

14.2 DERIVATIVES OF CARBOXYLIC ACIDS- SQ

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Introduction

1. Write the functional group of an amide. 1
2. Write the functional group of an ester. 1

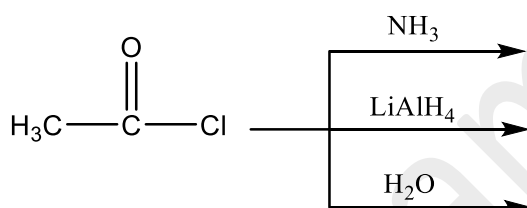
Preparation of derivatives from carboxylic acids

3. Predict the major product of the following reaction. $\text{CH}_3\text{COOH} \xrightarrow{\text{P}_2\text{O}_5, \text{Heat}}$ 1
4. What happens when ethanoic acid is heated with P_2O_5 ? 1
5. How would you convert ethanoic acid into Ethanoic anhydride? 1
6. Identify products A and B and give their IUPAC name.
$$\text{CH}_3\text{COOH} \xrightarrow[\text{heat}]{\text{P}_2\text{O}_5} \text{A} \xrightarrow[\text{heat}]{\text{LiAlH}_4} \text{B}$$
 2
7. How would you convert ethanoic acid into methyl ethanoate? 1
8. How does methanoic acid act upon methanol/ H^+ ? 1

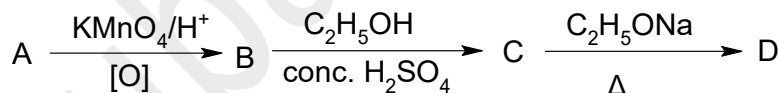
Comparative physical properties of acid derivatives

Comparative chemical properties of acid derivatives

9. Write the products of the following reactions with IUPAC names. 3



10. Predict the major product of the following reaction. $(\text{CH}_3\text{CO})_2\text{O} \xrightarrow{\text{LiAlH}_4, \text{Heat}}$ 1
11. Predict the major product of the following reactions; $\text{CH}_3\text{COOCOCH}_3 \xrightarrow{\text{LiAlH}_4}$ 1
12. Write the chemical reaction when an ester is hydrolysed. 2
13. Identify A, B, C and D in the following reaction sequence.



The compound A is a primary alcohol, which gives a positive iodoform test. [4]

14. Write the chemical reaction when an amide is hydrolysed. 2

Claisen condensation

15. Write a chemical reaction for the Claisen condensation reaction. [1]

Hofmann Bromamide degradation reaction

16. What happens when benzamide is heated with bromine and aq. KOH? 2
17. Give the major product of the following reaction

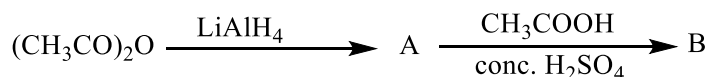


18. What happens when the product obtained by the action of ethanoyl chloride and ammonia is heated with Br_2 and aqueous KOH? 2

19. Define and give an example of Hofmann's hypobromite reaction. 1
20. What happens when benzamide is allowed to react with bromine in the presence of KOH solution? 1
21. Give an example of a decarbonylation reaction. 1
22. Convert ethanoic acid into methanoic acid. 2

Conversions:

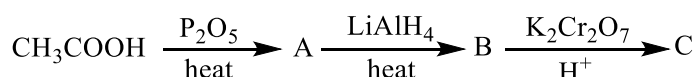
23. Identify A and B in the following sequence of reactions and give their IUPAC name.



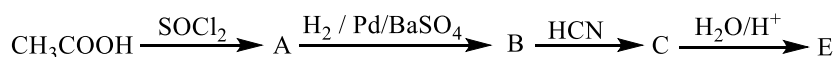
1

24. Identify the products A, B and C and give their IUPAC name.

2



25. Identify each lettered compound in the following reaction sequence:



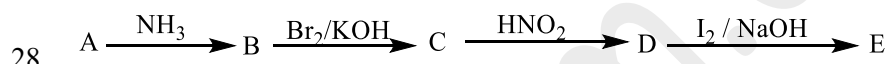
5

26. Represent a regular sequence of reactions of the following sets of organic compounds using suitable catalysts, reagents or conditions.



27. An aliphatic compound A reacts with SOCl_2 to give B. The compound B is heated with ammonia to produce C. The compound C is further heated with Br_2/KOH to yield D. The compound D gives E when treated with NaNO_2/HCl at low temperature. The compound E is a primary alcohol which gives the iodoform test. Identify A, B, C, D and E. Write reactions involved.

5



28. Compound E produces ethyne when heated with silver powder. Identify A, B, C, D and E.
29. An organic compound (A) of molecular formula $\text{C}_4\text{H}_8\text{O}_3$ undergoes acidic hydrolysis to give a carboxylic acid (B). When A is reduced with LiAlH_4 , an alcohol (C) is produced. The alcohol (C) if oxidised with KMnO_4/H^+ , gives back (B)

5

i. Draw the molecular structure of (A), (B) and (C) with reactions involved.

ii. What happens when (B) is heated with P_2O_5 ?

[4+1]

30. An organic compound (A) of molecular formula $\text{C}_4\text{H}_8\text{O}_2$ undergoes acidic hydrolysis to give a carboxylic acid (B) and alcohol (C). When (B) is reduced with LiAlH_4 , an alcohol (C) is produced. The alcohol (C), if oxidised with KMnO_4/H^+ , gives back (B)

i. Draw the molecular structure of (A), (B) and (C) with reactions involved.

ii. What products would you expect when (A) is reduced with LiAlH_4 ?

[4+1]

31. How would you convert propanone to ethanal?

2

32. How would you convert ethanol into methanol?

3

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