

Organic Chemistry

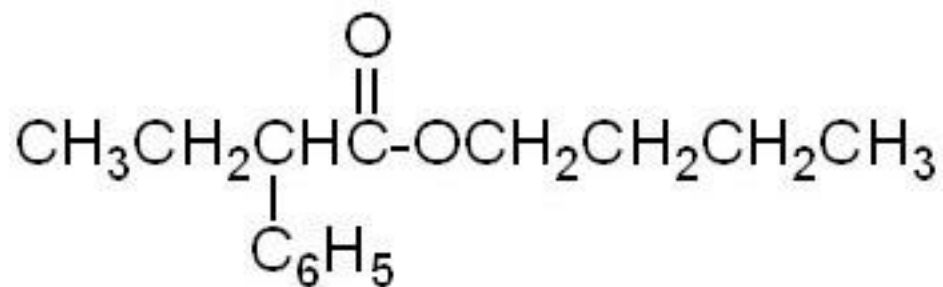
Carey/Giuliano

10th edition

Chapter 20

[Question 1]

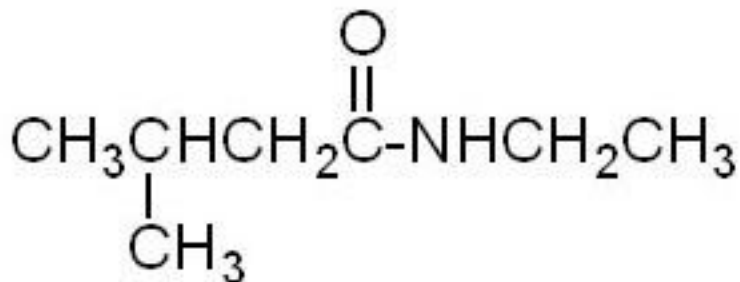
What is the correct IUPAC name of the compound at the right?



- A) 2-phenylbutyl butanoate
- B) butyl 2-phenylbutanoate
- C) butyl 2-benzylbutanoate
- D) butyl 2-ethylbenzoate

Question 2

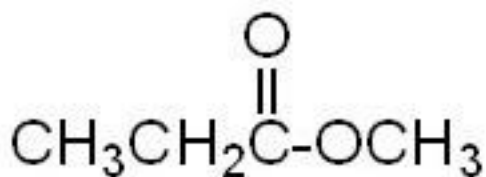
Select the correct IUPAC name for the compound shown here.



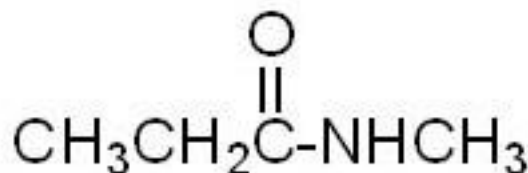
- A) *N*-ethyl-3,3-dimethylpropanamide
- B) *N*-ethyl-3-methylbutanamide
- C) *N*-ethyl-3-methylbutanamine
- D) Ethyl-3-methylbutanamide

Question 3

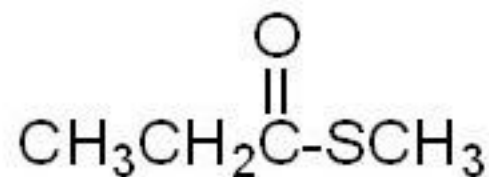
Arrange the compounds below in increasing order of reactivity toward nucleophilic acyl substitution.



