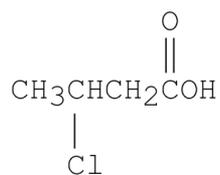
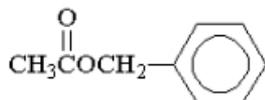


1) What is the common name for the following compound?



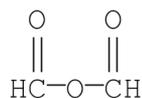
- A) β -chlorobutanoic acid
- B) 3-chlorobutyric acid
- C) β -chlorobutyric acid
- D) λ -chlorobutyric acid
- E) λ -chlorobutanoic acid

2) What is the IUPAC name for the following compound?



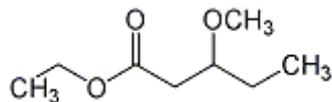
- A) methyl phenylacetate
- B) benzyl acetate
- C) methyl benzoate
- D) phenyl acetate
- E) benzyl methylacetate

3) What is the common name for the following compound?

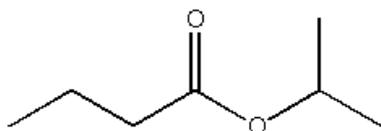


- A) formic anhydride
- B) ethanoic anhydride
- C) propanoic anhydride
- D) diformyl ether
- E) formyl formate

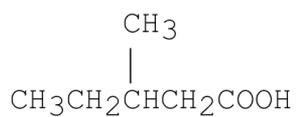
4) Provide the IUPAC name of the compound shown below.



5) Provide the IUPAC name for the organic compound below.



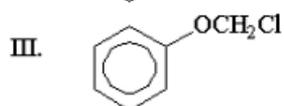
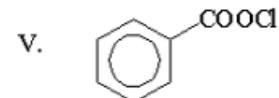
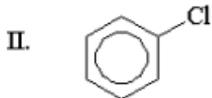
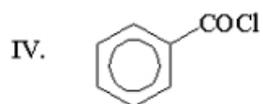
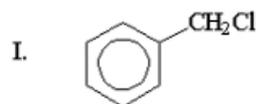
6) What is the IUPAC name for the following compound?



- A) 2-methylpentanoic acid
- B) isohexanoic acid
- C) 3-methylpentanoic acid
- D) β -methylvaleric acid
- E) 3-methylvaleric acid

7) Provide TWO IUPAC names for $(\text{CH}_3)_3\text{CCH}_2\text{CH}_2\text{CH}_2(\text{CN})$.

8) Provide the structure of benzoyl chloride.



A) I

B) II

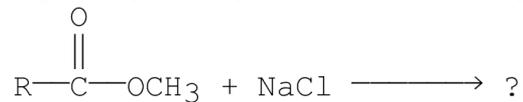
C) III

D) IV

E) V

9) Do you expect the following reaction to go to completion?

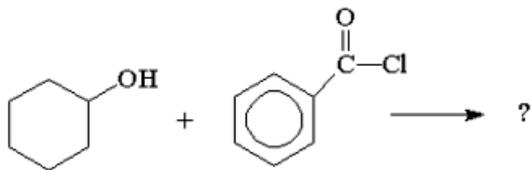
Why or why not? - your answer must clearly explain 1. basicity, 2. strength of bonds, and 3. leaving groups.



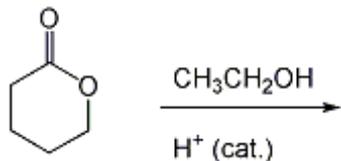
10) In Question 9, explain how you would determine if the reaction occurred IF you were provided the pKa values of the conjugate acids (you just identify the conjugate acids they would give you). Be brief and to the point!

11) List the following carboxylic acid derivatives in decreasing order of reactivity in nucleophilic acyl substitution reactions: acetic anhydride, methyl acetate, acetamide, acetyl chloride.

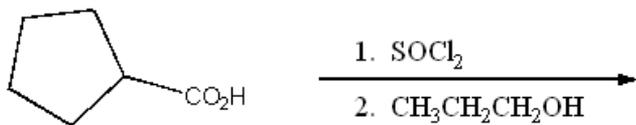
12) What are the products from the following reaction?



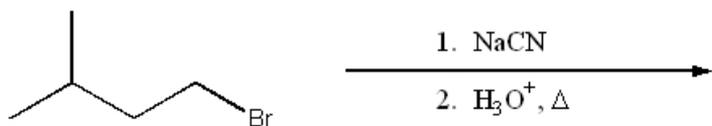
13) Provide the major organic product of the reaction below.



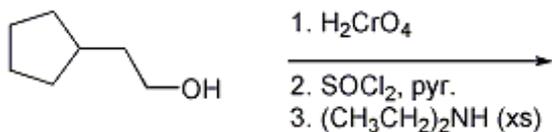
14) Provide the organic product produced after Step 1 and the final major organic product of the following.



15) Provide the organic product produced after Step 1 and the final major organic product of the following.



16) Provide the product produced after Step 1, Step 2, and the final major organic product of the reaction below.



- 17) Provide a detailed, stepwise mechanism for the reaction of acetyl chloride with methanol to produce methyl acetate and HCl. Explain clearly if excess alcohol is needed - your answer must contain an equation.
- 18) In the lab, a student tried to prepare an amide by heating acetyl chloride with two equivalents of triethylamine. Was the student successful? Explain clearly.
- 19) The acid-catalyzed alcoholysis of carboxylic acids is called:
- 20) The alcoholysis of esters in acid is called:
- 21) The hydrolysis of a "tri"ester in base is called:
- 22) BONUS: An unknown compound, $C_5H_{10}O_2$, gave the following proton NMR data:
a) doublet, at 1.23 ppm
b) singlet, at 2.10 ppm
c) septet, at 4.98 ppm
Propose a structure for the compound & give the IUPAC name. Label your structure to prove your answer.