CHEM 102/112 Exam #1
March 3rd 2017 (1 hr 30 min)

(1) Fill in this cover sheet.

(1) On the **Answer Sheet** under Exam Information:

- **Test Version** –bubble in your version, which is located next to your *signed* name on this cover sheet (if not filled in, your paper will not be graded!)

(2) On the **Answer Sheet** under Student Information:

- **STUDENT ID** –write your 8 digit UB person number vertically & bubble in the numbers
- **Integrity Certification** – Sign your name stating you will not cheat on this exam
- **NAME** – print your first name, last name and your
- **UBIT name** – from your email

(3) Check that you have a complete examination (**10 pages – including Formula Sheet and Periodic Table**). Print your name on the top of *every* page of the Examination and hand in ALL pages when you are done.

(4) **To answer a question:** fill in the circle on the bubble sheet that corresponds to the *BEST* answer. You may use a pencil or a pen (blue or black ink only, and no felt tips). **If you decide to change your answer write an "X" over the incorrect answer, fill in the new correct answer *and* write the letter for the *correct* answer to the left of the question number.** Questions with more than one answer marked and not written as stated above will be graded as incorrect. The only answers accepted are those which appear on the bubble sheet.

There are 25 questions, 4 points each (Total possible points = 100)

PLEASE READ AND SIGN THE ACADEMIC HONESTY STATEMENT BELOW.

I hereby certify that the answers given represent my own unaided work.

*Signed:*_____ **Test Version: A**

Printed Name: _____

PersonNumber: __ __ __ __ – __ __ __ __

Day/Time of Recitation: _____ Recitation Code: __ __

Name of TA: _____

Name: _____

1. Consider the following pairs of liquids. Which pairs are **miscible**?

I. Benzene, C_6H_6, and Hexane, C_6H_{14}
II. Water and Methanol, CH_3OH
III. Water and Hexane

A) I & II only
B) II only
C) I only
D) III only
E) I, II & III

2. What are the ideal van't Hoff factors for the following compounds?

BaF_2 $C_6H_{12}O_6$ K_3PO_4 $(NH_4)_2SO_4$

A) 1, 1, 1, 1
B) 3, 1, 4, 1
C) 3, 1, 4, 3
D) 2, 3, 5, 5
E) None of the above

3. A solution made by dissolving 9.81 g of a nonvolatile nonelectrolyte in 90.0 g of water boiled at 100.37 °C and 760.1 mmHg. What is the approximate molecular weight (in g/mol) of the nonelectrolyte substance?

Substance	Normal Boiling Point (°C)	K_b (°C/m)	Normal Freezing Point (°C)	K_f (°C/m)
Water	100.00	0.51	0.00	1.86

A) 240
B) 150
C) 79
D) 61
E) 34

4. At 20. °C and 1.00 atm of partial pressure of O_2, the solubility of O_2 in water is 1.38×10^{-3} M. At sea level however, the partial pressure of O_2 is 0.21 atm. Calculate the concentration (M) of O_2 in water at sea level.

A) 1.4×10^{-3}
B) 6.6×10^{-3}
C) 2.9×10^{-4}
D) 0.21
E) None of these answers are correct

Name: _____

5. (Hw): During the formation of a solution, which step is always an exothermic process?

A) Only the separation of solvent particles to accommodate solute particles ($\Delta H_{solvent}$).
B) The mixing of solute particles and solvent particles with one another (ΔH_{mix}).
C) The overall solution process (ΔH_{Soln}).
D) Only the separation of solute particles from one another (ΔH_{solute}).
E) The separation of solute and solvent particles from one another (ΔH_{solute} and $\Delta H_{solvent}$).

6. A solution is prepared by dissolving 23.7 g of aspirin, $C_9H_8O_4$, in 375 g of water. The density of the resulting solution is 1.05 g/mL. What is the molar concentration of aspirin?

A) 0.347
B) 0.35
C) 54.7
D) 878
E) 0.063

7. Of the concentration units below, only _____ is temperature dependent.

A) mass%
B) ppm
C) mole fraction
D) molarity
E) molality

8. What is the osmotic pressure (in atm) of a solution formed by dissolving 25.0 mg of $CaCl_2$, in 250. mL of water at 25 °C?

A) 7.34
B) 9.01×10^{-4}
C) 0.0661
D) 0.0220
E) 2.25×10^{-4}