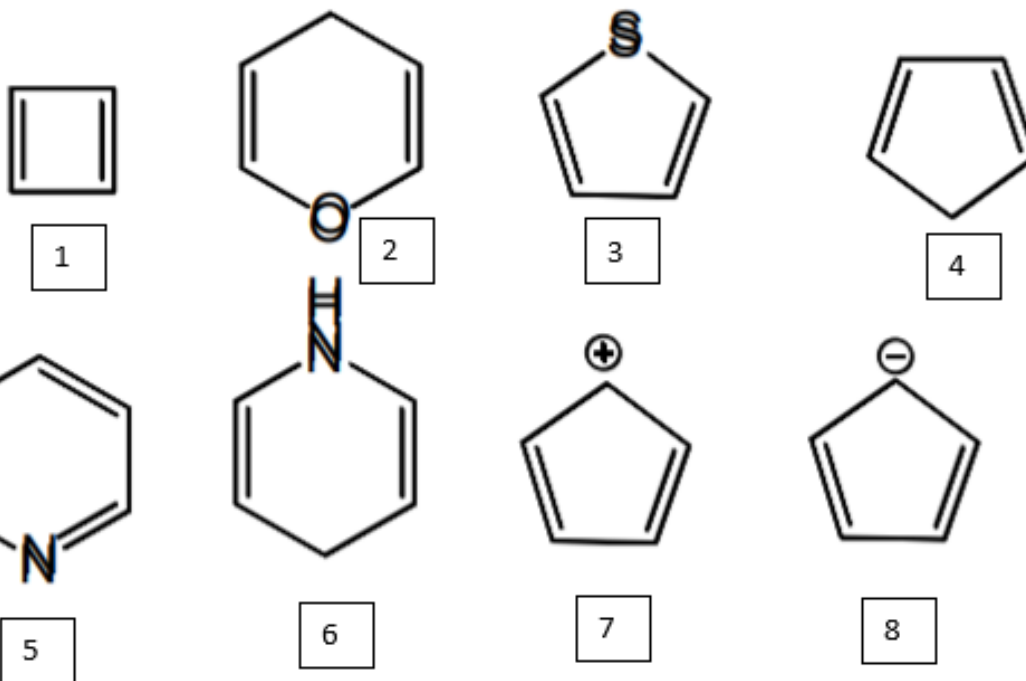


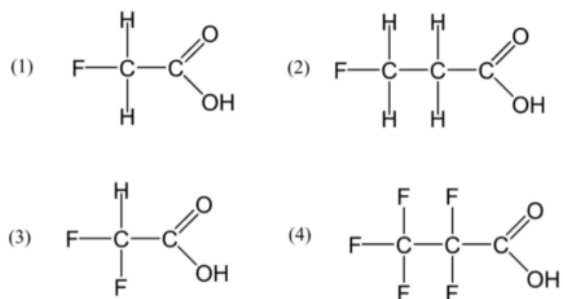
## Studypalooza Problem Set

Are these molecules aromatic, anti-aromatic, or not aromatic?



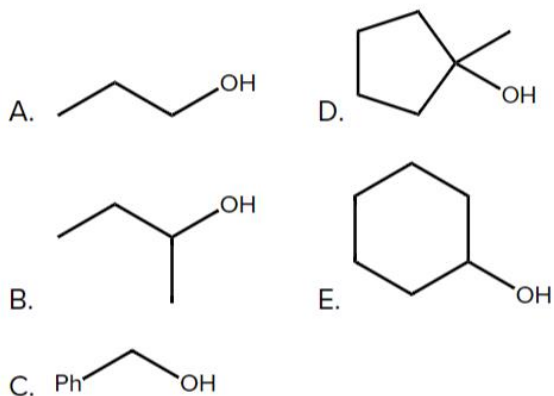
True or false?