1



2



3

A) 1 < 2 < 3

B) 2 < 3 < 1

C) 3 < 2 < 1

D) 2 < 1 < 3

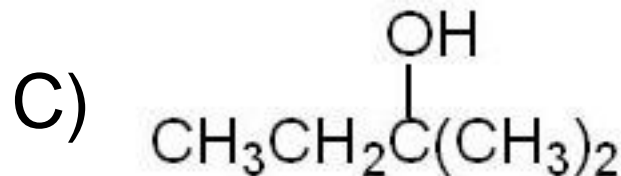
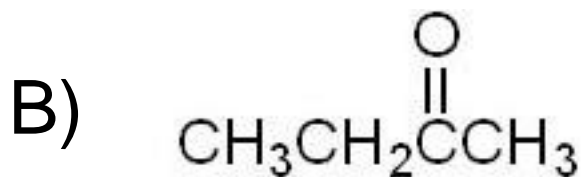
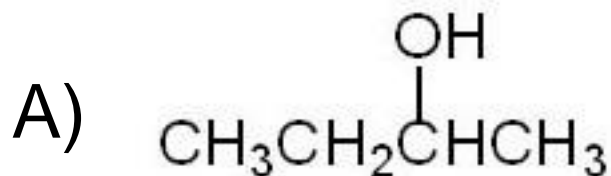
[Question 4]

What is the product of the reaction of benzoyl chloride with ethanol?

- A) $\text{C}_6\text{H}_5\overset{\text{O}}{\parallel}\text{C}-\text{OCH}_2\text{CH}_3$ B) $\text{C}_6\text{H}_5\overset{\text{O}}{\parallel}\text{C}-\text{Cl}$
- C) $\text{C}_6\text{H}_5\overset{\text{O}}{\parallel}\text{C}-\text{CH}_2\text{CH}_3$ D) $\text{C}_6\text{H}_5\overset{\text{O}}{\parallel}\text{C}-\text{OH}$

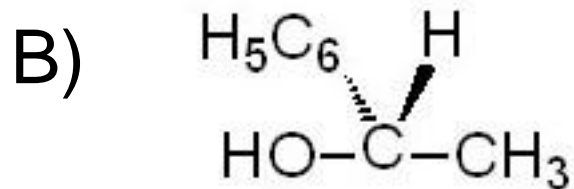
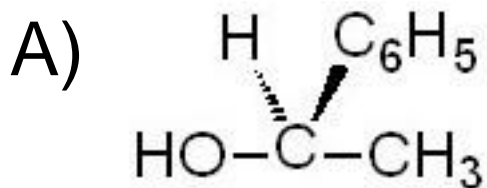
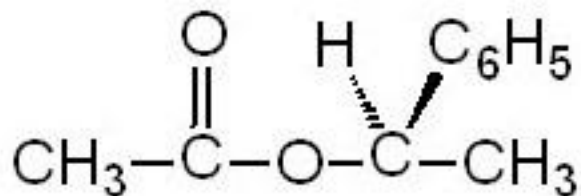
[Question 5]

What is the product of the reaction of methyl propanoate with methylmagnesium bromide?



Question 6

Which alcohol(s) will be isolated from the hydrolysis of (*R*)-(+)-1-phenylethyl acetate?

