

[This question paper contains 2 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 262

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Unique Paper Code : 2173522004

Name of the Paper : MOLECULES OF LIFE

Name of the Course : B.Sc. (Prog.)

Semester : IV/VI (NEP-UGCF)

Duration : 2 Hours

Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. All questions have equal marks.
3. Attempt any **four** questions in all.

1. Answer any *five* of the following:

- a) What are carbohydrates? How are they classified?
- b) Will sucrose give a positive Fehling test? Explain giving reasons.
- c) What is isoelectric point? The three pK_a values of lysine are 2.18, 8.95 and 10.79. Calculate pI of the amino acid.
- d) What are essential and non-essential amino acids? Give one example of each.
- e) What is an apoenzyme, cofactor and holoenzyme?
- f) Describe key differences between DNA and RNA.

(5,5,5)

- 2.

- a) A sample of pure α -D-glucopyranose is dissolved in water. Over time, the specific rotation of the solution changes from +112.2° until it reaches a constant value of +52.7°.
 - i. Identify the name of this phenomenon.
 - ii. Explain the structural changes occurring in the solution with the help of reaction.
 - iii. What is the relationship between the structures so formed in the solution?
- b) Discuss the synthesis of solution phase synthesis of Gly-Ala using appropriate protecting and activating functionalities.
- c) What do you mean by active site of an enzyme? What are the main characteristics of an active site?

(5,5,5)

P.T.O.

3.

- a) What happens when glucose reacts with:
- Bromine water
 - HI in presence of red phosphorus
 - conc. sulfuric acid
 - 5 moles of HIO_4
 - conc. HNO_3
- b) Describe the determination of primary structure of proteins using Edman degradation method.
- c) What are primary and secondary structure of a nucleic acid?

(5,5,5)

4.

- a) i) Draw Haworth projection formula of lactose and maltose.
ii) Mention the linkage and anomeric carbon in each case.
iii) Which of the two sugars is a reducing sugar?
- b) Explain Merrifield solid phase peptide synthesis. Discuss its advantages over solution phase synthesis.
- c) How do changes in substrate concentration and temperature affect the enzyme activity?

(5,5,5)

5.

- a) What are anomers and epimers? Explain with relevant examples.
- b) i) Name the only asymmetric amino acid with its structure.
ii) Give one example each of sulphur and hydroxyl group containing amino acid with their structures.
iii) What do you mean by denaturation of proteins?
- c) What are the fundamental components of a nucleotide? Discuss in detail.

(5,5,5)

6. Write short note on any **three** of the following:

- Starch and cellulose
- Primary, secondary, tertiary and quaternary structure of proteins
- Mechanism of enzyme action
- Types of RNA

(5,5,5)