- All deactivating groups are meta directors
- All activating groups are ortho/para directors



Place the  carboxylic acids in the order of decreasing acidity:

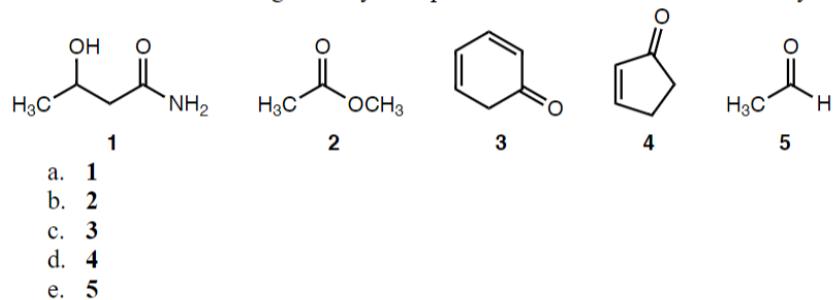
Which of the following alcohols does not react in the presence of aqueous chromic acid ( $\text{H}_2\text{CrO}_4$ ,  $\text{H}_3\text{O}^+$ )?



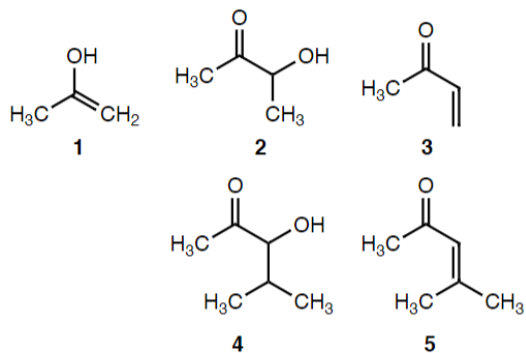
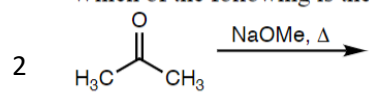
Which of the following best describes the key mechanistic steps in the reaction of an acyl chloride and an alcohol to form an ester?

- Elimination followed by nucleophilic addition
- Nucleophilic addition followed by Elimination
- Substitution ( $\text{S}_{\text{N}}2$ ) followed by Elimination
- Substitution ( $\text{S}_{\text{N}}2$ )
- Substitution ( $\text{S}_{\text{N}}1$ )

For which of the following carbonyl compounds is the enol form most heavily favored?

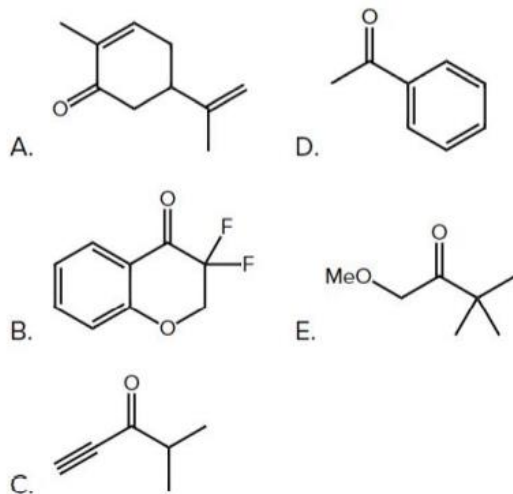


Which of the following is the *major* product of the reaction conditions below?

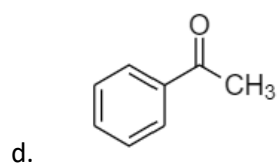
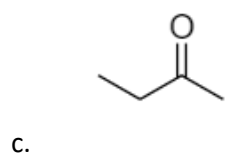
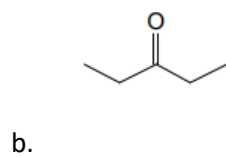
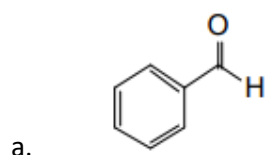
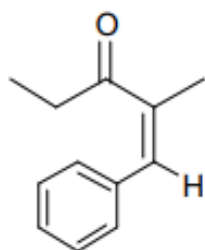


- a. 1
- b. 2
- c. 3
- d. 4
- e. 5

Which of the following ketones *cannot* form an enol?



What is the nucleophile of the aldol reaction?

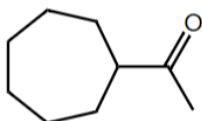


A sequence of reactions leading to a dipeptide is described below. Select the answer choice that correctly describes the structure(s) of the product(s). The *N*-terminus is designated “H<sub>2</sub>N-” and the *C*-terminus is designated “-OH.”

