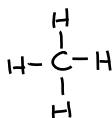
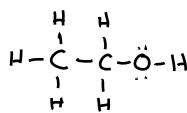


1. Draw the Lewis dot structure of each of the following acids and rank them in INCREASE order (least to most) of acidity.

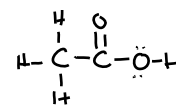
A. Methane



B. Ethanol



C. Acetic Acid



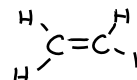
D. Hydrochloric Acid



E. Acetylene



F. Ethylene



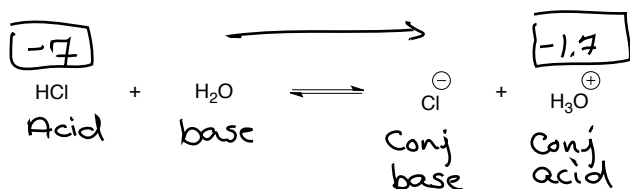
Ranking: (Least) A < F < E < B < C < D (Most)

2. For acetylene, ethylene and methane explain the relationship between hybridization and acidity. Be sure to clearly articulate and justify your rationale.

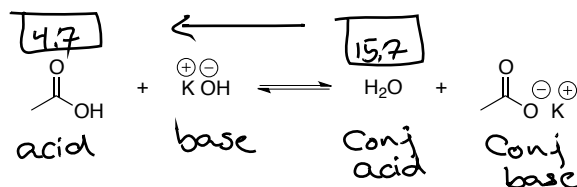
The greater the s-character, the more stable the conjugate base

$sp = 50\%$  s-char.  $\rightarrow$   $sp^3 = 25\%$  s-character

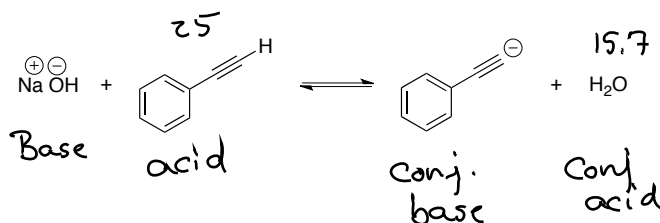
3. For each chemical reaction a) label the acid, base, conjugate acid and conjugate base; b) identify the pKa value of the acid and conjugate acid; c) indicate if the equilibrium is located toward the reactants or products.



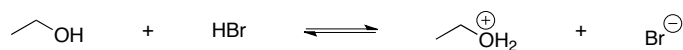
Prod are favored



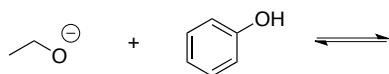
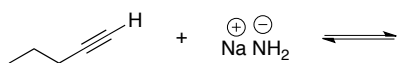
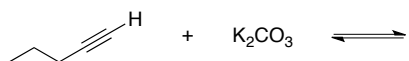
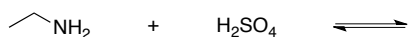
Reactants are favored



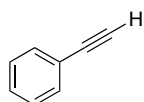
Reactants are favored



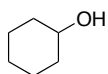
4. Predict the products of each acid-base reaction. Indicate if the equilibrium favors the reactants or the products.



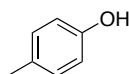
5. Rank the following organic molecules in increasing order of acidity. Place a box around the molecules that can be deprotonated using KOH.



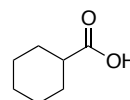
**A**



**B**



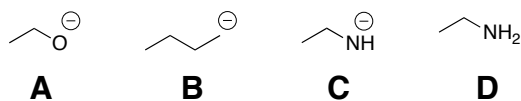
**C**



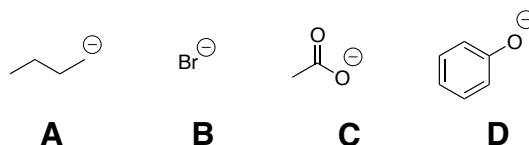
**D**

**Ranking:** (Least) \_\_\_\_\_ < \_\_\_\_\_ < \_\_\_\_\_ < \_\_\_\_\_ (Most)

6. Rank the following molecules in INCREASING (weakest to strongest) order of basicity.



**Ranking:** (Least) \_\_\_\_\_ < \_\_\_\_\_ < \_\_\_\_\_ < \_\_\_\_\_ (Most)



**Ranking:** (Least) \_\_\_\_\_ < \_\_\_\_\_ < \_\_\_\_\_ < \_\_\_\_\_ (Most)

7. Using proper arrow formalism, draw a reaction mechanism for each acid-base reaction