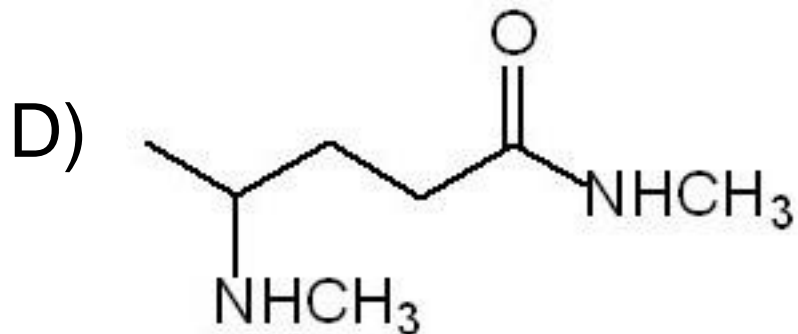
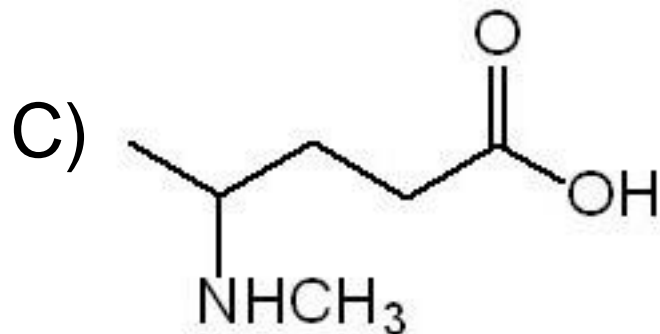
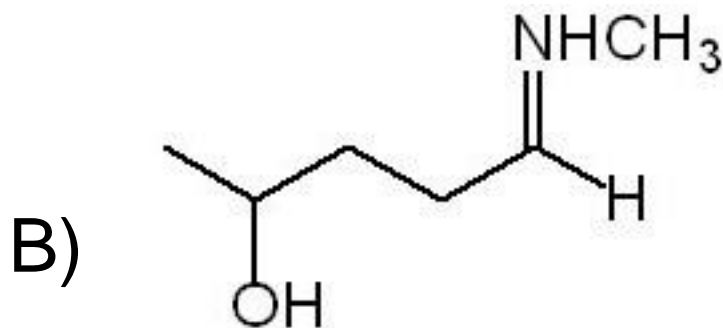
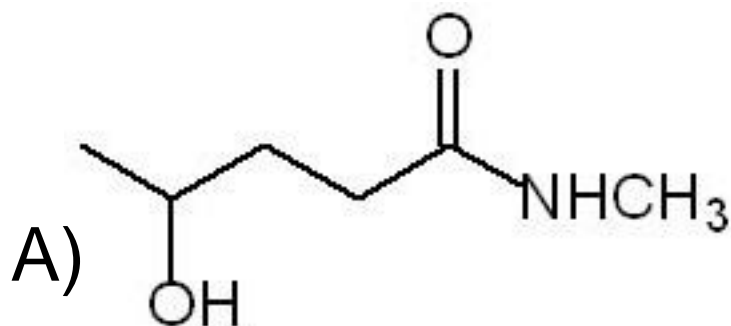
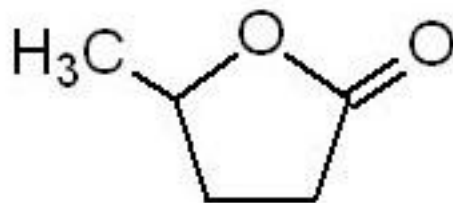


C) ethanol

D) 1:1 mixture of A and B.

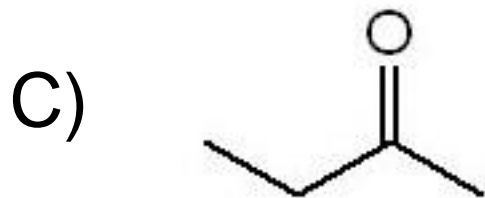
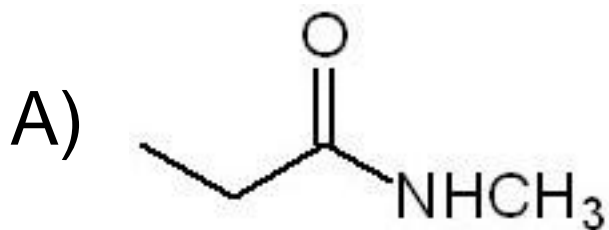
Question 7

Identify the product expected from the reaction of the lactone shown here with methyl amine.



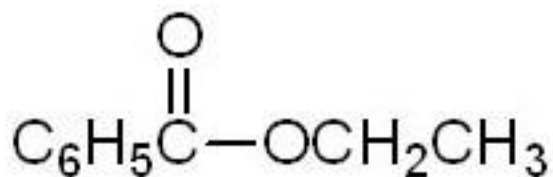
[Question 8]

What is the product of the reaction of butanenitrile with CH_3MgBr followed by hydrolysis?

