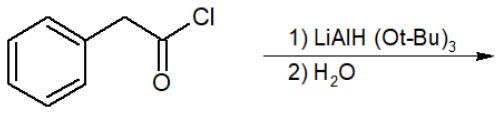
# 19.16: ADDITIONAL EXERCISES

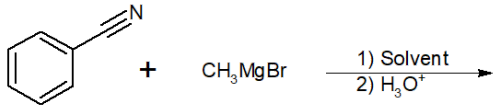
General Review

**19-1** Give the product of the following reaction.

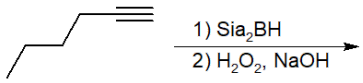



**19-2** For each of the following reactions, give the final product.

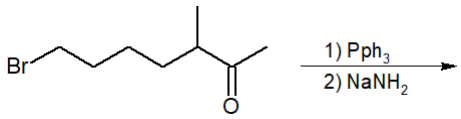
**a)**




**b)**

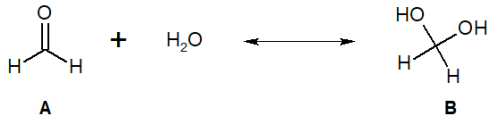



**19-3** For the following reaction, give the final product.




**19-4** For the following reactions, identify the side favored at equilibrium.

**1)**

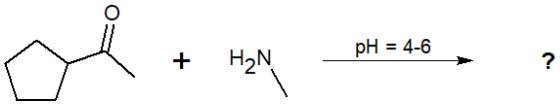



**A** **B**

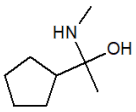
**2)**


**A** **B**

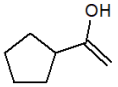
**19-5** Identify the correct product of the following reaction.



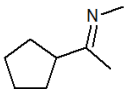

**a)**



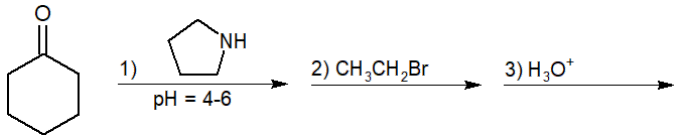

**b)**




**c)**

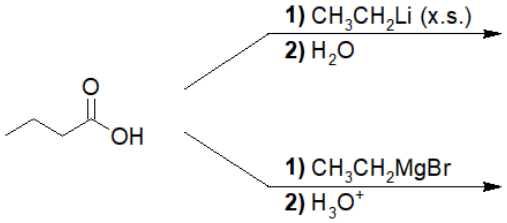



**19-6** Give the final product of the following chain of reactions.

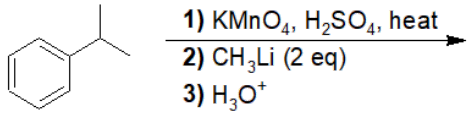



**Synthesis of Ketones from Carboxylic Acids**

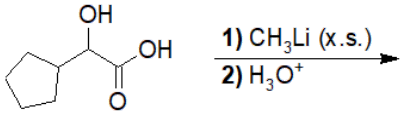
**19-7** Provide the structures of the products of the following reactions.



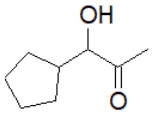

**19-8** Provide the structure and IUPAC nomenclature of the product of the following reaction.



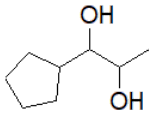

**19-9** Choose the correct answer.



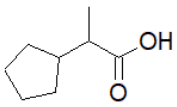

**a)**



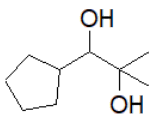

**b)**




**c)**



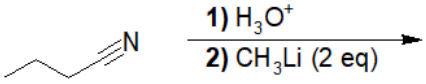

**d)**



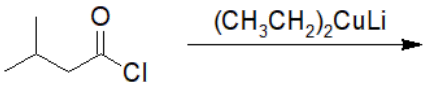

**Synthesis of Ketones and Aldehydes from Acid Chlorides, Esters, and Nitriles**

**19-10** Provide the structures of the products of the following reactions.

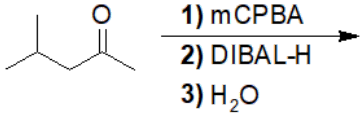
**a)**




**b)**

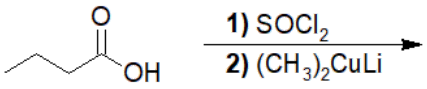



**19-11** Choose the correct product of the following reaction.



a) b) c) d)

