PLUS Session Chem 2313
Fall 2017
Practice Final Exam

Part I. Multiple Choice. Circle the number that corresponds to the answer to each question. There is only one correct answer for each question.

1. Which of the following mechanisms involve isomerization?
   a. Michael Addition
   b. Robinson Annulation
   c. Mannich Reaction
   d. Claisen Condensation

2. What is the IUPAC name for the following chemical?

   a. 2,5-dimethylcyclohexan-1-one
   b. 1,4-dimethylcyclohexan-5-one
   c. 2,5-dimethylphen-1-one
   d. 2,5-dimethylcyclohexan-1-al

3. Which of the following chemicals is most acidic?

   a. A
   b. B
   c. C
   d. D

4. What localized orbital interaction is depicted in the elementary step below?

   a. n → a
   b. σ → a
   c. n → σ*
   d. σ → σ*

5. What is the type of the intermediate formed during an acid-catalyzed decarboxylation?

   a. Enolate
   b. Carbocation
   c. Enol
   d. Alkoxide
6. What is the IUPAC name for the following chemical?

![Chemical Structure]

a. 5-Hexen-3-one  
   b. 1-Hexen-4-one  
   c. 5-Hexen-3-al  
   d. (5,3)-Hexenol

7. What is the name of the alcohol obtained by hydrolysis of a glycoside?

   a. Glucose  
   b. Aglycone  
   c. Tetrose  
   d. Methanol

8. Which of the following best represents the monomer of DNA?

   a. Nucleotide  
   b. Nucleoside  
   c. Nitrogenous Base  
   d. Monosaccharide

9. Which of the following factors the least in the determination of the acidity of molecules?

   a. Electronegativity  
   b. Resonance  
   c. Hybridization  
   d. Stereochemistry

10. What type of reaction occurs when a ketone reacts with lithium aluminum hydride to create a secondary alcohol?

    a. Nucleophilic addition  
    b. Electrophilic addition  
    c. Nucleophilic substitution  
    d. Electrophilic substitution

11. Which of the following is true about the Wittig reaction (reaction of an aldehyde/ketone with a phosphorus ylide)?

    a. The product of the reaction is an alkyne  
    b. The reaction creates a cyclic intermediate called oxaphosphetane  
    c. An enol is formed to react with the phosphorus ylide  
    d. Phosphonium ylides are electrophilic

12. Which of the following can convert a primary alcohol into a carboxylic acid?

    a. Chromic Acid  
    b. Lithium Aluminum hydride  
    c. Sodium borohydride  
    d. Swern’s reagent
13. What is the major organic product of the following reaction?

14. Which of the following best describes the key mechanistic steps during a general base-catalyzed ester hydrolysis?
   a. Simultaneous proton transfer and nucleophilic addition with beta-elimination
   b. Proton transfer, followed by nucleophilic addition and beta-elimination
   c. Nucleophilic addition, proton transfer, beta elimination, and proton transfer
   d. Nucleophilic addition and beta elimination

15. Which of the following is not aromatic?

16. What is the major product of this reaction?
17. Which of the labeled hydrogens is the most acidic?

![Image of a molecular structure]

18. Which of the following reactions can reduce a benzene ring into 1,4-cyclohexadiene?
   a. Dieckmann Condensation
   b. Birch Reduction
   c. DIBAL-H
   d. Curtis Rearrangement

19. Which of the following structures could be used in an elimination-addition reaction with NaNH₂?
   ![Images of structures A, B, C, D]

20. Which of the following amino acid residues is achiral?
   a. Alanine
   b. Methionine
   c. Glutamine
   d. Glycine

21. What is the major organic product from the following reaction?
   ![Image of a reaction with structures A, B, C, D]

22. Which of the following best describes the key mechanistic steps in the reaction between an ester and a Grignard reagent?
   a. Addition followed by protonation
   b. Substitution followed by decarboxylation
   c. Addition followed by elimination
   d. Elimination followed by addition
Part II. Provide the Answers. Give the answers for each part of the questions.
Multiple Choice Answers

1. B  
2. A  
3. C  
4. C  
5. C  
6. A  
7. B  
8. A  
9. D  
10. A  
11. B  
12. A  
13. B  
14. A  
15. C  
16. B  
17. B  
18. B  
19. C  
20. D  
21. A  
22. C