Propose a mechanism for the following reaction if it is

a. General-acid catalyzed

b. Specific-acid catalyzed

What energy diagram for catalysis would each case correspond to?
Propose a mechanism for the following reaction if it is

a. General-base catalyzed

b. Specific-base catalyzed
Propose a mechanism for the following reaction

Why is this reaction slower with the following compound
Propose a mechanism for a Co$^{2+}$-catalyzed hydrolysis of glycynamide
SAMPLE PROBLEMS

Based on **Problems 11 and 12**

Propose the mechanism and explain the differences in the mechanism of hydrolysis for the following two compounds in the box. Note that the nitro groups have a strong withdrawing effect in the ortho and para positions.

- The compound with \( pK_a = 9 \) hydrolyzes through intramolecular general base catalysis.
- The compound with \( pK_a = 4 \) hydrolyzes through intramolecular nucleophilic catalysis. It is much stronger as an acid.
2-Acetoxy-cyclohexyl tosylate reacts with acetate anion to form 1,2-cyclohexanediol diacetate. The reaction is stereospecific – that is, the stereoisomers obtained as products depend on the stereoisomer used as a reactant. Recall that because 2-acetoxy-cyclohexyl tosylate has two stereocenters, it has four isomers – two cis and two trans. Explain the following:

a. Both cis reactants form an optically active trans product, but each cis reactant forms a different trans product.
b. Both trans reactants form the same racemic mixture.
c. A trans reactant is more reactive than a cis reactant.
Based on Problem 41

At pH = 12, the rate of hydrolysis of ester A is greater than the rate of hydrolysis of ester B. At pH = 8, the rates reverse. Explain these observations.

![Structures A and B](image-url)
Would you expect a difference in the rate and mechanism for hydrolysis of the following two halides? Propose a mechanism for both

A

B