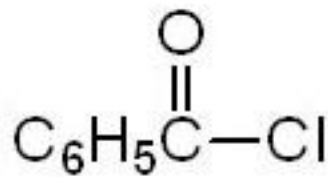


Question 9

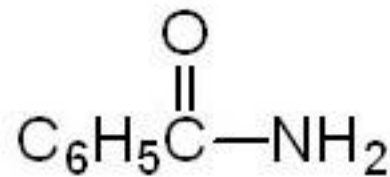
Arrange the compound below in order of decreasing IR carbonyl stretching frequency.



1



2



3

A) 1 > 2 > 3

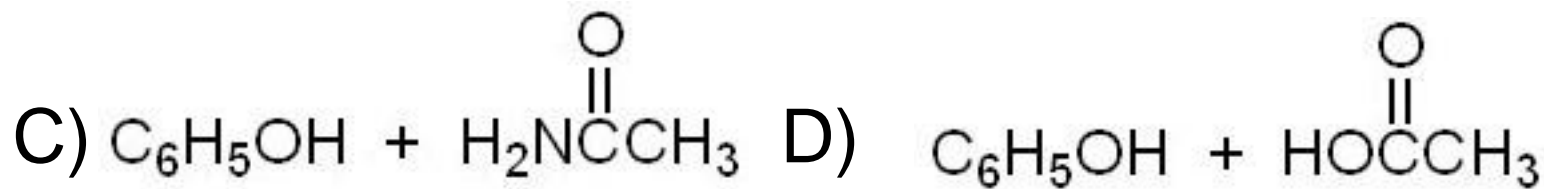
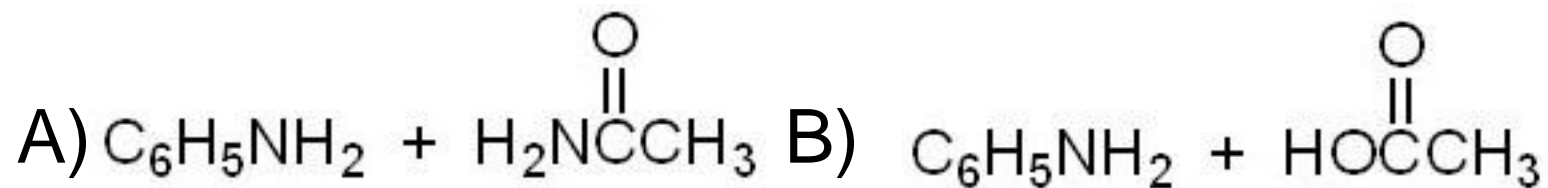
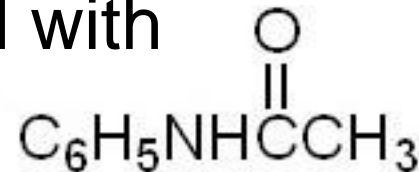
B) 2 > 1 > 3

C) 3 > 2 > 1

D) 2 > 3 > 1

[Question 10]

What are the principal organic products when the amide on the right is reacted with aqueous HCl and heat?



Question 11

Which of the following statements is not true regarding carboxylic acid derivatives?

- A) Acid anhydrides are less reactive toward nucleophilic attack than acyl chlorides.
- B) Electron pair donation stabilizes the carbonyl group making it less reactive toward nucleophilic attack.
- C) Acyl chlorides, anhydrides, esters, and amides react through nucleophilic aromatic substitution.
- D) Thioesters can undergo the same reactions that esters do but at a faster rate.

[Question 12]

An acid anhydride can be converted into any of the following derivatives **except**

- A) a carboxylic acid.
- B) an acyl chloride.
- C) an ester.
- D) an amide.