**19-12** Choose the correct IUPAC nomenclature of the product of the following reaction.




a) butanal

b) 2-methylhexan-3-one

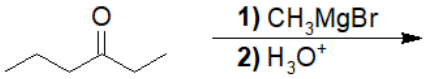
c) pentan-2-one

d) 2-methylpentan-2-ol

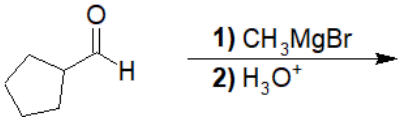
**Reactions of Ketones and Aldehydes**

**19-13** Provide the products of the following reactions.

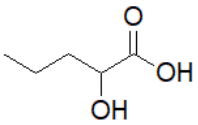
**a)**




**b)**

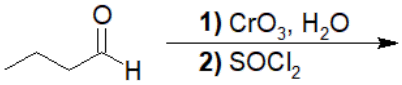



**19-14** Suggest a way to make the following compound from butanol. Use any necessary reagents.



**2-hydroxypentanoic acid**

**19-15** Choose the correct product of the following reaction.




a) 2-chloropentane

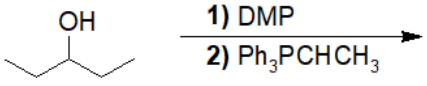
b) 1-chlorobutan-1-ol

c) 2-chlorobutanoic acid

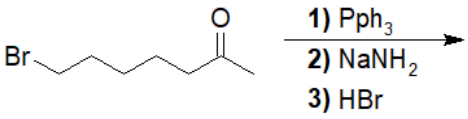
d) butanoyl chloride

**The Wittig Reaction**

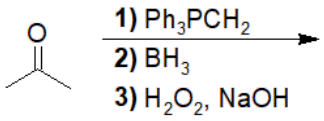
**19-16** Predict the structure of the product of the following reaction.



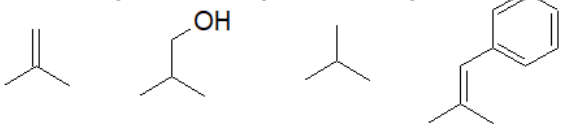

**19-17** Provide the product of the following reaction.



**19-18** Choose the correct product of the following reaction.

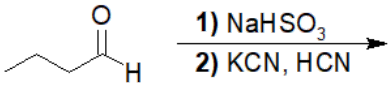



a) b) c) d)

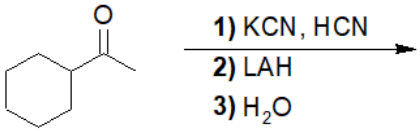



**Formation of Cyanohydrins**

**19-19** Predict the structure of the product of the following reaction.




**19-20** Provide the structure of the product of the following reaction.




**19-21** Choose the correct IUPAC nomenclature of the product of the following reaction.


a) 3-ethylhex-1-yn-3-ol

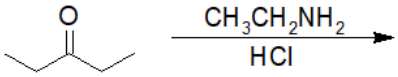
b) 2-ethyl-2-hydroxypentanenitrile

c) 3-(aminomethyl)hexan-3-ol

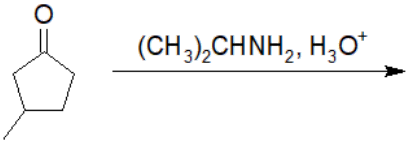
d) butanoyl cyanide

**Formation of Imines**

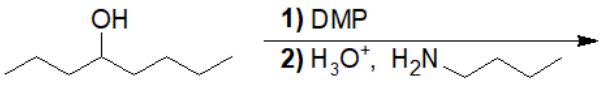
**19-22** Predict the product of the following reaction.




