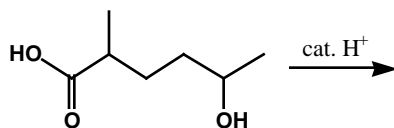
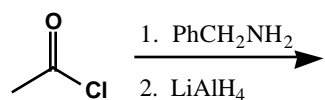
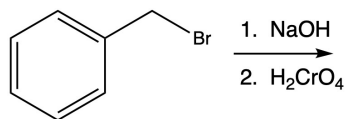
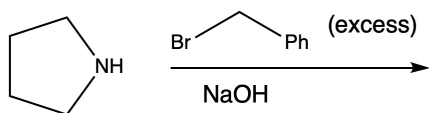
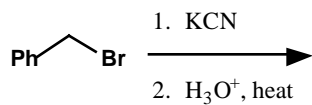
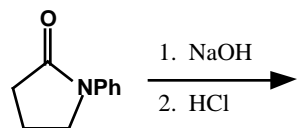
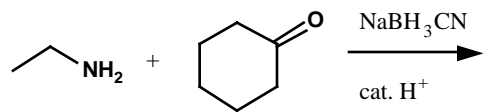
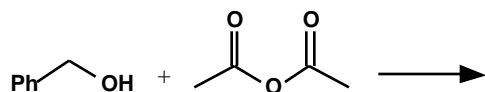
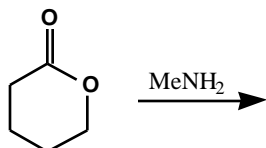
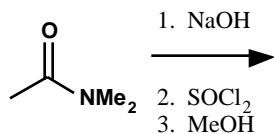
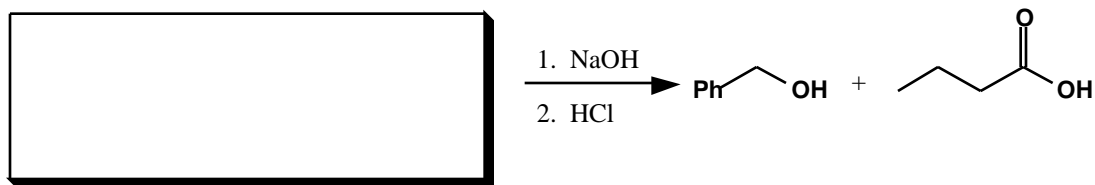
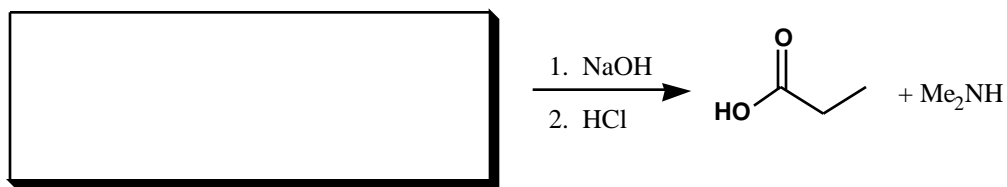


1. Synthesis Reactions. Draw the feature product of the following reactions. (3 pts each)





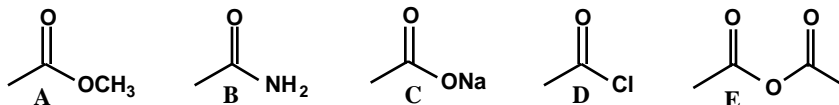
2. Draw the starting materials for the following hydrolysis reactions. (2 pts each)



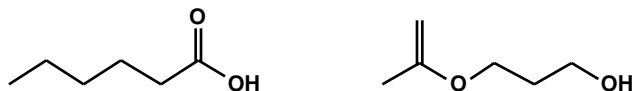
3. a) Which one(s) of the following will react spontaneously with H_2O ? (2 pts)

b) Which one(s) will react spontaneously with Me_2NH ? (2 pts)

