a. concentration, weight per unit weight

b. concentration, weight per unit volume

c. oBrix (see glossary for definition)

4. Convert a moisture content of 85% wet basis to moisture content dry basis (see glossary to understand moisture).

5. A wet food product contains 70% water. After drying, it is found that 80% of original water has been removed. Determine (a) mass of water removed per kilogram of wet food and (b) composition of dried food.

6. Potato flakes (moisture content = 75% wet basis) are being dried in a concurrent flow drier. The moisture content of the air entering the drier is 0.08 kg of water per 1 kg dry air. The moisture content of air leaving the drier is 0.18 kg water per 1 kg of dry air. The air flow rate in the drier is 100 kg dry air per hour. As shown in Figure below, 50 kg of wet potato flakes enter the drier per hour. At steady state, calculate the following:

a. What is the mass flow rate of "dried potatoes"?

b. What is the moisture content, dry basis, of "dried potatoes" exiting the drier?