Name:_____
Blk:___Date:_____

ACID BASES UNIT
Lesson #5

CONJUGATE ACIDS AND BASES

A conjugate ACID-BASE PAIR is a pair of chemical species that differ only by one proton

CONJUGATE ACID- has an extra proton

CONJUGATE BASE- has one less proton

Example1. In the equlibrium reation $NH_4^+ + H_2O$ <----> $NH_3 + H_3O^+$ there are **TWO CONJUGATE PAIRS**

	CONJUGATE PAIR	CONJUGATE ACID	CONJUGATE BASE
a.	NH_4^+ / NH_3	NH_4^+	NH_3
b.	H_2O / H_3O^+	H_3O^+	H_2O

Example 2. Given the following conjugate pairs, identify the conjugate acid and the conjugate base:

	ACID	BASE
$H_2PO_4^{1-}$, HPO_4^{2-}	$H_2PO_4^-$	HPO_4^{2-}
S^{2-}, HS^-	HS^-	S^{2-}
HCO_3^- , CO_3^{2-}	HCO_3^-	CO_3^{2-}

Example 3.

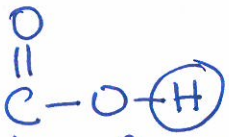
a. What is the conjugate ACID of NH_3 ?

$$NH_3 + H^+ \rightarrow NH_4^+$$

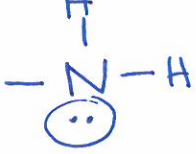
b. What would be the conjugate BASE of NH_3 ?

$$NH_3 - H^+ \rightarrow NH_2^-$$

A NOTE on ORGANIC COMPOUNDS:



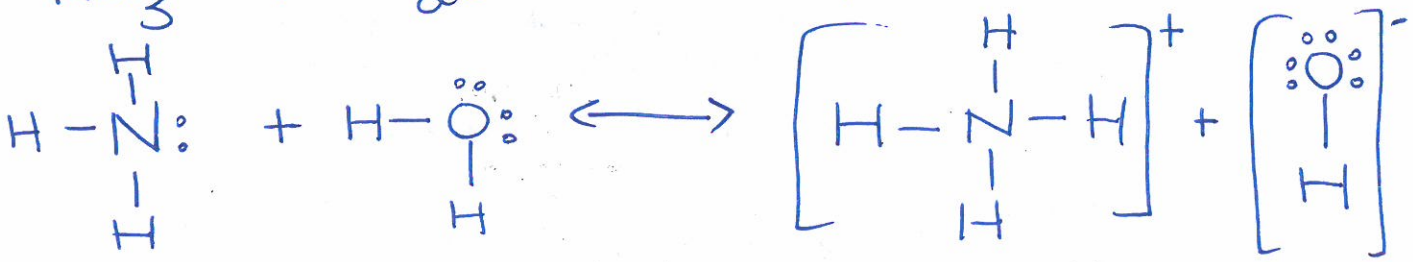
ORGANIC ACIDS, substances containing a COOH group: the H @ the end of the functional group is removeable



ORGANIC BASES, substances containing either an NH_2 group or an NH group: It is the Nitrogen that accepts the proton.

Using LEWIS DOT STRUCTURES we can visualize the reaction between water and NH_3:

$NH_3 + H_2O \longleftrightarrow NH_4^+ + OH^-$



Example 4. Write the acid-base equilibrium which occurs when H_2S and CO_3^{2-} are mixed in solution:

1. $H_2S + CO_3^{2-}$ [identify your reactants 1st)
   acid base
2. $H_2S + CO_3^{2-} \longrightarrow HS^- + HCO_3^-$
   C.B. C.A.
3.

Generic Bronsted-Lowry acid base equilibrium reaction looks like:

Conjugate ACID + Conjugate Base <----> Conjugate BASE + Conjugate ACID
of A **of B** **of A** **of B**

acting as an acid:
1. $H_2S - H^+ \rightarrow HS^-$

acting as a base:
2. $CO_3^{2-} + H^+ \rightarrow HCO_3^-$

SEATWORK/HOMEWORK: Exercises 15-19 in Hebden
PLO's: J10-J12