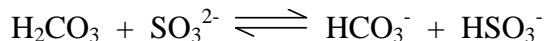
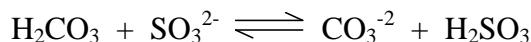


IV.10 - Relative Strengths of Acids and Bases

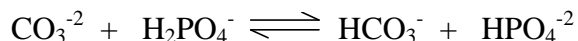
- If we mix solutions containing H_2CO_3 and SO_3^{2-} , the SO_3^{2-} can only act as a base (since it has no protons) and we find:



In Chemistry 12 we will only study the transfer of ONE proton. We will not deal with two-proton transfers such as:



- Consider what happens when we mix CO_3^{2-} and H_2PO_4^- :



We have set up a “proton competition” in solution.

- There are two acids in equilibrium, H_2PO_4^- and HCO_3^- , each trying to donate a proton.
- There are two bases in equilibrium, CO_3^{2-} and HPO_4^{2-} , each trying to accept a proton.
- The stronger of the two acids involved will be more successful in donating a proton than the weaker.
- From the Acid-Base Table we see that H_2PO_4^- ($K_a = 6.2 \times 10^{-8}$) is a stronger acid than HCO_3^- ($K_a = 5.6 \times 10^{-11}$).
- As a result, H_2PO_4^- has a greater tendency to donate a proton than does HCO_3^- . Therefore, there will be MORE PRODUCTS than reactants (“products are favoured”)

*****In a Bronsted-Lowry acid-base equilibrium, the side of the equilibrium that has the WEAKER ACID will be favoured*****

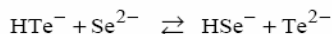
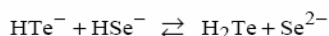
Try this....

When HS^- and HCO_3^- are mixed, does the resulting equilibrium favour the reactants or products?

Examples:

1. June 1998

Consider the following equilibria:



Reactants are favoured in both equilibria. The order of acids from strongest to weakest is

- A. HTe^- , HSe^- , H_2Te
- B. HSe^- , H_2Te , HTe^-
- C. H_2Te , HTe^- , HSe^-
- D. H_2Te , HSe^- , HTe^-

*****Do Hebden Questions #38 - 46, pg 133*****