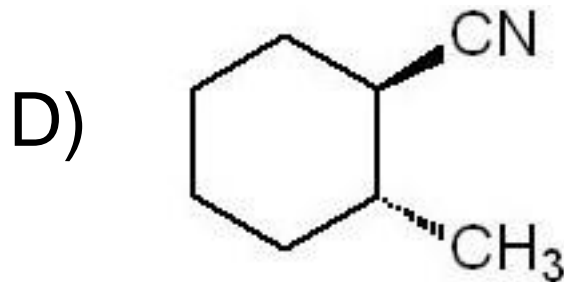
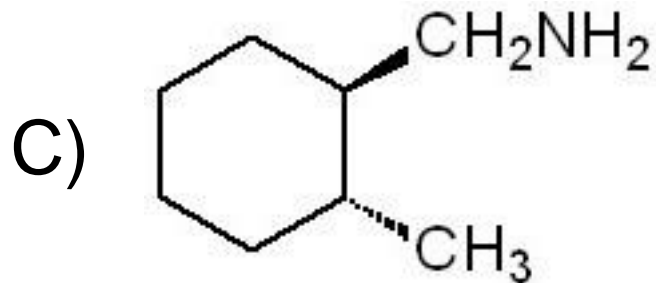
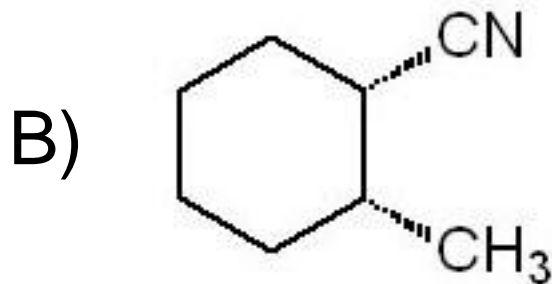
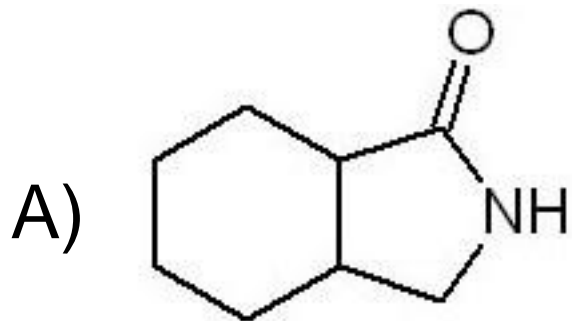
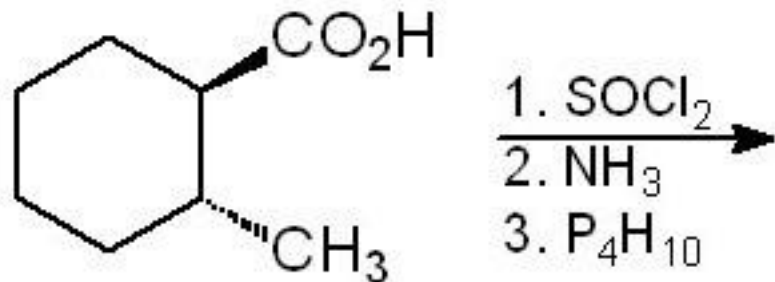
[Question 13]

An unknown compound, $C_9H_{10}O_2$, did not dissolve in aqueous NaOH. The IR spectrum exhibited strong absorption at 1730 cm^{-1} . The $^1\text{H-NMR}$ spectrum had signals at δ 7.2 (multiplet), δ 4.1 (quartet), and δ 1.3 (triplet). Which of the following is most likely the unknown?

- A) $C_6H_5CO_2CH_2CH_3$
- B) $C_6H_5CH_2O-C(=O)CH_2CH_3$
- C) $C_6H_5CO_2CH_3$
- D) $C_6H_5CH_2C(=O)CH_2CH_3$

Question 14

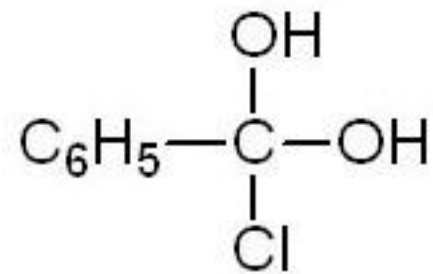
Which product will be isolated from the reaction shown at the right?



