**Engr 130 Homework Assignment #6f – Chapter 6 & Related**

**HFCC Winter, 2012 MW 0910-1030 Wednesday 20 March, 2013**

**Due Wednesday 27 March, 2013**

* **Answer all problems with proper units and correct sig figs.**
* **Thou shalt only use conversions provided below,**

**(unless noted otherwise, all conversions are exact values) :**

* + Length : 1 m = 100 cm, 1 mi = 5280 ft, 1 ft = 12 in, 1 in = 2.54 cm
  + Volume (liquid) : 1 gal = 3.785 L (not exact), 1 L = 1000 cm3
  + Mass : 1 lbm = 0.4356 kg (not exact), 1 kg = 1000 g
  + Time : 1 hr = 60 min, 1 min = 60 s
  + Temperature : 1 K = 1.8 °F
  + Force : 1 N = 1 kgms-2 = 1 (kgm)/s2
  + Energy : 1 J = 1 Nm
  + Multiplier : 1 k = 1000
  1. Solve the following,

1. Number of square inches, in2, in a square foot, ft2. (NOT ft2 per in2!)
2. Number of square centimeters, cm2, in a square inch, in2. (NOT in2 per cm2!)
3. Number of square meters, m2, per square centimeter, cm2. (NOT cm2 per m2!)
   1. A compact car holds 16.0 gallons (gal) of gasoline. Determine the capacity equivalent to 16.0 gal in the following units.
4. Liters, L.
5. Cubic inches, in3.
6. Cubic feet, ft3.
   1. Gasoline has a density of approx. 670 kg/m3. What is the mass, in lbm, the 16.0 gal tank holds?

(Note : that Mass = Density \* Volume)

* 1. A sealed vessel holds a pressure of p = 50.0 psi (pounds per sq in = lbfin-2 = lbf/in2). A circular access hatch has a diameter of 2.0’. (A =  r2).

1. Calculate the total force exerted on the hatch, in lbf. (Note that Force = Pressure \* Area).
2. Knowing that 1 lbf = 1 lbm \* 32.2 fts-2, calculate the total force exerted on the hatch, in N.
   1. Define a physical quantity *H = m Cp (*, Given that *Cp* = 4.19 kJkg-1K-1, *m* = 2.50 lbm, and ** = 68.0 °F,** = 243.0 °F, calculate *H* in J.