

7. Describe the following :

- (a) History of Bioinformatics. 4
- (b) Any two tools for web search in Bioinformatics. 4
- (c) Major databases in Bioinformatics. 4

**OR**

- (d) Bioinformatics application in Life Science Research. 4
- (e) Differentiate between primary and secondary database. 4
- (f) Differentiate between composite and structural database. 4

**AP-461**

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

**3S : BIOTECHNOLOGY (R/V)**

**(Essential Mathematics, Biostatistics, Bioinformatics and Biophysical Methods)**

Time : Three Hours] [Maximum Marks : 80

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

(2) Draw well labelled diagrams wherever necessary.

1. (a) Fill in the blanks : 2
- (i) Standard deviation is the square of ———.
- (ii) Chlorophylls are soluble in ———.
- (iii) Biostatistics is also called as ———.
- (iv) ANOVA developed by statistician and evolutionary biologist ———.
- (b) Choose correct alternative : 2
- (i) Which of the following is not a measure of central tendency ?
- (a) Mean

- (b) Mode
- (c) Median
- (d) Range
- (ii) Radioactive substance emits the following rays except :
- (a) Gamma
- (b) Beta
- (c) Alpha
- (d) X-rays
- (iii) Which of the following is a protein sequence database ?
- (a) DDBJ
- (b) EMBL
- (c) GenBank
- (d) PIR
- (iv) A compound which is found in all living cells and play a key role in energy transformations is ———.
- (a) ADP

(c) Test of significance. 4

**OR**

- (p) Importance of ANOVA in Life Science Research. 4
- (q) Differentiate between mode and median of ungrouped data. 4
- (r) The following is the number of problems that Mr. Anup assigned for homework on 10 different days. What is the mode ?  
8, 11, 9, 14, 9, 15, 18, 6, 9, 10 4
5. Describe in detail the Chemistry of Henderson-Hasselbalch equation. Also explain estimation of blood  $p^H$  with examples. 12

**OR**

- Define Radioactivity. Also discuss the discovery, nature, resource and its properties in Biology. 12
6. Describe the laws of thermodynamics and bioenergetics of chloroplast in detail. 12

**OR**

- Describe the chemical potential in detail. Add a note on role of Half cell and Redox potential in biological systems. 12

(b) ATP

(c) Chlorophyll

(d) Granum.

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

(i) Define database.

(ii) Define  $p^H$ .

(iii) Define mean deviation ?

(iv) Half life period of radioactivity.

2. Explain the following :

(a) General feature of Logarithmic functions. 4

(b) Derivatives of simple algebraic function with examples. 4

(c) Differentiate between Addition rule and Product rule. 4

**OR**

(p) Integration as antidifferentiation. 4

(q) What is Vein diagram ? Explain with suitable examples. 4

(r) Limits of function at a point. 4

3. Describe the following :

- (a) Two coins are tossed, find the probability that two heads are obtained. 4
- (b) Limitation of random sampling. 4
- (c) Define Events with suitable example. 4

**OR**

(p) Which of these numbers cannot be a probability ?  
Justify.

- (a)  $-0.00001$
- (b)  $0.5$
- (c)  $1.001$
- (d)  $0$
- (e)  $1$
- (f)  $20\%$  4

(q) Describe Random experiment of Probability with suitable examples. 4

(r) Define sample space with suitable examples. 4

4. Describe the following with suitable examples :

- (a) Standard deviation. 4
- (b) Differentiate between ungrouped and grouped mean data. 4