

Chem 1515
Problem Set #12
Fall 2001

Name _____

TA Name _____

Lab Section # _____

ALL work must be shown to receive full credit. **Due 5:00 pm on Tuesday, November 6, 2001.**

PS12.1. Calculate the pH of a 0.200 M H_3PO_4 . Calculate the $[\text{PO}_4^{3-}]$ in the solution.

PS12.2. Predict the products of the following neutralization reactions.

- a) $\text{HCl}(aq) + \text{NaOH}(aq) \rightarrow$
- b) $\text{HNO}_3(aq) + \text{Ba}(\text{OH})_2(aq) \rightarrow$
- c) $\text{NaOH}(aq) + \text{H}_2\text{CO}_3(aq) \rightarrow$
- d) $\text{NH}_3(aq) + \text{H}_2\text{SO}_4(aq) \rightarrow$
- e) $\text{HC}_6\text{H}_5\text{O}(aq) + \text{NaOH}(aq) \rightarrow$
- f) $\text{HCN}(aq) + \text{KOH}(aq) \rightarrow$

PS12.3. Given a solution containing the following ions (neglect the counter-ion for the moment), write a reaction (with water) and indicate whether the ion acts as an acid or as a base.

- a) $\text{F}^-(aq)$
- b) $\text{ClO}_2^-(aq)$
- c) $\text{NO}_2^-(aq)$
- d) $\text{NH}_4^+(aq)$
- e) $\text{CH}_3\text{NH}_3^+(aq)$
- f) $\text{C}_2\text{H}_5\text{NH}_3^+(aq)$

PS12.4. Can you make any generalizations about the acid-base character of the ions in Problem #12.3? If so, state them.

c) 0.890 M KCl

d) 0.572 M $\text{KC}_3\text{H}_5\text{O}_2$

e) 1.00 M NaHSO_4

PS12.8. In the series of oxyacids, XOH , OXOH , and O_2XOH , list the acids in order of increasing acid strength. Justify your answer.