*Valine (Val)* is treated with  $\text{Boc}_2\text{O}$  + *DMAP* followed by *DCC*, then *serine (Ser)* is added. The resulting protected dipeptide is treated with trifluoroacetic acid to remove the *Boc* group.

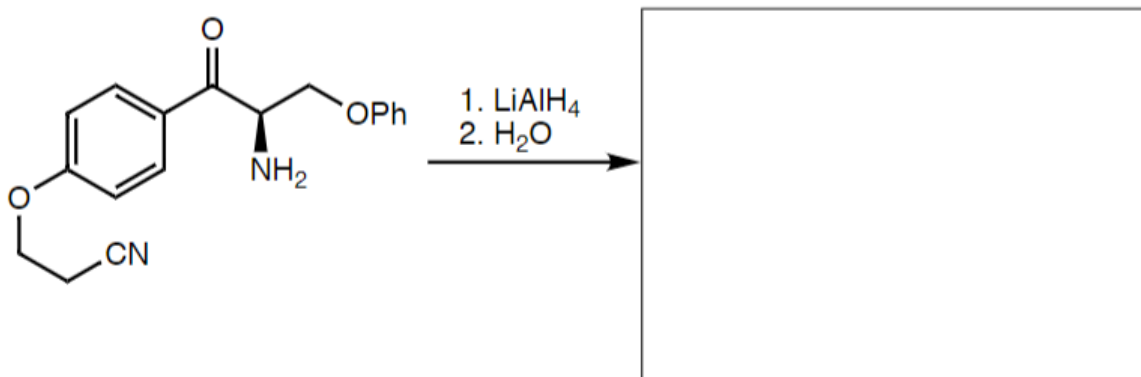
- H<sub>2</sub>N-Ser-Val-OH
- H<sub>2</sub>N-Ser-Ser-OH
- H<sub>2</sub>N-Val-Val-OH
- H<sub>2</sub>N-Val-Ser-OH
- The process described would lead to a statistical mixture of all four possible dipeptides.

