

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: IMSc/MSc
BRANCH: Chemistry

SEMESTER: X/IV
SESSION: SP/2023

SUBJECT: CH515 INTERDISCIPLINARY ORGANIC CHEMISTRY

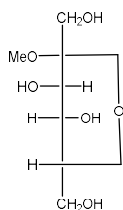
TIME: 3 Hours

FULL MARKS: 50

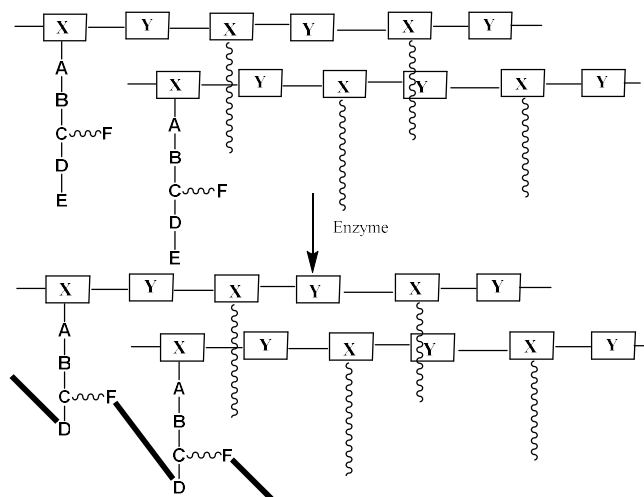
INSTRUCTIONS:

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

- Q.1(a) i) Write the cyclic structures of α -D (+) glucopyranose and Ethyl β -D (+) glucopyranoside in the most stable chair conformation. [3+2] CO 1 BL 2
ii) The following cyclic structure is that of a methyl fructoside.



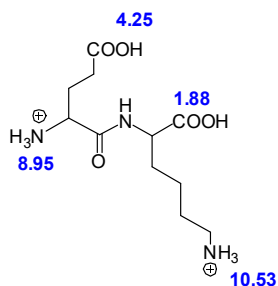
- a. Is it reducing or non-reducing? Give reasons
b. Is it the α or β anomer?
c. Which series D or L it belongs to?
d. How can you determine the ring size?
- Q.1(b) i) Show the steps to convert an aldopentose into an aldohexose by Killiani-Fischer method. [5] 1 4
ii) The following diagram represents the final step of peptidoglycan cell structure of a Gram-positive bacteria.



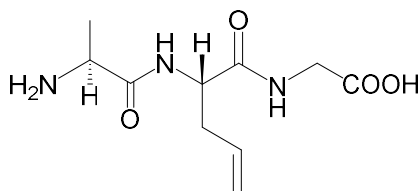
- i) Write the structures of X and Y
ii) Name the amino acids A-F and mention their configuration (D/L)

PTO

- Q.2(a) i) What is isoelectric point of a peptide? By which technique, it is determined? [2+3] 2 2
 Explain the principle behind the technique. For the peptide as shown below, each pK_a value is mentioned. Calculate its isoelectric point.



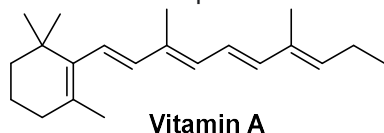
- ii) Provide the steps for the synthesis of the following tripeptide



- Q.2(b) i) A decapeptide X failed to react with Sanger's reagent. Amino acid analysis gave a composition: Ala, Pro, Val, Lys (2). The peptide X on treatment with Trypsin gave a pentapeptide Y with identical amino acid composition as that of X. Edman degradation of Y gave the following partial sequence: Ala-Val...Deduce the structure of X and Y. [3+2] 2 2

- ii) Different techniques for separation of proteins have been developed based on various parameters/properties of the proteins to be separated. Mention those parameters/properties giving example of the technique exploiting each parameter.

- Q.3(a) i) Write the basic skeleton of Flavanoids. [1+2+2] 3 1
 ii) Write the biosynthetic steps for Limonene.
 iii) What class of terpene is vitamin A? Highlight the isoprene units in it.



- Q.3(b) i) What are the major group of alkaloids? Give one example of each group. [3+2] 3 1
 ii) Discuss the medicinal use of Vinca alkaloids along with their mechanism of action.

- Q.4(a) Define and differentiate between glass transition temperature (T_g) and melting point (T_m) [5] 4 1

- Q.4(b) Discuss the role of plasticizers, stabilizers and antioxidants in a polymer. [5] 3 1

- Q.5(a) Give example and use of safer solvents used in green chemistry. [5] 5 1

- Q.5(b) Discuss any one less hazardous chemical synthesis. [5] 5 1

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