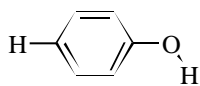


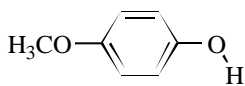
Problem Set #1 – Review Problems

Chemistry 3231
September 4, 2001

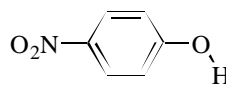
1. The hydroxylic proton ($-\text{OH}$) of phenols is acidic ($\text{p}K_a \sim 10$) compared to “regular” alcohols like methanol and ethanol ($\text{p}K_a \sim 16\text{-}18$). Rank phenols **1-3** below in order of increasing acidity (weakest acid first) and explain why. (HINT: Resonance pictures will help.)



1

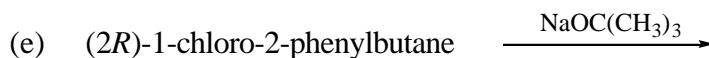
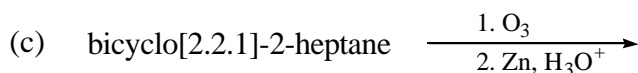


2

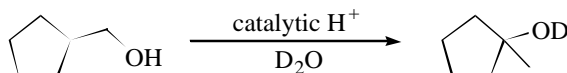


3

2. Provide the product for the reactions below. Be sure to indicate stereochemistry.

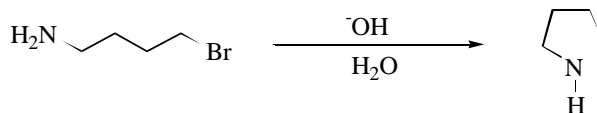


3. Draw (using electron pushing arrows) the mechanism:



4. Ethyl bromide and isobutyl bromide are both primary alkyl halides, yet ethyl bromide undergoes $\text{S}_{\text{N}}2$ reactions more than 10 times faster than does isobutyl bromide. When each of these is treated with a strong base/nucleophile ($\text{CH}_3\text{CH}_2\text{O}^-$), isobutyl bromide gives more elimination products than substitution products; this behavior is reversed for ethyl bromide. Explain these observations.

5. Show the mechanism for the following reaction:



6. Provide reagents and conditions for the following transformations. More than one step may be required.