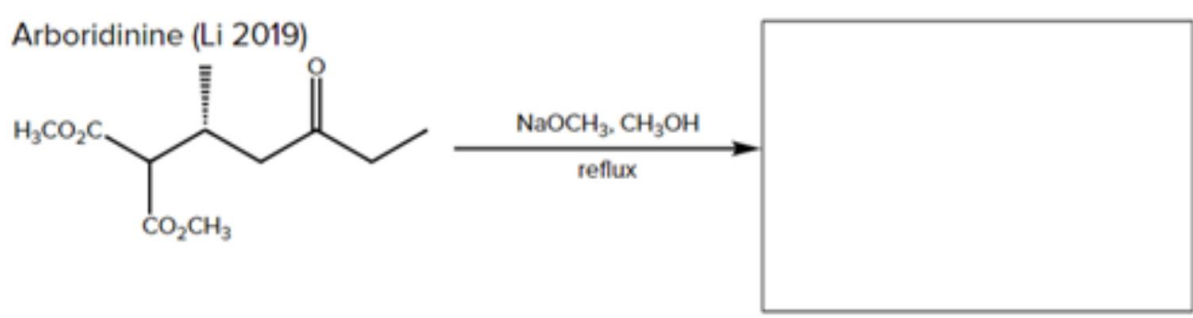
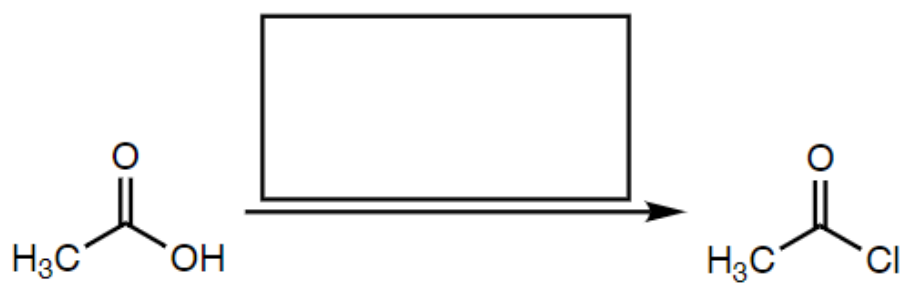
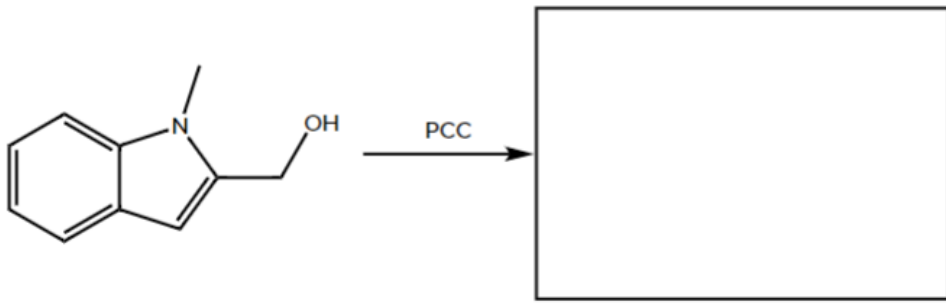
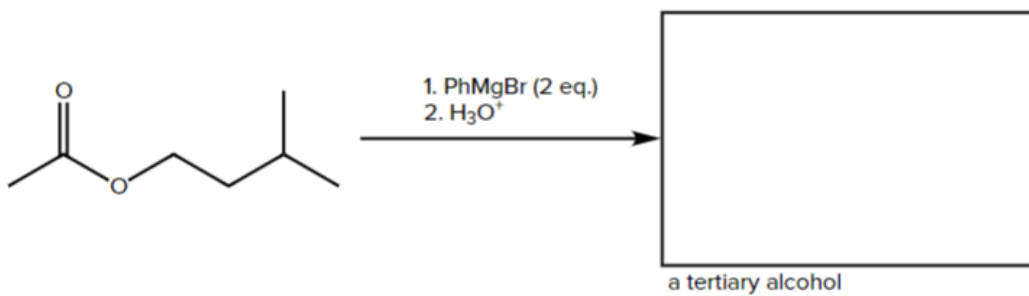
Which reagent would you use to form only the kinetic enolate?



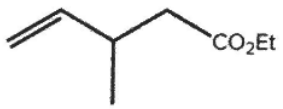
- Lithium diisopropyl amide (LDA, LiN(*i*-Pr)<sub>2</sub>)
- Sodium acetate (NaOAc)
- Sodium hydroxide (NaOH)
- Sodium hydride (NaH)

Predict the product

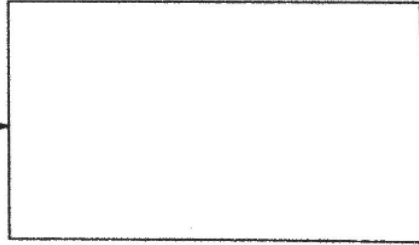




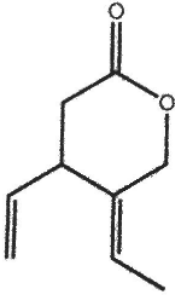
Dactylol (Gadwood 1986)



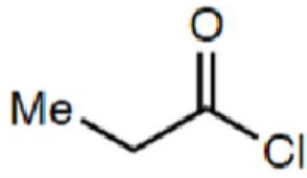
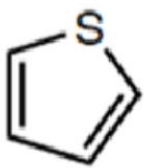
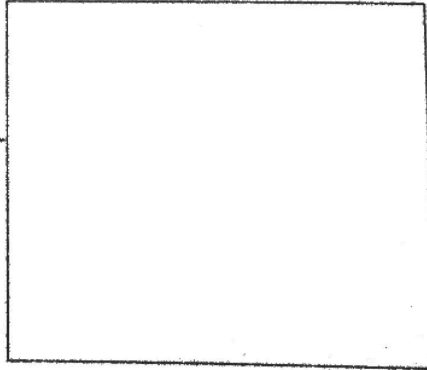
$\xrightarrow{\text{LiAlH}_4, \text{Et}_2\text{O}}$



