

B.Sc. Part-II (Semester-III) Examination**BIOTECHNOLOGY (R/V)****(Essential Mathematical, Biostatistics, Bioinformatics and Biophysical Methods)**

Time : Three Hours]

[Maximum Marks : 80

Note :— (1) **ALL** questions are compulsory.

(2) Draw well labelled diagram wherever necessary.

1. (A) Fill in the blanks :

2

(i) A point at which two or more things meet is called as _____.

(ii) Most frequently occurring number in a set is _____.

(iii) Alpha particles are _____ charge.

(iv) BLAST is used for _____ searching.

(B) Choose the correct alternative :

2

(i) Value that function approaches as input (or index) is :

(a) Derivative

(b) Limit

(c) Binomial

(d) Arithmetic

(ii) An element common to all bases is :

(a) H^+ (b) OH^-

(c) CN

(d) COOH

(iii) According to second law of thermodynamics, entropy of a universe is :

(a) Increasing

(b) Decreasing

(c) Constant

(d) All of these

(iv) Following tool is used widely for homology :

(a) DNASTAR

(b) BLASTN

(c) BLASTP

(d) Both (b) and (c)

(C) Answer in **ONE** sentence :

4

(i) Binomial equation

(ii) Random sampling

(iii) Blood buffers

(iv) BLASTN.

2. Describe the following :

(a) Limit of function

4

(b) Expression of limit

4

(c) Polynomial function.

4

OR

(p) Describe Venn diagram

4

(q) Simple algebraic limit

4

(r) Binomial theorem.

4

3. Discuss merits and demerits of Selective and Random Sampling with suitable example. 12

OR

Define probability. Discuss significance of randomness and axioms of probability. 12

4. Describe the following :

- (a) Mean of ungrouped data 4
- (b) Standard error 4
- (c) ANOVA. 4

OR

- (p) Mode of ungrouped data 4
- (q) Standard deviation 4
- (r) Test of significance. 4

5. Explain the following :

- (a) pH 4
- (b) Handerson-Hasselbalch equation 4
- (c) Nuclear radiation. 4

OR

- (p) Blood buffers 4
- (q) Gamma radiation 4
- (r) Application of radioactivity in biology. 4

6. Explain laws of thermodynamics with suitable examples. 12

OR

Explain structure and bioenergetics of mitochondria. 12

7. Describe the following :

- (a) Goal of bioinformatics 4
- (b) Primary databases 4
- (c) BLAST. 4

OR

- (p) Applications of bioinformatics 4
- (q) Secondary databases 4
- (r) SRS. 4