

ANSWERS TO "TRY YOURSELF" PROBLEMS FROM STUDY SECTIONS 8.5, 8.6 AND 8.7

Try Yourself 8.5

Decide whether K_3PO_4 will give rise to an acidic, basic or neutral solution in water.

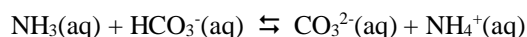
Answer:

An aqueous solution of K_3PO_4 should be basic ($pH > 7$) because the PO_4^{3-} ion has a K_b value = 2.8×10^{-2} which is smaller than 1 but relative large compared to other well-known bases.

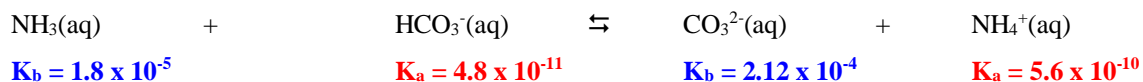
The K^+ ion does not affect the pH of the solution.

Try Yourself 8.6

Is a reaction between HCO_3^- ions and NH_3 product- or reactant-favored at equilibrium?



Answer:



Both the weaker base and the weaker acid are on the reagent side of the equation (left-hand side), therefore:

All proton transfer reactions proceed from the stronger acid and base to the weaker acid and base. The reaction will proceed from right to left. Reactant-favored!!

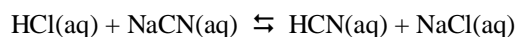
* I will supply you with the K_a and K_b values in a test OR I will supply you with a table with values from which you will be able to extract the values.

Try Yourself 8.7

Equal molar amounts of $HCl(aq)$ and $NaCN(aq)$ are mixed. Is the resulting solution acidic, basic or neutral?

Answer:

The two compounds react and form a solution containing HCN and $NaCl$.



$$K_{b(Cl^-)} = \text{smaller than } 1.0 \times 10^{-14}$$

$$K_{a(HCN)} = 4.0 \times 10^{-10}$$

The solution is acidic (HCN is a stronger acid than the chloride ion is a base).