

1/7/2003

FABE 325	Instructor:Dr. Kaletunç TA : Kelley Yosick
<u>Homework #1</u>	Winter 2003

Homework Due 1/14/2003

1. Prepare a flow chart of the “Living Machine” set-up in the FABE building. In your flow chart label all of individual units and the streams between the various units.
2. Determine the following unit conversions to SI units
 - a. A density value of $60 \text{ lb}_m/\text{ft}^3$ to kg/m^3
 - b. An energy value of $1.7 \times 10^3 \text{ BTU}$ to kJ
 - c. An enthalpy value of $2475 \text{ BTU}/\text{lb}_m$ to kJ/kg
 - d. A pressure value of 14.69 psig to kPa
 - e. Viscosity value of 20 cP to Pa s
 - f. A power value of 120 hp to kJ/min
3. Calculate
 - a. The weight in lb_f of a 10.0-lb_m object
 - b. The weight in N of a 10.0-kg object
 - c. The weight in lb_f of a 4539-g object
4. According to Archimedes’ principle, the mass of a floating object equals the mass of the fluid displaced by the object. Use this principle to solve the following problems.
 - a. A wooden cylinder 30.0 cm high floats vertically in a tub of water (density= $1.00 \text{ g}/\text{cm}^3$). The top of the cylinder is 14.1 cm above the surface of the liquid. What is the density of the wood?
 - b. The same cylinder floats vertically in a liquid of unknown density. The top of the cylinder is 20.7 cm above the surface of the liquid. What is the density?