

M.Sc. BIOTECHNOLOGY
Third Semester
BIostatistics, Bioinformatics & IPR
(MBT - 301)

Duration: 3Hrs.

Full Marks: 70

Part-A (Objective) =20
Part-B (Descriptive) =50

(PART-B: Descriptive)

Duration: 2 hrs. 40 mins.

Marks: 50

Answer any four from *Question no. 2 to 8*
Question no. 1 is compulsory.

1. What are the different measures of central tendency? What are the desirable properties for arithmetic mean? A clerk calculated arithmetic mean of 50 values as 39.2. However; it was found that instead of taking two values as 25 and 32, he took them as 52 and 23. Find the corrected arithmetic mean. (3+3+4=10)
2. (5+5=10)
 - (i) A husband and wife appear in an interview for two vacancies in the same post. The probability of husband's selection is $\frac{1}{7}$ and that of wife's selection is $\frac{1}{5}$. What is the probability that:
 - d) Both of them will be selected
 - e) Only one of them will be selected
 - f) None of them will be selected
 - (ii) The incidence of occupational disease in an industry is such that the workers have 20 percent chance of suffering from it. What is the probability that out of six workers 4 or more will come in contact of the disease?
3. What is sampling? Critically examine the well-known methods of sampling technique. (2+8=10)

4. (2+3+5=10)

- a) Define local and global sequence alignment.
- b) Calculate the identity and similarity percentage of *Seq 1 to Seq 2*, in the following pair wise sequence alignment?

Seq 1: A-T-G-G-C-C-T-T

Seq 2: A-T-G-G-C-C

- c) Describe the applications of nucleic acid sequence comparison and homology analysis.
5. What do you mean by molecular phylogeny? Explain the steps of phylogenetic tree construction? Mention the names of different methods of constructing such trees.

(2+5+3=10)

6. (2+3+5=10)

- a) What are the various types of biological databases?
- b) Explain the Gen Bank file format.
- c) What are the various steps of drug discovery?

7. What is patent? How patent is granted and which safeguards are given under patent law.

(2+8=10)

8. (2+3+5=10)

- a) What do you mean by Geographical Indication? How it protects the interests of producers and consumers?
- b) Write the case study of protection of turmeric under intellectual property rights.

10. Which of the following is not a secondary biological database?

- a) pfam
- b) prosite
- c) PDB
- d) KEGG

11. In a phylogenetic tree, 'distance scale' means

- a) The common ancestor of all taxa.
- b) It represents the number of differences between the organisms or sequences.
- c) It is located between a node and a leaf.
- d) None.

12. ADMET stands for

- a) Adsorption, Distribution, Metabolism, Excretion and Toxicity.
- b) Adsorption, Distribution, Metabolism, Extraction and Toxicity.
- c) Adsorption, Distribution, Metal, Elimination and Toxicity.
- d) None.

13. Which of the following is correct in respect to global sequence alignment?

- a) Compares sequences and gives best overall alignment.
- b) Will return only the best matching segment for a given pair of sequences.
- c) May fail to find the best local region of similarity (e.g. a common motif).
- d) All.

14. Multiple Sequence Alignment (MSA) is very often used for the following purposes

- a) Detecting similarities between sequences.
- b) Detecting conserved regions.
- c) Detection of structural homologies.
- d) All.

15. A lead compound is a drug originally discovered by

- a) Natural products
- b) High-throughput screening
- c) Serendipity
- d) All

II. Match the following:

1×5=5

- | | |
|---------------------|------------------|
| (a) Trade secret | (i) Patent |
| (b) One Indian Girl | (ii) GI |
| (c) Darjeeling tea | (iii) copyright |
| (d) Trademark | (iv) coca-cola |
| (e) PCR | (v) logo of nike |