Isodihydrokoumine (Kerr 2018)

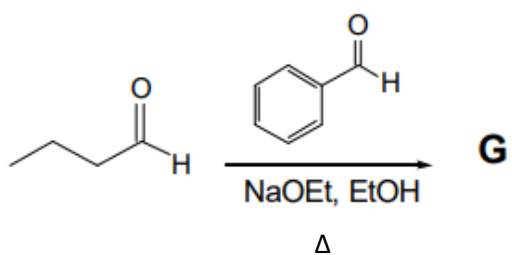
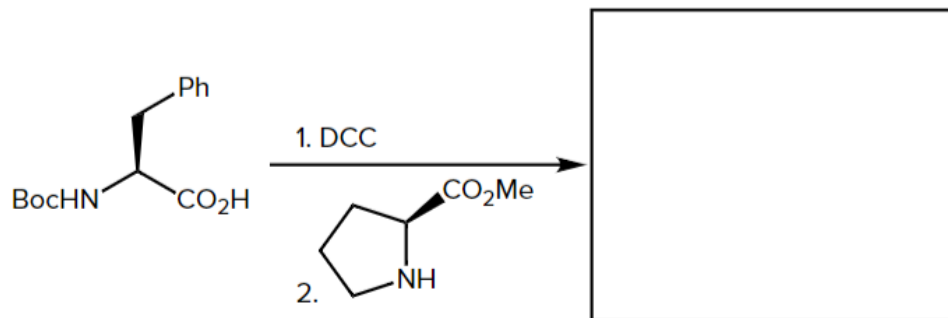
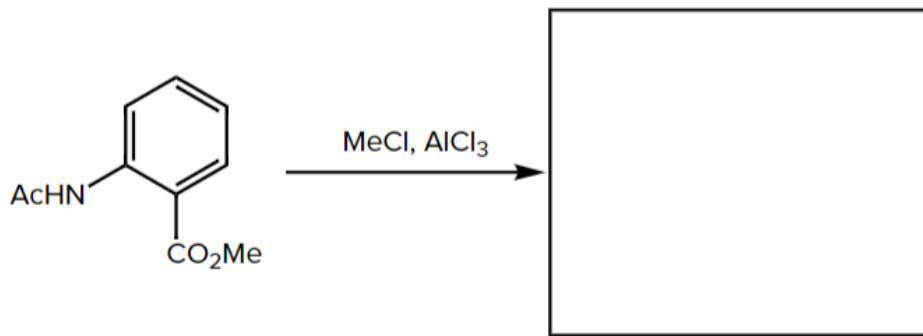


