

**M.Sc. Examination 2019**  
**Semester - II**  
**Chemistry**  
**Course: CH-808**  
**( Organic Chemistry )**

**Time: Three Hours**

**Full Marks: 40**

Questions are of value as indicated in the margin.

Notations and symbols have their usual meanings.

Attempt *any four* questions.

1. a) Draw the structure of AT and GC base pairs found in DNA molecule. Indicate the number of hydrogen bonds in each base pair. 2+1  
b) What is the difference of transcription and translation in protein bio-synthesis? 2  
c) What is t-RNA? Outline a diagram of the secondary structure of a t-RNA molecule and indicate its major parts. 2  
d) Discuss the mechanism of the peptide bond formation occurring in ribosome. 3
2. a) What is protease? Discuss various types of proteases depending on its residues at the active site. 1+2  
b) Show an example of protease and the mechanism of its action on a substrate. 1+3  
c) What do you mean by coenzyme? Offer some examples. 2+1
3. a) What do you mean by peptidoglycan? What role does it play in bacteria? 2+1  
b) Offer a name of an enzyme that performs a crucial step in the bio-synthesis of peptidoglycan. Discuss a mechanistic pathway through which it helps the synthesis of peptidoglycan. 1+3  
c) Show an example drug that inhibits the activity of the enzyme responsible for the synthesis of peptidoglycan. Discuss the mechanism of action of this drug. 1+2
4. a) What is synthetic detergents? How it becomes advantageous than normal soap? 2+2  
b) What is biodiesel? How it can be produced? 2+2  
c) Stearic acid and linoleic acid both contain 18-carbon atoms in it. But the melting point of stearic acid is 70°C whereas the melting point of Linoleic acid is -5°C – Explain. 2
5. a) What are the characteristic features of  $\alpha$ -helix and  $\beta$ -pleated sheet? 2+2  
b) Discuss the mechanism of action of phenyl isocyanate in Edman's procedure for sequence analysis of polypeptide chain. 4  
c) How does cyanogens bromide hydrolysis the amide bond of a methionine residue? Explain with plausible mechanism. 2

**P.T.O.**

6. a) Write down the specificity of the following reagents during peptide cleavage: 5
- i) Carboxypeptidase A
  - ii) Carboxypeptidase B
  - iii) Trypsin
  - iv) Chymotrypsin
  - v) Elastase
- b) Determine the amino acid sequence of a polypeptide from the following results:
- Acid hydrolysis gives Ala, Arg, His, 2 Lys, Leu, 2 Met, Pro, 2 Ser, Thr, Val.  
 Carboxypeptidase A releases Val.  
 Edman's reagent releases PTH-Leu.  
 Cleavage with cyanogens bromide gives three peptides with the following amino acid compositions:
- i) His, Lys, Met, Pro, Ser
  - ii) Thr, Val
  - iii) Ala, Arg, Leu, Lys, Met, Ser.
- Trypsin catalyzed hydrolysis gives three peptides and a single amino acid:
- i) Arg, Leu, Ser
  - ii) Met, Pro, Ser, Thr, Val
  - iii) Lys
  - iv) Ala, His, Lys, Met.
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