

**City College, Chemistry Department
Chemistry 10301, sections T and T2, Prof. T. Lazaridis
Second Midterm exam, Nov. 2, 2006**

Name (last name first): _____

I.D. Number: _____

Workshop leader: _____

**Note: There are 7 questions in this exam (check both sides of the sheet).
Fill in your answer in the blank space provided immediately following each
question. 1/2 point will be subtracted every time you report a numerical result with
an incorrect number of significant figures. The last sheet of this exam contains
information that may or may not be needed to answer these questions.**

1. (20) a. (6) Predict whether each the following compounds is soluble in water:

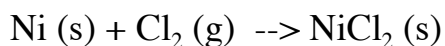
K_3PO_4 Soluble Not Soluble

$BaSO_4$ Soluble Not Soluble

$NaClO_4$ Soluble Not Soluble

b. (4) What is the molarity of a solution that contains 0.0345 mol NH_4Cl in 400 mL of solution?

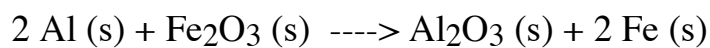
c. (5) Which element is oxidized and which is reduced in the following reaction?



d. (5) If the partial pressure of ozone (O_3) in the stratosphere is 3.0×10^{-3} atm and the temperature is 250 K, how many ozone molecules are in a liter? ($N_{av} = 6.022 \times 10^{23}$)

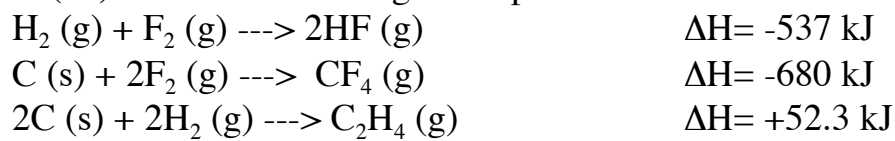
2. (15) Ammonium sulfate, a fertilizer, can be prepared by the reaction of ammonia (NH_3) with sulfuric acid (H_2SO_4). Write a balanced equation for the reaction and calculate the volume of ammonia gas needed at 20 °C and 25.0 atm to react with 150 Kg of H_2SO_4 .

3. (10) Using your datasheet, find the standard enthalpy of the thermite reaction:

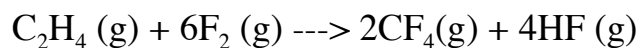


Is it exothermic or endothermic?

4. (15) From the following enthalpies of reaction:

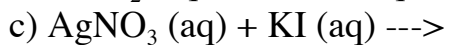
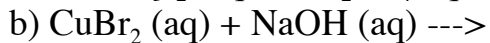
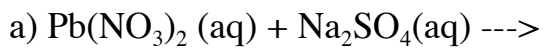


calculate the ΔH for the reaction:



5. (10) What volume of 0.128 M HCl is required to neutralize 2.87 g of $\text{Mg}(\text{OH})_2$?

6. (15) Write balanced net ionic equations for the reactions that occur in each of the following cases. Identify the spectator ions in each reaction:



7. (15) When a 4.25 g sample of solid ammonium nitrate dissolves in 60.0 g of water in a coffee-cup calorimeter, the temperature drops from 22.0 °C to 16.9 °C. Calculate the ΔH for the following reaction:



(assume that the specific heat of the solution is the same as that of pure water and use your datasheet)