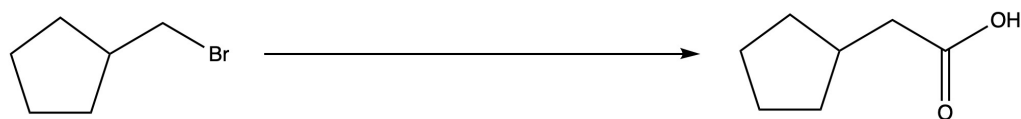
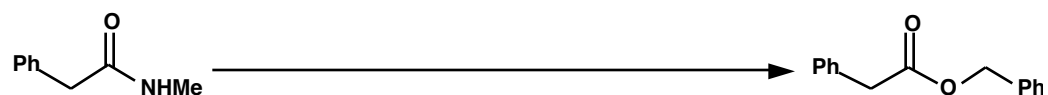
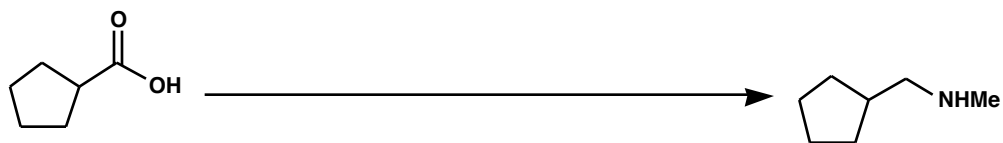
[Note: there may be more than one that reacts.]



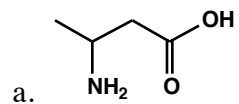
4. Shown are two isomers. Circle the one with the higher boiling point. (2 points)



5. Provide Reagents for the Following Transformations (4 pts each)



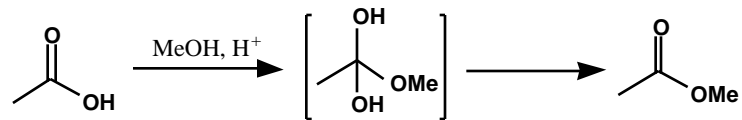
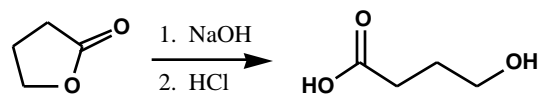
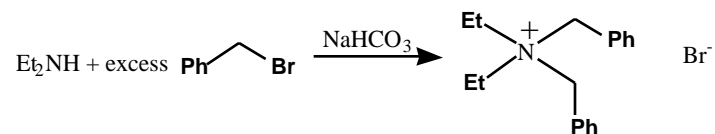
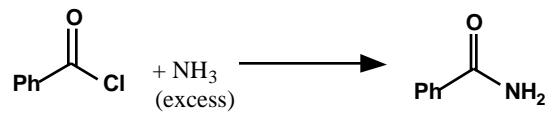
6. Name the Following or Draw the Structure (2 pts each)



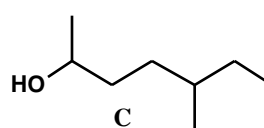
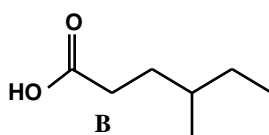
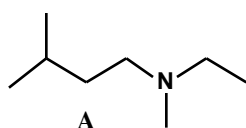
b. N-methyl-N-ethyl-3-hexanamine

c. methyl benzoate

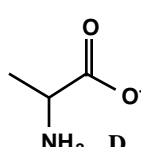
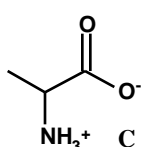
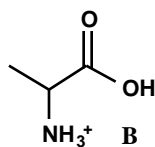
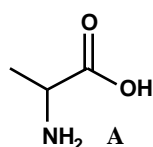
7. Provide Mechanisms for the Following Reactions. (Note: In some cases, these may be “partial” reactions.) (16 points)



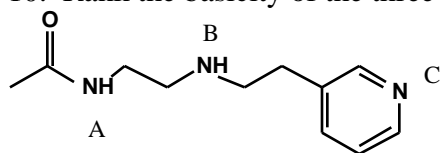
8. Which (if any) after being dissolved in diethyl ether, will: (4 points)
- a) Extract into NaOH/H₂O? b) Extract into HCl/H₂O? c) Extract into neutral water?



9. Of the following, which form would exist at: (4 points)
- a) pH = 2 (acidic) b) pH = 7 (neutral) c) pH = 12 (basic)

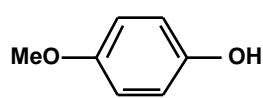
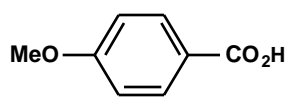
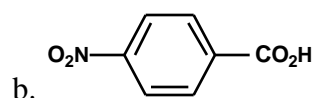


10. Rank the basicity of the three Nitrogen atoms, from most to least (1 most, 3 least). (2 pts)



11. Rank the acidity of the following, 1 being most acidic, 3 being least (2 pts each)

- a. ethanoic acid CH₃NH₃⁺Cl⁻ ethanol



12. Rank the basicity of the following, 1 being most basic, 3 being least (2 points each)

- a. NH₃ CH₃NH₂ PhNH₂

- b. NaOH CH₃NH₂ sodium ethanoate

