

B.Sc. Part—II (Semester—III) Examination

3S : BIOINFORMATICS

(Fundamentals of Bioinformatics)

Time : Three Hours]

[Maximum Marks : 80

N.B. :— (1) Attempt **ALL** questions.

(2) Question No. 1 is compulsory.

(3) Draw well labelled diagrams wherever necessary.

1. (a) Fill in the blanks :

2

(i) In proteins the amino acids are linked together by ——— bond.

(ii) Proteinaceous biochemical catalysts are termed as ———.

(iii) Triglycerides are the esters of fatty acids with ———.

(iv) In protein synthesis ——— RNA is translated by ribosomes to synthesize polypeptide chain.

(b) Choose the correct alternative :

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(i) Starch is a polymer of :

(a) glucose

(b) Sucrose

(c) fructose

(d) Ribose.

(ii) Water is ——— solvent.

(a) Non polar

(b) Highly acidic

(c) Polar

(d) Highly alkaline.

(iii) In disaccharides the monosaccharide units are linked by :

(a) Peptide bond

(b) Phosphodiester bond

(c) Glycosidic bond

(d) None of the above.

5. Describe primary, secondary, tertiary and quaternary structure of proteins. 12

OR

What are proteins ? Describe their biological functions. Explain denaturation and renaturation of proteins. 12

6. (a) What are enzymes ? Describe their nomenclature. 4

(b) Describe the general characters and properties of enzymes. 4

(c) Discuss the factors affecting rate of enzyme catalyzed reactions. 4

OR

(p) What are isoenzymes ? Explain with examples. 4

(q) What are active sites of enzymes ? How they contribute in enzyme action ? 4

(r) What is K_m value of enzyme ? How it is related to V_{max} ? 4

7. Describe in detail TCA cycle. 12

OR

Describe in detail the process of protein synthesis. 12

(iv) α Helix is a ——— structure of proteins :

- (a) Primary
- (b) Secondary
- (c) Quaternary
- (d) None of the above.

(c) Answer in **one** sentence : 4

- (i) Write the full form of TCA in TCA cycle.
- (ii) What is p^H ?
- (iii) What are fatty acids ?
- (iv) What are the two monosaccharide units present in sucrose ?

2. (a) Explain the term 'Molarity'. How molar solutions are prepared ? 4
- (b) What are Buffers ? Give example. 4
- (c) Describe water as a biological solvent. 4

OR

- (p) Explain the term 'Normality'. Explain the preparation of $\text{IN H}_2\text{SO}_4$. 4
- (q) Describe the structure of water molecule. 4
- (r) What are weak acids and bases ? Give examples. 4

3. (a) What are carbohydrates ? Outline the classification of carbohydrates. 4
- (b) What are polysaccharides ? Explain with example. 4
- (c) Give the structure of maltose. 4

OR

- (p) What are mucopolysaccharides ? Explain with example. 4
- (q) What are monosaccharides ? Give the straight chain structure of glucose and fructose. 4
- (r) Write the biological importance of carbohydrates. 4
4. (a) Give the outline of classification of lipids. 4
- (b) What are saturated fatty acids ? Explain with examples. 4
- (c) Describe briefly triglycerides with examples. 4

OR

- (p) Describe the biological functions of lipids. 4
- (q) What are unsaturated fatty acids ? Give examples. 4
- (r) Briefly describe steroids with examples. 4