[Question 15]

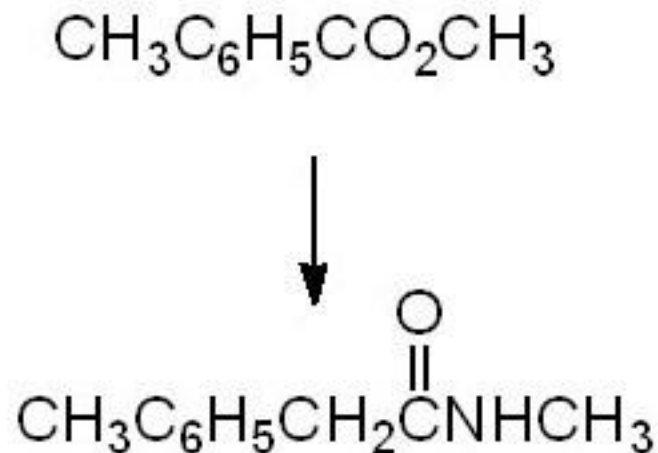
What are the products of the most favorable mode of decomposition of the intermediate species shown?

- A) Benzoic acid and HCl
- B) Benzoyl chloride and H₂O
- C) Both A and B equally likely
- D) Neither A nor B



Question 16

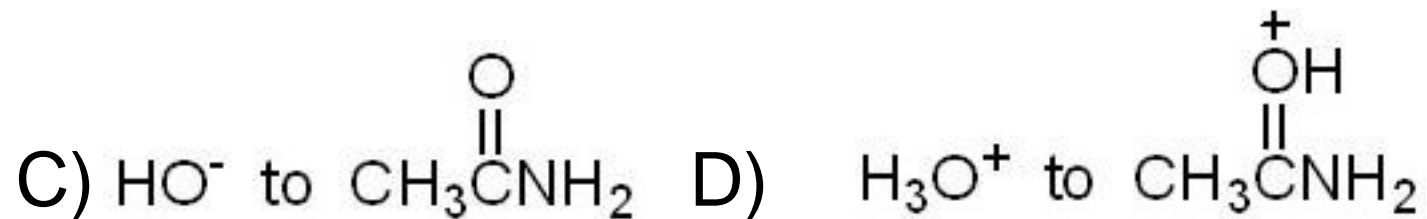
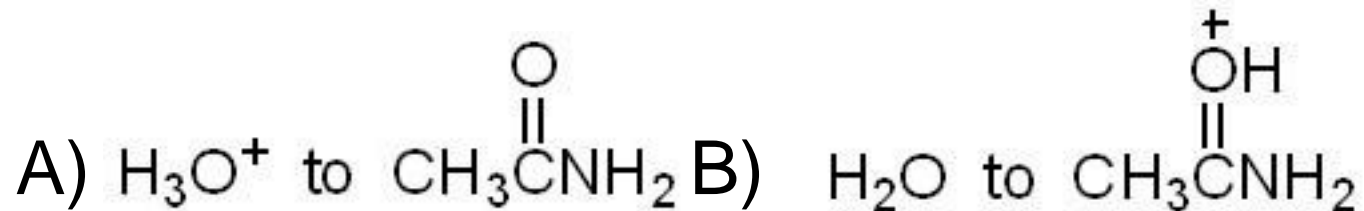
Choose the best sequence of reactions for the transformation given. Semicolons indicate separation steps to be used in the order shown.



