KATHMANDU UNIVERSITY
End Semester Examination [C]
June/July 2024

Marks Scored:

Level : B.Pharm.
Year : II
Course : CHEM 203
Semester : I
Exam Roll No. :
Time: 30 mins.
F. M. : 20
Registration No.:
Date 05 JUL 2024

SECTION "A"
[20Q. × 1 = 20 marks]

Choose the most appropriate answer and mark [X] in the box.

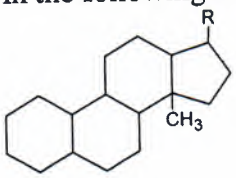
1. A useful method for obtaining double bond at alpha beta carbon is by
   [ ] Aldol condensation [ ] Wittig reaction
   [ ] Claisen condensation [ ] Crossed Claisen condensation

2. The final product in acetoacetic ester synthesis is
   [ ] Acetic acid [ ] β Keto ester
   [ ] Sodio acetic ester [ ] Ketone

3. Which of the following helps in the synthesis of peptides by combining amino acids?
   [ ] di-*tert*-Butyl dicarbonate [ ] Benzyl chloroformate
   [ ] *p*-Toluenesulphonyl chloride [ ] Dicyclohexylcarbodiimide

4. The carbon in organometallic compounds exhibit _____ character.
   [ ] Electrophilic [ ] Nucleophilic [ ] Neutral [ ] Acidic

5. In the following steroid, position of R is assigned as



   [ ] 11 [ ] 14 [ ] 17 [ ] 19

6. In Ziegler-Natta polymerization, metal alkyls can be oxidized by air to give
   [ ] Alkane [ ] Alkene [ ] Alcohol [ ] Ester

7. In peptide chemistry, Sanger method is used for
   [ ] Preparation of amino acids [ ] Generation of phenylthiohydantoin
   [ ] C-Terminal analysis [ ] N-Terminal analysis

8. Out of the following, the most common detergent is
   [ ] Lauryl alcohol [ ] Sodium lauryl sulfate
   [ ] Ethoxylate [ ] Salt of alkyl benzene sulfonic acid

9. Cellobiose consists of
   [ ] Glucose and glucose [ ] Glucose and galactose
   [ ] Glucose and fructose [ ] Galactose and fructose

10. Catalytic shape of α chymotrypsin is maintained by

[ ] Serine-195 and Isoleucine-16 [ ] Isoleucine-16 and Aspartic Acid-194

[ ] Aspartic Acid-194 and Histidine-57 [ ] Histidine-57 and Isoleucine-16

11. The glycosidic linkage in cellobiose is

[ ] α 1-4 [ ] β 1-4 [ ] α 1-6 [ ] β 1-6

12. For the cycloaddition reaction where the number of pai electrons involved is 8, the photochemical reaction occurs in _____ mode.

A. antara, antara B. antara, supra C. supra, antara D. supra, supra

[ ] A and B [ ] B and C [ ] C and D [ ] D and A

13. Which of the following statements is NOT true in case of base-promoted halogenation of ketones?

[ ] If the reactant is acetone; haloacetone can easily be obtained

[ ] Kinetics helps to study the mechanism of this reaction

[ ] Rate of the reaction depends upon the concentration of ketone and halogen

[ ] First step is rate degerming step in this reaction

14. Which of the following statement is NOT TRUE about Diels-Alder reaction?

[ ] Diene must have *s*-cis conformation

[ ] With respect to dienophile, the addition is *syn*

[ ] The endo–addition is more preferable

[ ] [2+2] Cycloaddition reaction is favorable in thermal condition

15. The reaction of pyridine with KNO_3 is an example of

[ ] Electrophilic substitution [ ] Addition

[ ] Elimination-addition [ ] Nucleophilic substitution

Fill in the blanks with appropriate words/symbols.

16. Glucose upon oxidation with HNO_3 gives _____

17. In pericyclic reaction, transition state of the molecule exhibit _____ geometry.

18. Linear polymer molecule with high crystallinity is obtained by _____ reaction.

19. Complete hydrolysis of cellulose gives _____

20. The aldoses react with excess_____ to give osazone.

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SECTION "B"

Attempt ALL questions.

1. Give the mechanism for the following reactions. [5 × 2 = 10]
   a. Methyl magnesium bromide with $CH_3COOC_2H_5$
   b. Malonic ester synthesis
   c. Wittig reaction
   d. Sanger method for peptide sequence analysis
   e. Ionic polymerization

2. Explain the following statements (*ANY FIVE*). [5 × 2 = 10]
   a. Electrophilic substitution in pyridine takes place at 3 position.
   b. The basicity of pyrrole is very less.
   c. Electrophoresis helps in the separation and analysis of protein mixture.
   d. [1, 5] Sigmatropic shifts of hydrogen take place readily compared to [1, 3].
   e. Kiliani Fischer synthesis generates epimers.
   f. Glycine amino acid is optically inactive.

3. Give the chemical reactions involved in the following processes *(ANY SIX)*. [6 × 2 = 12]
   a. Conversion of aldohexose to aldopentose
   b. Coordination polymerization.
   c. Aldol condensation
   d. Electrocyclic reaction
   e. D (+) Glucose with acetic anhydride
   f. Fructose with HCN
   g. (+) Maltose with bromine/water

4. a. How can the ring size of sugar be determined? Explain with suitable chemical reactions. [2]
   b. How can you determine the chemical structure of amylopectin? [2]
   c. Write down the preparation of amino acids with suitable chemical reactions (one method). [2]
   d. [1,3] Carbon shifts in sigmatropic reaction occurs with inversion of configuration. Explain it. [2]
   e. Write down the chemistry of soap and also explain its cleaning action. [3]

OR

Explain that the end group analysis of polysaccharide helps to determine the chain length.

P.T.O.

5. Write short notes on (*ANY FOUR*). [3 × 4 = 12]

a. Crossed Claisen condensation
b. Biosynthesis of fatty acid
c. Acetoacetic ester synthesis of ketone
d. Nucleophilic substitution in pyridine
e. Pericyclic reactions