CHE301 Exam 1 Name_____

1.An analytical procedure required the preparation of a solution containing 100.0 ppm chromium. How many grams of potassium dichromate ($K_2Cr_2O_7$) would be required to prepare 1.000 liter of this solution?

100.0 ppm = 0.1000 g/L Cr

$0.1000g/L*FW(K_2Cr_2O_7)/2AW(Cr)=0.1000*294.18/2*51.996=0.2829$ g

2. For very precise work, a chemist may want to calibrate the pipets used for an analysis. This was done by pipeting from a **20-**mL pipet **20.0002 g** of water at 22^0 C into a weighing bottle. What is the actual volume of the pipet? The following data is available from Table 2-7 in your text. At 22^0 C the correction factor based on the density of water and buoyancy is **1.0033** mL/g.

*20.0002*1.0033=20.07 mL*

3. Balance the following equation: $Sr(OH)_2 + 2\,HClO_4 \rightarrow Sr(ClO_4)_2 + 2H_2O$

4. How many significant figures are in the number 6.230×10^{23} ? ***4***

in 0.000120? ***3***

5. What is the lead concentration of a saturated solution of lead(II) sulfate containing 0.030 molar Na_2SO_4 ? K_{sp} $PbSO_4$ = 6.3×10^{-7}

$[Pb]=K_{SP}/[SO_4^{2-}]=6.3*10^{-7}/0.030 = 2.1*10^{-5}$ M

6 In the following reaction, identify the conjugate acid-base pair.

$NO_2^- + H_2O \leftrightarrow HNO_2 + OH^-$.

Base *Acid*

7.If solution containing 0.01 M Cl^-, I^-, Br^-, and SCN^-.is treated with $AgNO_3$, in which order will the anions precipitate?

I,Br,SCN,Cl – in order of K_{SP} increase

8. In the following reaction (**balance it first**!):

$CaCO_3 + 2HNO_3 \rightarrow Ca(NO_3)_2 + CO_2 + H_2O$

how many mL of **0.1235** M HNO_3 are required to react with **0.4057** g of $CaCO_3$?

$V(mL)=2*m(CaCO_3)*1000/(FW(CaCO_3)*C_{HCl})= 2*0.4057*1000/(100.09*0.1235)=65.64mL$

9. Argentometric titrations are titrations using a standard solution of silver ions to form a silver halide precipitate. Calculate the $[Ag^+]$ value when 20.0 mL of 0.100 M $AgNO_3$ is added to 20.0 mL of 0.0500 M sodium bromide. K_{sp} AgBr = 5.0×10^{-13}

$[Ag^+]=(0.100*20-0.05*20)/40=0.025$ M

10. Draw a formula of a conjugated base for **HSO_3^-** ion. *SO_3^{2-}*