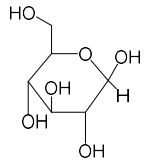
BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: M. Sc — **SEMESTER : IV**
BRANCH: Chemistry — **SESSION : SP/22**

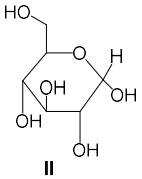
SUBJECT: Interdisciplinary Organic Chemistry (CH515)
TIME: 2 Hours — **FULL MARKS: 50**

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) Draw all the possible D-2-ketopentoses in Fischer projection. Consider the following molecules I and II and answer the subsequent questions: [1+4]



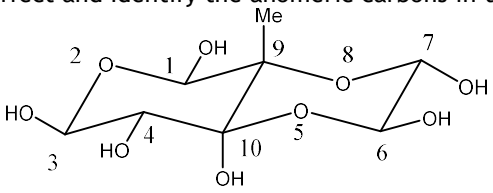
I



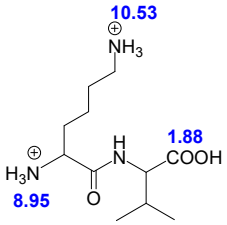
II

i) Write their most stable chair conformations
ii) Name them
iii) How can you interconvert them?
iv) Which one is more stable and why?

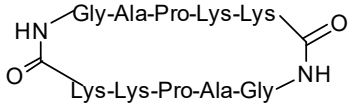
Q.1(b) Write the mechanism of formation of osazone from D-Glucose and phenyl hydrazine. Define anomeric effect and Identify the anomeric carbons in the following molecule. [3+2]



Q.2(a) Provide the steps for the solid phase synthesis of the tripeptide Ala-Gly-Val. Define isoelectric point and calculate it for the following peptide (each pK_a value is mentioned). [3+2]



Q.2(b) What are meant by salting in and salting out of a protein? A decapeptide **X** failed to react with Sanger's reagent. Amino acid analysis gave a composition: Ala, Pro, Gly, 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-Gly…Which of the following is the correct structure of **X? Write the structure of Y.** [1+4]



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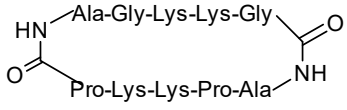
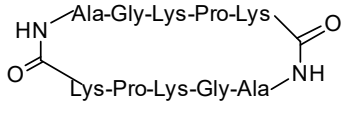
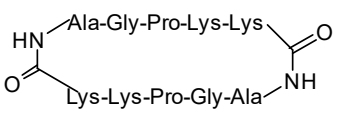


II



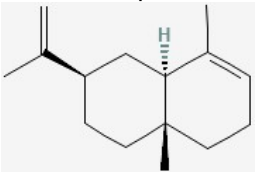
III



IV

Q.3(a) Discuss the medicinal importance of Vinca alkaloids along with the biological pathway through which they show their therapeutic effect. [5]

Q.3(b) Show the isoprene units in the following compound. It belongs to which class of terpene? [4+1]



Q.4(a) Discuss glass transition temperature (T_g) and melting point (T_m) of polymers. Correlate T_g and T_m with crystallinity and strength of polymers. [5]

Q.4(b) Discuss the role of plasticizers, stabilizers, and fillers in polymer processing. [5]

Q.5(a) Discuss the principles of green chemistry. [5]

Q.5(b) Give one example each of supercritical solvents and ionic liquids in Green synthesis. [5]

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