M.Sc. CHEMISTRY Third Semester (Repeat) ORGANIC CHEMISTRY-III (MSC - 301)

Duration: 3Hrs.

Full Marks: 70

Part-A (Objective) =20 Part-B (Descriptive) =50

(PART-B: Descriptive)

Duration: 2 hrs. 40 mins.

Marks: 50

Answer any four from Question no. 2 to 8 Question no. 1 is compulsory.

- 1. Describe all the steps involved in the synthesis of Ala-Gly-His peptide bond. (10)
- 2. (a) Write the correct sequence of amino acid in the tripeptide when it is subjected to Edman degradation. (2)

(b) Write down the mechanism for the following-

(2)

- (c) Glucose react with NH₂OH to form glucose oxime but glucose penta-acetate does not form its corresponding oxime. Explain. (2)
- (d) Give systematic nomenclature for the following heterocyclic molecules: (2)

$$(i) \qquad \begin{matrix} H \\ N \end{matrix} \qquad (ii) \qquad \begin{matrix} S \\ S \end{matrix} \qquad N$$

(e) Discuss the role of haemoglobin as oxygen carrier and explain its oxygen binding mechanism. (2)

- 3. (a) Describe with a plausible mechanism of Skraup's quinoline synthesis. (4)
 - (b) Write down the product with mechanism-

i)
$$\bigcap_{N} \bigcap_{C_6H_5\text{-CHO}} ?$$
ii) $\bigcap_{N} \bigcap_{H} \bigcap_{M} \bigcap_{N} \bigcap_{M} \bigcap_{N} \bigcap_{M} \bigcap_{M}$

(c) Write a synthetic method for imidazole.

4. (i) Calculate the pI of the following amino acids: $(2\times3=6)$

- a) with pKavalues COOH = 2.35; $N^{+}H_{3} = 2.35$ having a neutral side chain
- b) with pKa values COOH = 1.88; $N^+H_3 = 9.68$ having acidic side chain (pKa value of side chain carboxylic group is 3.65
- c) with pKa values COOH = 2.16; N⁺H₃ = 9.18 having basic side chain (pKa value of side chain N⁺H₃ group is 10.79
- (ii) How can you synthesize

 -amino acids via Gabriel phthalimide synthesis? (2
- (iii) How DCC method of peptide synthesis is superior to the general method? (2)
- 5. (i) Show the of stereochemical representation of glyceraldehyde. (2)
 - (ii) Study the following Fischer projections to answer the questions below.

(1+1+2+1=:

(3)

- a. Is galactose a D-sugar or an L-sugar?
- b. Is mannose a D-sugar or an L-sugar?
- c. Are these two carbohydrates enantiomers? If not, in how many places do they differ?
- d. Is the term to describe the relationship between galactose and mannose?

- (iii) What are the main differences between reducing sugar non-reducing sugar.

 Describe with example. (3)
- 6. Answer the following questions: $(5 \times 2 = 10)$
 - (i) Draw the structure of porphyrin. How many π electrons are involved in delocalization? Will it follow Huckel's rule of aromacity?
 - (ii) Describe briefly about the phenomenon of photosynthesis.
- 7. (a) (i) Predict the products of the following reaction: (2+3=5)

- (ii) Describe briefly about the biosynthesis of amino acid.
- (b) (i) Write short notes on Claisen Rearrangement. (2+3=5)
 - (ii) Under which condition [4+2]-cycloaddition reaction is allowed. Explain with the help of FMO approach.
- 8. (a) Draw the Correlation diagram for disrotatory conversion of butadiene to cyclobutene. Is the process allowed or forbidden? Explain. (5)
 - (b) Predict whether conrotatory or disrotatory motion will take place under the conditions mentioned against each compound. Write the structure of the product with stereochemistry in each case. (5)

(i)
$$CH_3$$
 CH_3 $CH_$

2017/08

M.Sc. CHEMISTRY Third Semester (Repeat) ORGANIC CHEMISTRY-III (MSC - 301)

