Chemistry 106 Fall 2006 Exam 1   **Form**

1) Name _____

YOU ARE TO KEEP THIS COPY OF THE TEST. YOUR NAME IS IN CASE YOU LEAVE IT BEHIND.

2) Use only a #2 pencil on the answer sheet.

3) Before starting the exam fill in your student ID# (not your SS#). Also fill in your name, course number and
   sign the form.

4) Fill in the test form section (A, B, C or D).

5) Do not begin the exam until you are told to.

6) **You will not get your scan sheet back!!!** Circle your answers on this exam sheet and then transfer them to the
   scan sheet when you are satisfied with all your answers. An answer key will be posted on the class web site
   and in the glass case across from the lab after the exam.

7) If atomic weights are needed use only those from the attached periodic table.

8) **No scratch paper is to be used.**   Use the back of this exam sheet if necessary.

9) There are 40 equally weighted questions on this exam. You have 90 minutes to complete them.

10) **If you believe there is more than one correct answer pick only the best answer.**

Useful Data

Constants

$c = 2.998 \times 10^8$ m/s

$h = 6.63 \times 10^{-34}$ Js

density of $H_2O = 1.00$ g/mL

$N_A = 6.022 \times 10^{23}$ amu/g or things/mole

$R = 0.082058$ atm•L•mol^{-1}•K^{-1}
   or 8.31451 J•mol^{-1}•K^{-1}

e (charge on electron) = 1.60×10^{-19} C

$1 D = 3.336 \times 10^{-30}$ C•m

Units

2.54 cm = 1 inch

3.78 L = 1 gal

1 kg = 2.20 lb

1 % = 10,000 ppm

1 hr = 60 min

1 min = 60 seconds

1 amu = 1.660540×10^{-27} kg

Molarity (M) = moles solute/L sol'n

molality (*m*)= moles solute/kg solvent

mole fraction $(X_i) = n_i/n_{tot}$

1 atm = 760 Torr = 760 mm Hg

1 atm = 1.01325×10^5 Pa

1 atm = 1.01325 bar

Equations

% = fraction * 100 %

ppm = fraction * 10^6 ppm

ppb = fraction * 10^9 ppb

T (in Kelvin) = 273.15 + T (in ºC)

$P_{vap} = X_{solv}P^o_{solv}$

$P_{total} = P_1 + P_2 + P_3 + ...$
$\qquad\quad = X_1 P^\circ_1 + X_2 P^\circ_2 + ...$

$\Delta H_{rxn} = \Sigma\Delta H^\circ_f(\text{product}) - \Sigma\Delta H^\circ_f(\text{reactant})$

$\Delta E = q + w$
expansion work = $w = -P\Delta V$

$q = C_p\Delta T = nc_p\Delta T$

$q = n\Delta H_{vap}$ $q = n\Delta H_{fus}$

in a calorimeter $\Delta H = -C_{cal\ contents}\Delta T$