

Roll. No.....

Unique Paper Code : 32175912\_OC  
Name of the Paper : GE-7, Molecules of life  
Name of the Course : B.Sc. (Hons.)  
Semester : IV  
Duration: 3 Hours

Maximum Marks: 75

**Instructions for Candidates**

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

Q1. a) Write a short note on *any four* of the following.

**4 x 4**

- (i) Denaturation of proteins
- (ii) Purines and pyrimidines
- (iii) DNA transcription
- (iv) Biological importance of cholesterol
- (v) Iodine value
- (vi) Genetic code

b) What are carbohydrates? How can we classify them into reducing and non-reducing sugars? Give one example each.

**2.75**

Q2. a) Describe the steps involved in Glycolysis with the help of a diagram.

**8**

b) What are phospholipids? Give their structure and explain their biological importance.

**6**

c) What happens when glucose reacts with excess of phenyl hydrazine? Give the mechanism involved.

**4.75**

Q3. a) Write down the complete chemical structure of the following: (*Any four*)

**8**

- (i) Thymidine
- (ii) Adenosine 3'-monophosphate
- (iii)  $\alpha$ -D-ribose
- (iv) Deoxycytidine
- (v) Cellobiose
- (vi)  $\alpha$ -D-galactopyranose
- (vii)  $\alpha$ -D-fructofuranose

b) Explain the method for the synthesis of dipeptide, Ala-Phe using DCC and *t*-BOC.

**6**

c) Explain the binding role of the following in determining the structure-activity relationship of a drug:

- (i) Binding role of -NH<sub>2</sub> group
- (ii) Binding role of aromatic ring

**4.75**

Q4. a) What are Enzymes? Explain and differentiate between lock and key mechanism and induced fit mechanism for enzyme-substrate interaction. **8**

b) Explain the various classes into which enzymes can be classified with one example each. **6**

c) Draw the structure of Maltose. Name the monosaccharide units, its systematic name and the type of glycosidic bond involved. **4.75**

Q5. a) What are polysaccharides? Explain the structural differences between starch and cellulose. **8**

b) What are different types of RNAs? Write their respective functions. **6**

c) Define saponification value? Explain its significance. **4.75**

Q6 a) Explain how *N*-terminal amino acid can be determined by Sanger and Edman method and C-terminal amino acid can be determined by thiohydantoin and with carboxypeptidase enzyme. **8**

b) Differentiate between the following. (*any two*): **3x2**

- (i) Primary and secondary structures of proteins
- (ii) Omega-3 and Omega-6 fatty acids with structures
- (iii) Competitive and non-competitive inhibitors

c) What are essential fatty acids and essential amino acids? Give two examples of each. **4.75**