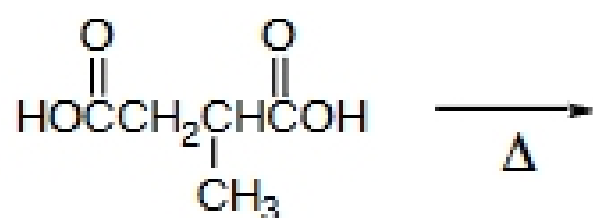
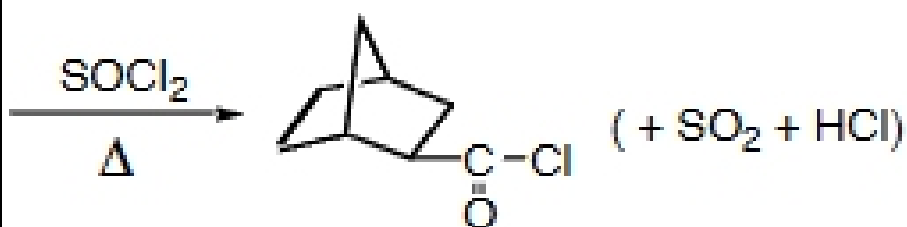
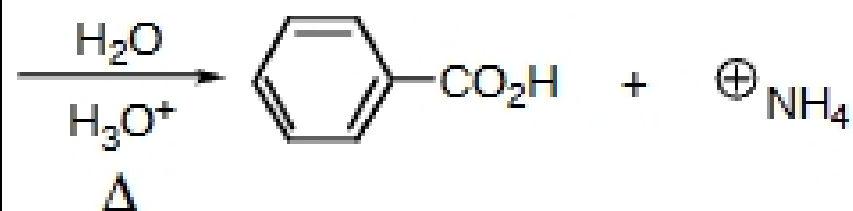
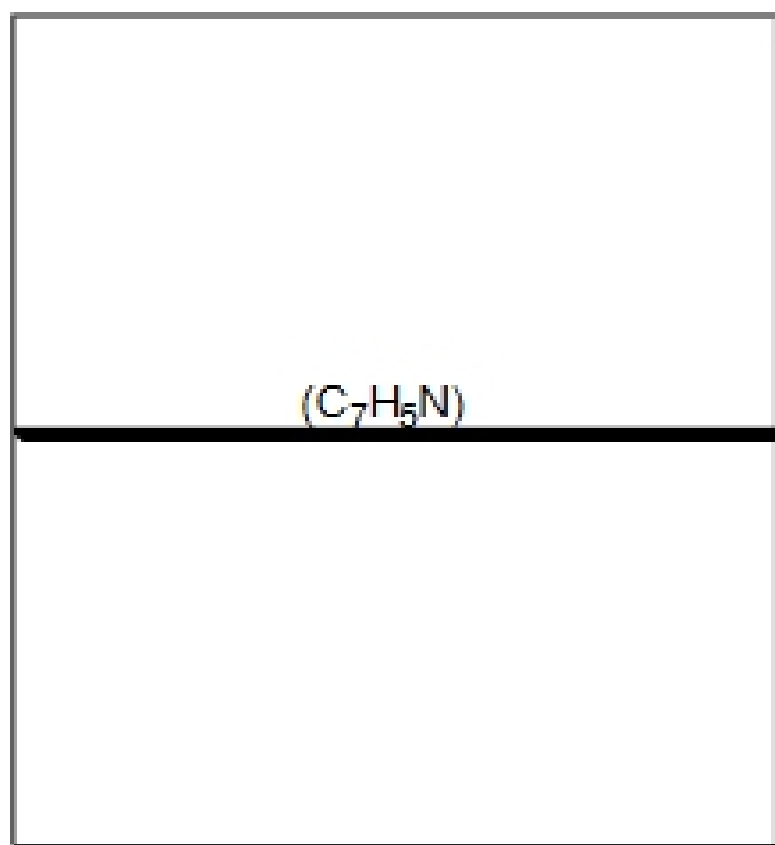
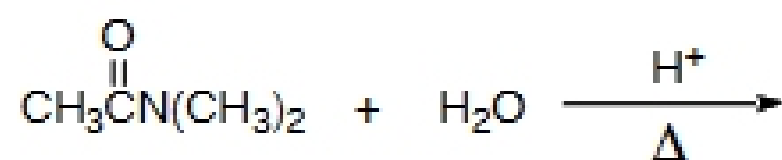
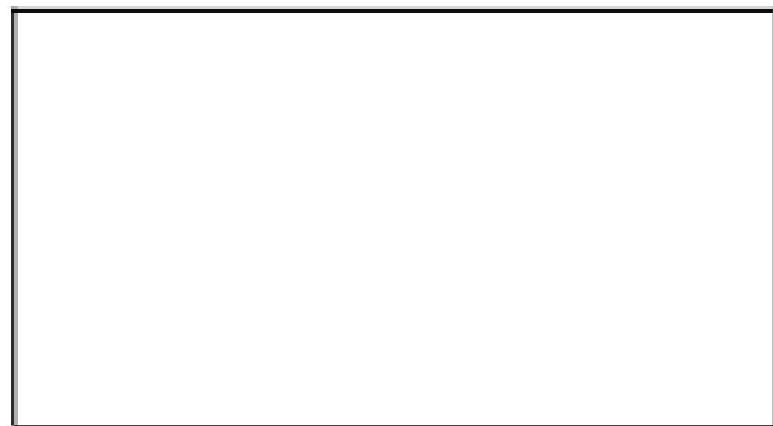
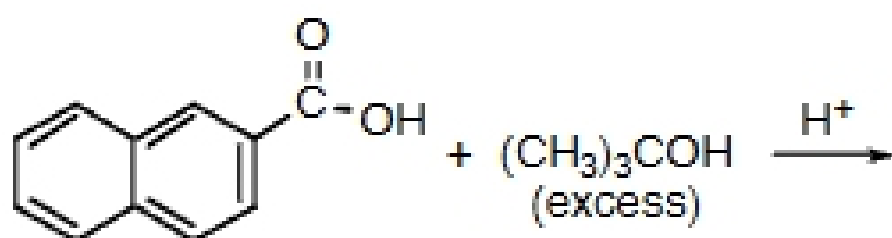
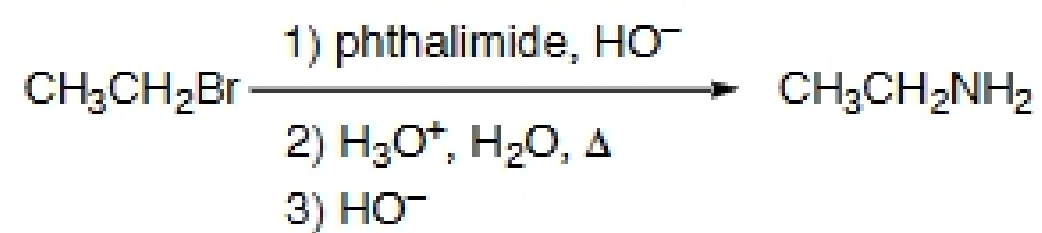


1. Provide the missing product(s) or starting material(s).



2. In the following reaction:



(a) The intermediate after the first step is what compound?

(b) Write a mechanism for the acid-catalyzed hydrolysis of this compound to phthalic acid and  $\text{CH}_3\text{CH}_2\text{NH}_3^+$ .

3. Draw all ketones and aldehydes with molecular formula  $C_5H_{10}O$ .

4. (a) Prepare 3-methyl-3-pentanol employing a Grignard reaction. Start from an alkyl halide and show the preparation of the Grignard reagent, then show what carbonyl compound is needed.

(b) Devise a second method, using a different alkyl halide and carbonyl compound.