CHM 151 Quiz# 12 Fall 2017 25 Pts Name:_____

ON SEPARATE PAPER, work each of the following problems. SHOW ALL WORK in **neat** form TO RECEIVE CREDIT! Due: Day/Time of final (Mon.Dec.10, 9:00-10:50 a.m.).

1. Ethyl alcohol has a density of 0.789 g/cm^3. What volume of ethyl alcohol must be poured into a graduated cylinder to give 19.8 g of alcohol?

2. Write net ionic equations for the following molecular equations. Be Careful on **WEAK ACIDS**.

   a) $HF(aq) + KOH(aq) \rightarrow KF(aq) + H_2O(l)$
   b) $AgNO_3(aq) + NaBr(aq) \rightarrow AgBr(s) + NaNO_3(aq)$
   c) $CaS(s) + 2HBr(aq) \rightarrow CaBr_2(aq) + H_2S(g)$
   d) $NaOH(aq) + NH_4Br(aq) \rightarrow NaBr(aq) + NH_3(g) + H_2O(l)$
   e) $H_2SO_4(aq) + NaOH(aq) \rightarrow$

3. Seawater contains 0.00065% (by mass) of bromine. How many grams of bromine are there in 1.00 L of seawater? The density of seawater is 1.025 g/cm^3.

4. Titanium, which is used to make airplane engines and frames, can be obtained from titanium tetrachloride, which in turn is obtained from titanium dioxide by the following process:

   $3TiO_2(s) + 4C(s) + 6Cl_2(g) \rightarrow 3TiCl_4(g) + 2CO_2(g) + 2CO(g)$

   A vessel contains 4.15 g TiO_2, 5.67 g C, and 6.78 g Cl_2. Suppose the reaction goes to completion as written. How many grams of titanium tetrachloride can be produced.

5. How many grams of sodium dichromate, $Na_2Cr_2O_7$, should be added to a 50.0-mL volumetric flask to prepare 0.025 M $Na_2Cr_2O_7$ when the flask is filled to the mark with water? What are the Molarities of the Na^+ ion and the $Cr_2O_7^{2-}$ ion in the solution?

6. How many milliliters of 0.238 M $KMnO_4$ are needed to react with 3.36 g of iron(II) sulfate, $FeSO_4$? The reaction is as follows:

   $10FeSO_4(aq) + 2KMnO_4(aq) + 8H_2SO_4(aq) \rightarrow 5Fe_2(SO_4)_3(aq) + 2MnSO_4(aq) + K_2SO(aq) + 8H_2O(l)$

7. A 1.28-g sample of a colorless liquid was vaporized in a 250-mL flask at 121°C and 786 mmHg. What is the molecular weight of this substance?

8. Small amounts of hydrogen are conveniently prepared by reacting zinc with hydrochloric acid.
   $Zn(s) + 2HCl(aq) \rightarrow ZnCl_2(aq) + H_2(g)$
   How many grams of zinc are required to prepare 2.50 L H_2 gas at 765 mmHg and 22°C?

9. The atmosphere in a sealed diving bell contained oxygen and helium. If the gas mixture has 0.200 atm of oxygen and a total pressure of 3.00 atm, what is the pressure due to He? Calculate the mass of helium in 1.00 L of the gas mixture at 20°C.

10. Determine the amount of heat needed to raise 20.0 g of ice at 0°C to steam at 100°C.
    (ΔH_{fusion} = 334 J/g; SpHt$_{(H2O)}$ = 4.18 J/gc; ΔH_{vap} = 2.25 kJ/g)