Chemistry 106 Fall 2007 Exam 2 **Form D**

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). Which form you have is shown in the upper right corner.

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) The exam questions are equally weighted. 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

Density of H_2O = 1.00 g/mL

Heat capacity of H_2O=C(H_2O) = 4.184 $J \cdot g^{-1} \cdot K^{-1}$

N_A(Avogadro's #) =6.022 x 10^{23} particles$\cdot mol^{-1}$

R (gas constant) = 8.315 $J \cdot mol^{-1} \cdot K^{-1}$

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 x 10^{-27} kg

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

molality (m)= moles solute/ kg solvent

1 cal = 4.184 J

1 Cal = 1000 cal

Equations

% = fraction • 100 %

ppm = fraction • 10^6ppm

T (in Kelvin) = 273.15 + T (in $^\circ$C)

T (in Celsius) = (5/9) (T (in F) -32)

$q_{sys} = -q_{surr} = C\Delta T$

$\Delta S_{univ} = \Delta S_{sys} + \Delta S_{surr}$

$\Delta H_{soln} = \Delta H_{hyd} + \Delta H_{ionic}$

$\Delta G_{rxn} = \Delta H - T\Delta S$

$\Delta G_{rxn} = \Sigma \Delta G_f^o(\text{product}) - \Sigma \Delta G_f^o(\text{reactant})$

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$\Delta S_{rxn} = \Sigma S_f^o(\text{product}) - \Sigma S_f^o(\text{reactant})$

Rate = $k [A]^m[B]^n$ for aA+bB--> cC+dD

1rst order: $\ln[A]_t = \ln[A]_0 - kt$ or $[A]_t = [A]_o \exp(-kt)$

also $t_{1/2} = 0.693 / k$

2nd order: $1/[A]_t = kt + 1/[A]_0$

$\ln k = (-E_a/R)(1/T) + \ln A$ or $k = A\exp(-E_a/(RT))$

$\ln(k_2/k_1) = (-E_a/R)(1/T_2 - 1/T_1)$