1. Provide the necessary conditions to convert benzene to benzenesulfonic acid and then to convert benzenesulfonic acid back to benzene. (4 points)

\[ \text{Benzene} \xrightarrow{\text{Conditions}} \text{Benzenesulfonic Acid} \xrightarrow{\text{Conditions}} \text{Benzene} \]

2. Predict the two major products of the reaction below. (Problem 17-46c, 4 points)

\[ \text{[Structure]} \xrightarrow{\text{Br}_2, \text{FeBr}_3} + \]

3. \( \alpha \)-Tetralone reacts cleanly with sodium, ammonia and ethanol to give one product. Provide a structure of that product. (Problem 17-51, 2 points)

\[ \text{[Structure]} \xrightarrow{\text{Na} / \text{NH}_3, \text{EtOH}} \]