Duration: 20 minutes Marks – 20

(PART A - Objective Type)

I. Choose the correct answer:

 $1 \times 20 = 20$

1. The major product of the following reaction is-

2. α and β-maltoses are

- (a) enantiomers
- (b) epimers
- (c) anomers
- (d) geometrical isomers
- 3. The catalyst used in Fischer's Indole synthesis-
 - (a) ZnCl₂
- (b) PPA
- (c) H₂SO₄
- (d) All of these
- 4. Which one of the following amino acid will not responds to positive test to Ninhydrin?
 - (a) Glycine

(b) Alanine

(c) Proline

- (d) Serine
- 5. Pyridine undergoes electrophilic nitration at elevated temperature to produce the following as major product-

(a)
$$N_{NO_2}$$
 (b) N_{NO_2} (c) N_{NO_2} (d) N_{NO_2}

- 6. The four protein chains of haemoglobin comprises of two α chains and two β chains. The number of residues of each of two α and each of β chains are respectively-
 - (a) 141 & 146

(b) 142 & 145

(c) 140 & 147

- (d) 150 & 151
- 7. Oxidation of pyridine by peracids leads to-
 - (a) Ring opening of pyridine
- (b) Removal of hydrogen
- (c) Formation of epoxide
- (d) Formation of pyridine N-oxide

- 8. Which one of the following amino acid is optically inactive?
- (a) Alanine
- (b) Leucine
- (c) Glycine (d) Phenylalanine
- 9. Write the name of the reagent required for the following transformation.

- (a) Trifluoroacetic acid
- (b) HF

(c) H_2/Pd

(d) HCl

10. The IUPAC name of the following tri-peptide is-

- (a) Gly-Ser -Ala
- (b) Gly-Phe-Ser
- (c) Ala-gly-Ser
- (d) Ser-cys-Phe
- 11.Oxidation of sucrose with HIO₄ will have the following result-
 - (a) consume 1 HIO₄ and produce 1 HCOOH
 - (b) consume 2 HIO₄ and produce 2 HCOOH
 - (c) consume 3 HIO₄ and produce 1 HCOOH
 - (d) consume 3 HIO₄ and produce 2 HCOOH
- 12. Which of the following is not a polymer of glucose?
 - (a) Glycogen
- (b) Amylopectin

(c) Chitin

- (d) Cellulose
- 13. Which of the following pairs of monosaccharides will not form the same osazone?
 - (a) Glucose & Mannose
- (b) Glucose & fructose
- (c) Glucose & galactose
- (d) Ribose & arabinose
- 14. Vit-B₁ contains which of the following heterocyclic moiety?
 - (a) Thiazole
- (b) Oxazole
- (c) Imidazole (d) Isothiazole

15. The product of the following reaction is-

HO HO

- 100
- c) (
- d) HO

16. The electrocyclic reaction for	or ground state of hexatrienes-
(a) Conrotatory.	
(b) Disrotatory.	
(c) Conrotatory or disrotator (d) Cannot be predicted.	ry depending on temperature at which reaction is carried ou
17. Thermolysis of allyl phenyl	ether generates-
(a) o-allylphenol only	(b) o- and p-allyl phenols
(c) o-, m-, p-allylphenols	(d) m-allyl phenol only
18. The correct molecular form	ulae of porphyrine is-
(a) $C_{20}H_{14}N_4$	(b) $C_{20}H_{12}N_4$
(c) $C_{18}H_{20}N_4$	(d) $C_{22}H_{20}N_4$

19. The oxidation state of Fe in heme is-

(a) + 2

(b) +3

(c) both +2 and +3

(d) +1

20. We need oxygen carriers because -

- (a) Cannot carry enough in blood to meet metabolic demand.
- (b) Oxygen can diffuse very easily.
 - (c) Oxygen cannot diffuse very easily.
 - (d) Oxygen is very reactive.



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