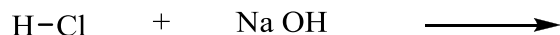


*Acid/Base chemistry is the first complete reaction studied in most Organic classes since students are familiar with the reactions from General Chemistry. This offers us the opportunity to show students a reaction they know (the movement of protons away from an acid) in the context of an Organic viewpoint (the movement of electrons from the base).*

1. a) Define "acid" and "base" under the Bronsted/Lowry system.

b) For the system below, draw the products of the acid/base reaction.



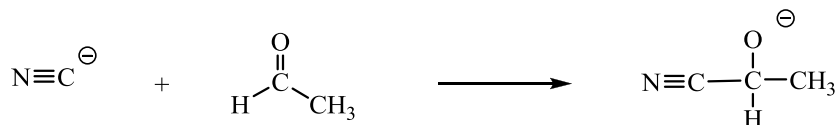
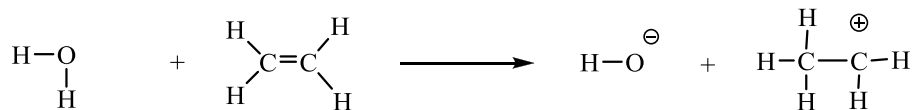
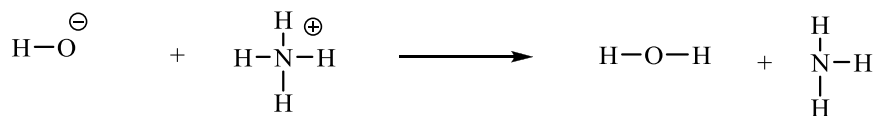
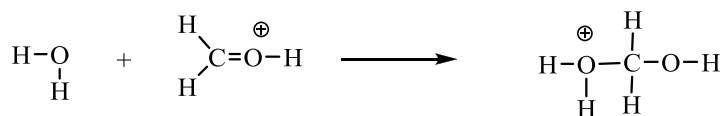
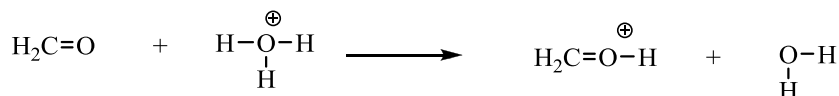
c) Label the acid, base, conjugate acid, and conjugate base in the reaction above

2. a) Go back to the reaction in problem 1 and add in the curved arrows which show how the bonds are formed / broken in this transformation.

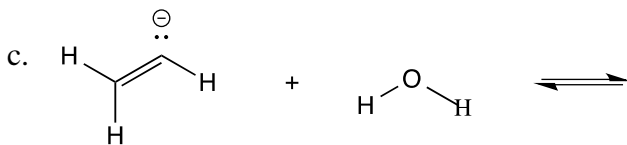
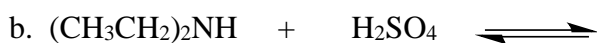
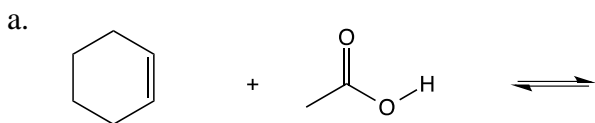
b) Define "acid" and "base" under the Lewis system.

c) Do the two definitions of acids and bases lead to the same or different outcomes?

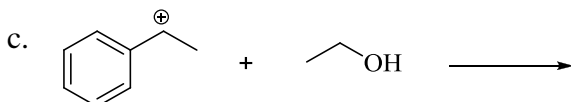
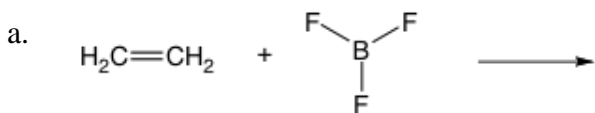
3. In each reactions below, draw in the curved arrows to show the movement of electron pairs in the reaction. Is each reaction best classified as a Bronsted/Lowry or Lewis acid/base reaction?



4. (a) Draw the products for the given Bronsted/Lowry acid-base reactions. (b) Use curved arrows to show the movement of electron pairs in the reaction (in other words provide the mechanism for each reaction). (c) Label the acid, base, conjugate acid and conjugate base.



4. a) Draw the products for the given Lewis acid-base reactions. (b) Use curved arrows to show the movement of electron pairs in the reaction (in other words provide the mechanism for each reaction). (c) Label the acid, base and Lewis adduct.



NOTE: Students often have issues using the terms “acid” and “base” in relation to a Lewis-style reaction. Therefore, it is common practice to use the terms “Electrophile” and “Nucleophile” instead. Thus, an Electrophile is a species which has an area of low polarity and looks to gain an electron pair in a reaction. A Nucleophile is a species which donates electron pairs in a reaction. Go back to question 4 and label the electrophiles and nucleophiles.