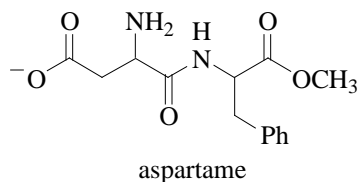


Problem Set #12

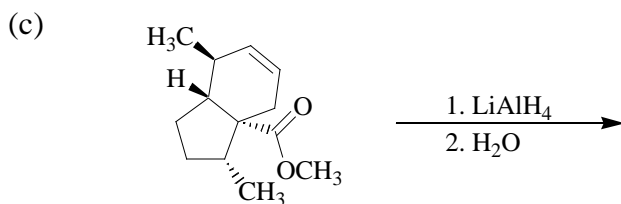
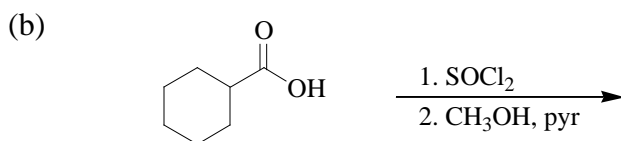
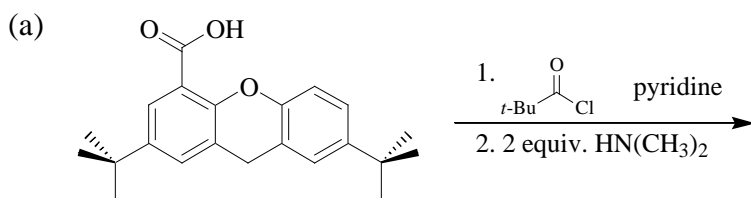
Chemistry 3231

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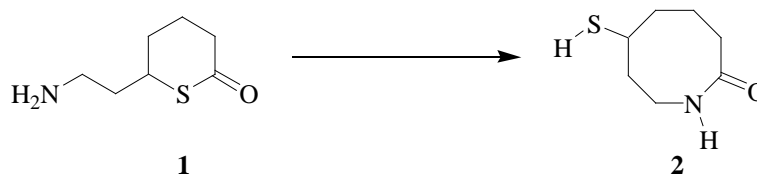
1. Aspartame is 160 times sweeter than sucrose. What products would be obtained if aspartame were hydrolyzed in an aqueous solution of HCl?



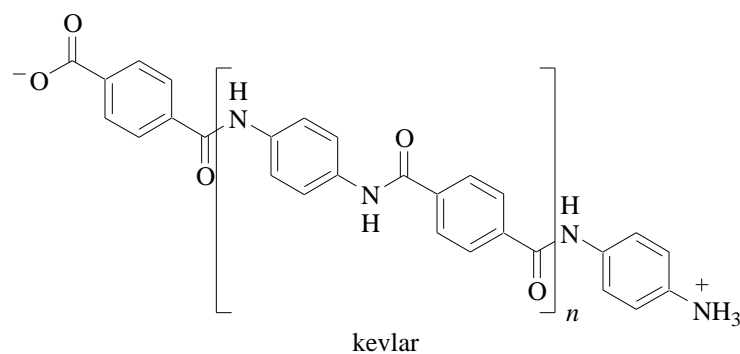
2. Give the products of each of the following organic transformations (Ref: Overman, et al. *J. Am. Chem. Soc.* **1998**, *120*, 4039).



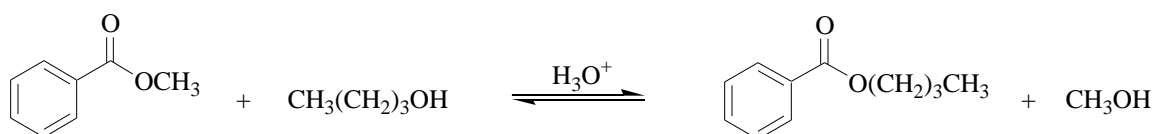
3. On standing, thiol ester **1** rearranges to lactam **2**. Provide a mechanism for this transformation.



4. Kevlar is an extremely strong polymer used to make bulletproof vests. Suggest suitable reagents that could be used to prepare this material in the laboratory.



5. Suggest a mechanism for the following reaction and propose a practical method for driving the equilibrium to the right.



6. Compound **X** ($C_8H_4O_3$; IR 1780, 1855 cm^{-1} ; ^{13}C NMR shows 4 signals) is initially insoluble in aqueous base, but dissolves gradually. Acidification of the basic solution provides compound **Y** (IR 3500-2500 (broad), 1720 cm^{-1} ; ^{13}C NMR shows 4 signals). When **X** is heated in ethanol, compound **Z** (^{13}C NMR shows 10 signals) is formed. Suggest structures for **X**, **Y**, and **Z**.