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Total No. of Pages : 02

Total No. of Questions : 11

M.Sc. (Chemistry) (2018 Batch) (Sem.-2)

CHEMICAL BIOLOGY

Subject Code : CHL-415B-18

M.Code : 75986

Time : 3 Hrs. Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains EIGHT questions carrying FIVE marks each and students have to attempt any SIX questions.**
3. **SECTION-C will comprise of two compulsory questions with internal choice in both these questions. Each question carries TEN marks.**

SECTION-A

1. Answer briefly :

a) Draw a bond-line structure showing the tripeptide Phe-Val-Trp (assume that all three residues are L - amino acids).

b) Draw the structure of each of the following peptides :

i) Cys-Asp-Ala-Gly ii) Met-Lys-His-Tyr-Ser-Phe-Val

c) Draw the nucleoside formed from each of the following pairs of compounds and name the nucleoside :

i) 2-Deoxy-D-ribose and adenine ii) D-Ribose and guanine

d) Explain the term hydrophobic interactions in biological systems.

e) A proline residue will often appear at the end of an α-helix but will rarely appear in the middle. Explain why proline generally cannot be incorporated into an α-helix.

f) Explain why glucose is the most common monosaccharide observed in nature.

g) "*ATP acts as an energy currency of the cell*". Explain.

h) Arrange the following compounds in order of increasing water solubility :

i) A triglyceride constructed from one equivalent of glycerol and three equivalents of myristic acid.

ii) A diglyceride constructed from one equivalent of glycerol and two equivalents of myristic acid.

iii) A monogiyceride constructed from one equivalent of glycerol and one equivalent of myristic acid.

i) What do you mean by the term molecular recognition?

j) What do you understand by electrophoresis technique?

SECTION-B

2. How high-energy phosphate compounds acts as energy shuttles? Explain with various examples.
3. Explain the term combinatorial synthesis by giving suitable example.
4. What do you understand by the term "Natural selection"? Explain briefly.
5. What are various non-covalent interactions in proteins and explain it with suitable examples?
6. Identify all of the steps necessary to prepare the tripeptide Leu-Val-Ala with a Merrifield synthesis.
7. Write the mechanism for the transesterification of a triglyceride using ethanol in the presence of an acid catalyst.
8. In molecular recognition, the H-bonding is described as the "master key interaction". Comment on it.
9. Write a short note on the application of NMR spectroscopy in the study of biomolecules.

SECTION-C

10. What are hydrogen bonds and how do they contribute to the folded state of polypeptides?

Or

What do you mean by central dogma of molecular biology? Explain.

11. Describe the applications of X-ray diffraction technique in studying biomolecules.

Or

Describe chemical synthesis of peptides.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.