

**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 : 4
- (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