**19-23** Provide the structure of the product of the following reaction.




**19-24** Choose the correct IUPAC nomenclature of the product of the following reaction.




a) (4Z)-N-butyloctan-4-imine

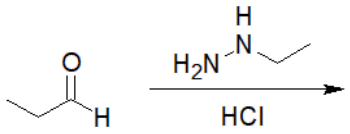
b) (4Z)-N-propyloctan-4-imine

c) (4Z)-5-propylnon-4-en-1-amine

d) 4-(butylamino)octan-4-ol

**Condensations with Hydroxylamine and Hydrazines**

**19-25** Choose the correct IUPAC nomenclature of the product of the following reaction.



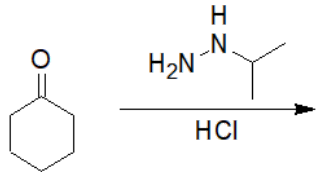

a) 1-ethyl-2-propylhydrazine

b) N-propoxyethanamine

c) (1E)-N-ethylbut-1-en-1-amine

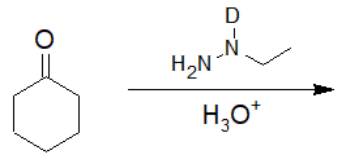
d) (2E)-1-ethyl-2-propylidenehydrazine

**19-26** Provide the structure of the product of the following reaction.

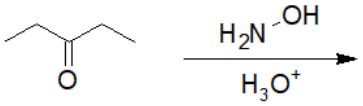



**19-27** Provide the structure of the products of the following reactions.

**a)**

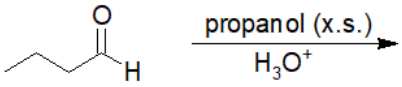



**b)**

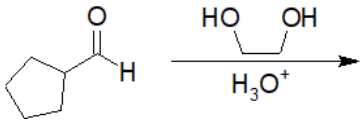



**Formation and Use of Acetals**

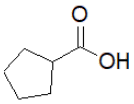
**19-28** Provide the structure of the resulting acetal.



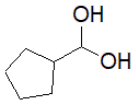

**19-29** Choose the correct structure of the product of the following reaction.



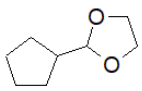

**a)**



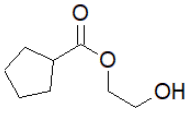

**b)**



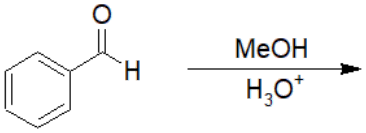

**c)**




**d)**




**19-30** Choose the correct IUPAC nomenclature of the product of the following reaction.




a) (dimethoxymethyl)benzene

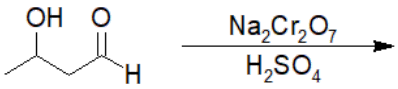
b) benzoic acid

c) phenylmethanediol

d) (methoxymethyl)benzene

**Oxidation of Aldehydes and Reductions of Ketones and Aldehydes**

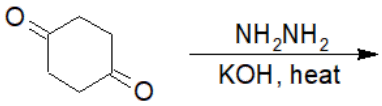
**19-31** Draw the structure of the product of the following oxidation reaction.



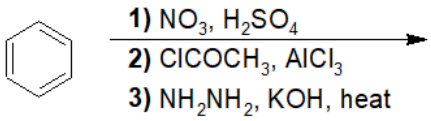

**19-32** Draw the structures of the products of the following reduction reactions.

**a)**


**b)**




**19-33** Predict the product of the following reaction and provide its IUPAC nomenclature.

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