Roll No. ……..

Unique Paper Code : 42177913

Name of the Paper : DSE: Molecules of Life

Name of the Course : B.Sc. Prog.

Semester : V

Duration : 3 hours

Maximum Marks : 75

Instructions for Candidate

1. Attempt any **four** questions.
2. Question no. 1 is **compulsory** carries 15 marks. All other questions are of 20 marks each.

1. Attempt any **Five**: (3 x 5)

a) What do you mean by good and bad cholesterol? What are their effects on our body?

b) Differentiate between cofactor and coenzyme with example.

c) What is the fate of pyruvate in the biological system?

d) Give the name and structure of acidic and basic amino acids.

e) Give the full name of "DCC" and "*t*-Boc" and highlight their use in peptide synthesis.

f) Differentiate between fibrous and globular proteins with examples.

g) What is meant by reducing and non-reducing sugars? Give the structure and name of each.

2. (5 x 4)

a) Draw the Fischer and Haworth projection of β-D-fructofuranose and α-D-glucopyranose.

b) How will you convert:
- Aldopentose into aldohexose
- Glucose into fructose

c) What do you understand by stereochemical specificity and substrate specificity. Give suitable example of each.

d) Differentiate between fats and oil. Give the skeletal structure and the reaction of a lipid which on hydrolysis yields glycerol, oleic acid.

3. (5 x 4)

a) Write down the Merrifield solid phase synthesis for a dipeptide Phe-Gly.
b) Write the structure and mechanism of the product formed by the Edman degradation of polypeptide Leu-Gly-Ala-Phe-Tyr-Val. What fragment of peptide chain will leave after the degradation reaction?
c) How many types of reactions are involved in metabolism? Discuss briefly with an example of each type.
d) Give the chemical reaction that support the fact that glucose has a cyclic structure.

4. (5 x 4)

a) What is the difference between nucleosides and nucleotides? Give the structure of Guanosine-5′-triphosphate.
b) How many types of RNA are known which works collectively for protein synthesis?
c) What is glycolysis? Give the steps involved in the conversion of glucose to glyceraldehyde during glycolysis.
d) What is denaturation of proteins. Explain with suitable examples.

5. (5 x 4)

a) Define saponification number. Calculate the saponification number of glyceryl tripalmitate having Mol. Wt. 806 (Mol. Wt. of KOH = 56).
b) What is Chargaff's rule? Draw structure of fragment of DNA showing A-T and G-C pairing.
c) Give the mechanism for the formation of glucosazone. Explain why glucose and fructose give same osazone derivative.
d) Differentiate between glycolipids and phospholipids. What is their significant role in biological system?

6. Write short notes on any **four** of the following: (5 x 4)

a) Secondary structure of proteins
b) Mutarotation
c) Transcription and translation
d) Starch and Cellulose
e) Kreb Cycle