DUE Friday 09/02/16

Homework Set 2 (20 pts total)

1. (5pts) How many of the following are found in 15.0 kmol of glucose ($C_6H_{12}O_6$)?
   (a) kg glucose, (b) mol glucose, (c) lb-mole glucose

2. (5pts) A suspension of calcium carbonate particles in water flows through a pipe. Your assignment is to determine both the flow rate and the composition of this slurry. You proceed to collect the slurry stream in a graduated cylinder for 1.00 min; you then weight the cylinder, evaporate the water from the cylinder, and then reweigh the cylinder. The following results are obtained:

   Mass of empty cylinder: 65.0 g
   Mass of cylinder + collected slurry: 565 g
   Volume collected: 455 mL
   Mass of cylinder after evaporation: 215 g

   Calculate:
   (a) the volumetric flow rate and mass flow rate of the suspension
   (b) the density of the suspension
   (c) the mass fraction of calcium carbonate ($CaCO_3$) in the suspension.

3. (5pts) Perform the following pressure conversions, assuming when necessary that atmospheric pressure is 1 atm. Unless otherwise stated, the given pressures are absolute.
   i. 2600 mm Hg to psi
   ii. 275 ft H_2O to kPa
   iii. 3.00 atm to N/cm^2
   iv. 280 cm Hg to dyne/m^2
   v. 20 cm Hg of vacuum to atm (absolute)
   vi. 25.0 psig to mm Hg (gauge)
   vii. 25.0 psig to mm Hg (absolute)
   viii. 325 mm Hg to mm Hg gauge
   ix. 35.0 psi to cm of carbon tetrachloride

4. (5pts) Convert the following:
   i. T = 85°F to °R, °C, K
   ii. T = -10°C to K, °F, °R
   iii. ΔT = 85°C to K, °F, °R
   iv. ΔT = 150°R to °F, °C, K