$\xrightarrow{\text{LiAlH}_4, \text{THF}, 0^\circ\text{C}}$

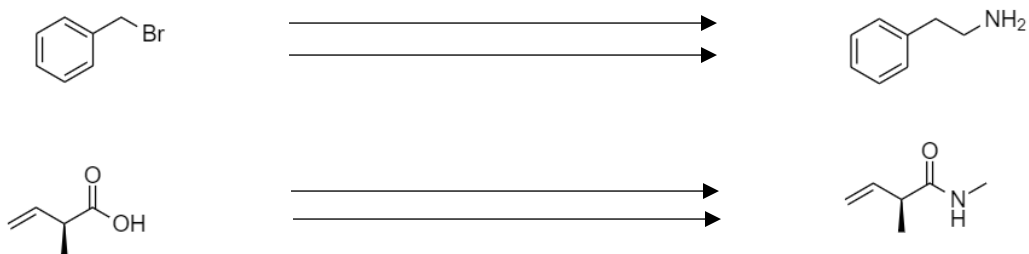


$\xrightarrow{\text{AlCl}_3}$

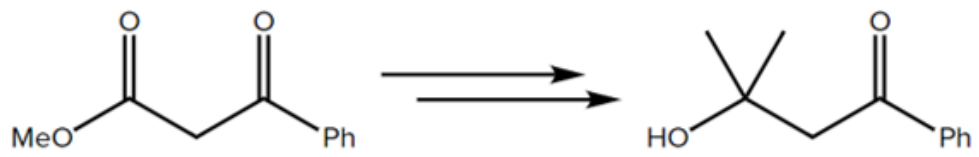
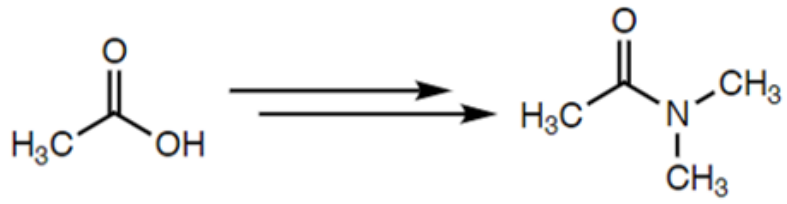




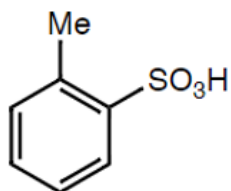
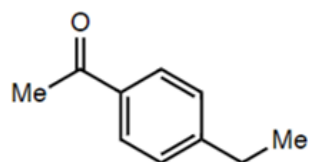
## Synthesis



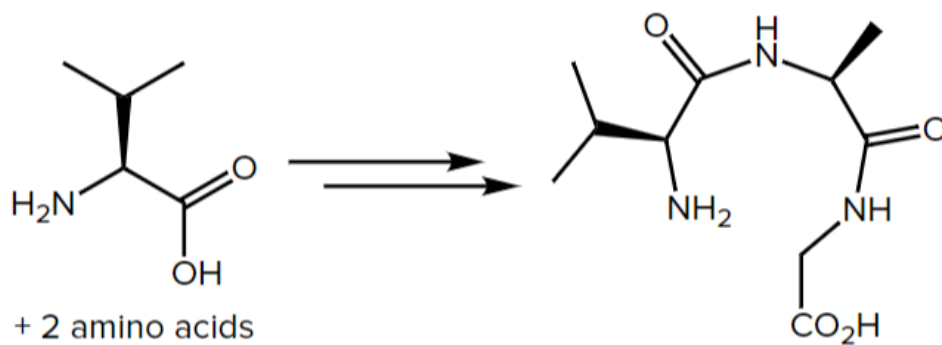




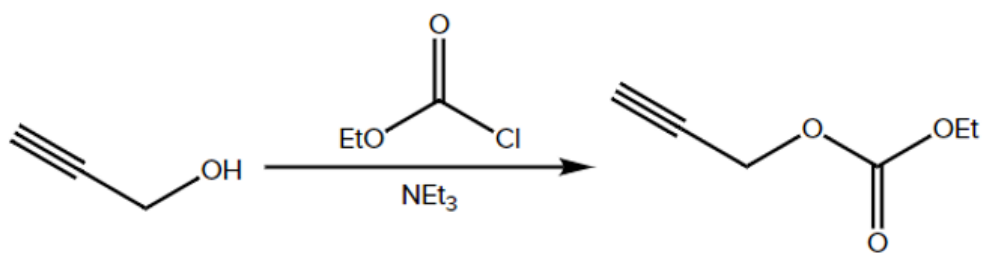
**Synthesize the following from benzene:**



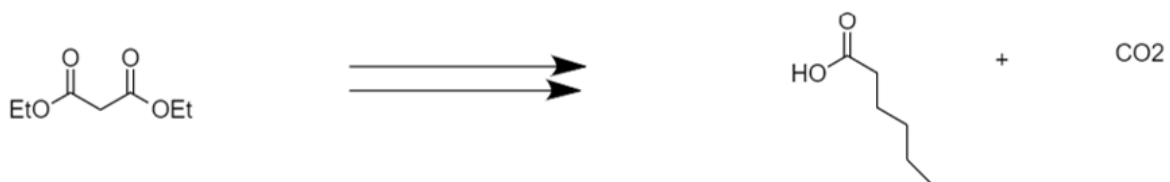
**Synthesize the following polypeptide from the starting amino acid given. You may use outside resources to look up amino acid structures.**



**Mechanism:**



**Mechanism below (also provide reagents)**



**Mechanism:**

