**Homework #6: Chemistry 1013 Spring 2014**

**Due Friday 14 March in class**

Your name: \_\_\_\_\_\_\_\_\_\_answers\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 1 pt **\_\_\_/20**

6.1. pH and pOH problems (see pp 149-153 of text also) (2 pts each)

a) What is the pH of an acid solution containing 0.003 M H+? **pH=-log(0.003)=+2.52**

b) What is the pOH of a solution containing 1\*10-13 M H+ pH=-log(1\*10-13)=13, **pOH=14-pH=1**

c) What is the pH of the above solution? **13**

d) The pH of blood is ~7.25. What is the concentration of H+ implied by this?

**[H+]=10-pH 10-7.25 =5.62\*10-8**

e) The pOH of liquid Drano is 0.1. What is the concentration of OH- implied by this?

**[OH-]=10-pOH = 10-0.1 =0.794**

**6.2. Osmotic pressure concepts A B**

Two solutions are separated by a membrane

that passes water but not salt (a semi-permeable

membrane.)

Side A contains 3 g NaCl/Liter. Side B contains no NaCl.

1. What direction is the natural osmotic pressure ? (A🡪B or **B🡪A ?)**
2. Given that the natural osmotic pressure of this system is ~20 psi, in what direction and what pressure would you suggest we apply to purify the water in side A ?

**Put in more than 20 psi pushing from A🡪B**

A blood cell with 3% NaCl inside its walls is suddenly dropped into a NaCl solution containing 1% NaCl.

1. The solution (relative to the blood cell) is: **hypotonic hypertonic**
2. What happens to the cell in the 1% solution ? it swell/ blows up as it tries to absorb water from the surroundings

6.3 . Following the electrons: Writing Complete Electronic **configurations**

Write the complete electronic configurations for the elements below

(for elements containing d electrons, put the s orbitals in their row after the d shell,e.g….3d44s2)

1. **B 1s22s22p1**
2. **Cl 1s22s22p63s23p5**
3. **Mn 1s22s2 2p63s23p6 3d54s2**
4. **Sb 1s22s2 2p63s23p6 3d104s24p6 4d105s25p3**
5. **Ca 1s22s2 2p63s23p6 4s2**