- A) H_3O^+ ; SOCl_2 ; CH_3NH_2
- B) $\text{HO}^-/\text{H}_2\text{O}$; PBr_3 ; Mg ; CO_2 ; H_3O^+ ; SOCl_2 ; CH_3NH_2
- C) LiAlH_4 ; H_2O ; HBr ; Mg ; CO_2 ; H_3O^+ ; SOCl_2 ; CH_3NH_2
- D) None of these would yield the desired product

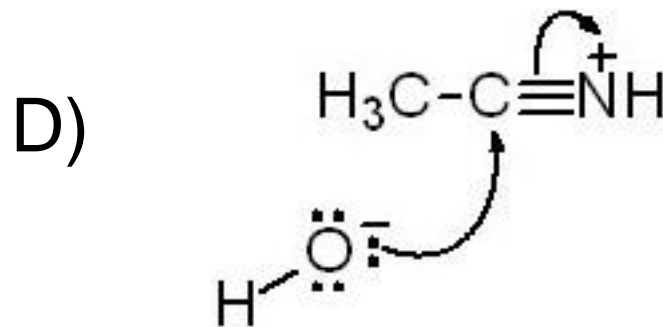
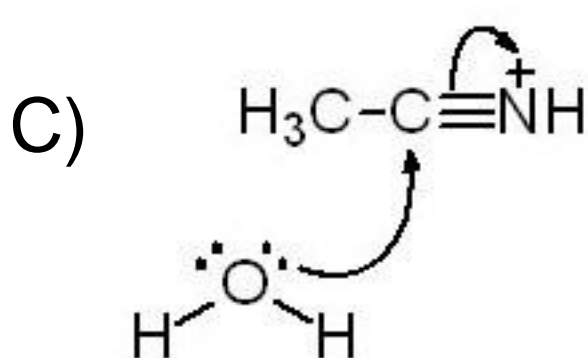
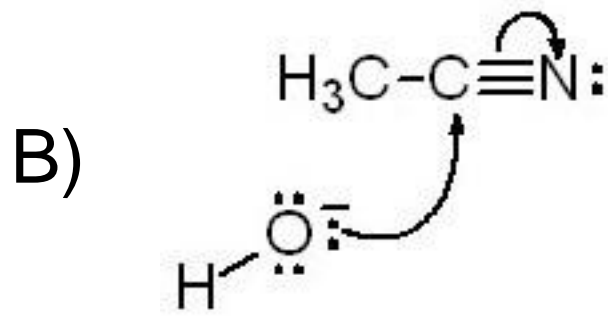
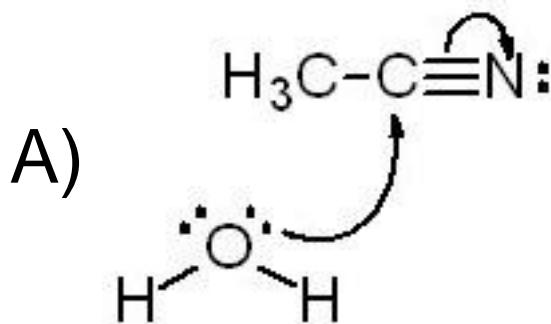
[Question 17]

Hydrolysis of acetamide in aqueous acid proceeds by nucleophilic addition of



[Question 18]

Which of the following best describes the nucleophilic addition step in the acid catalyzed hydrolysis of acetonitrile (CH_3CN)?



[Question 19]

Cyclic amides are commonly known as

- A) imines.
- B) lactones.
- C) lactams.
- D) hydrazones.

[Question 20]

Which of the following does not react with aqueous sodium hydroxide?

- A) Benzoic acid
- B) Acetic anhydride
- C) Ethyl acetate
- D) Benzyl methyl ether

[Answer Key – Chapter 20]

1. B

2. B

3. D

4. A

5. C

6. A

7. A

8. C

9. B

10. B

11. C

12. B

13. A

14. D

15. A

16. C

17. B

18. C

19. C

20. D