Total No. of Questions: 23

Enrollment No : _____

MEDICAPS UNIVERSITY

Faculty of Science

End Semester Examination May 2025

BT3EL01 Bioinformatics & Biostatistics

Programme	:	B.Sc.	**Branch/Specialisation**	:	BT
Duration	:	3 hours	**Maximum Marks**	:	60

Note: *All questions are compulsory. Internal choices, if any, are indicated. Assume suitable data if necessary. Notations and symbols have their usual meaning.*

Section 1 (Answer all question(s))

Marks CO BL

Q1. Open Reading Frames (ORFs) are useful in identifying: **1 1 1**

- ○ Protein structures
- ○ Repetitive sequences
- ◉ Coding regions in DNA
- ○ Transcription factors

Q2. The process of identifying genes and their functions using computational tools is called: **1 2 1**

- ○ Transcription
- ◉ Genome annotation
- ○ Translation
- ○ Hybridization

Q3. Which of the following tools is used for sequence similarity search? **1 2 1**

- ◉ BLAST
- ○ Entrez
- ○ SRS
- ○ EMBL

Q4. Which of the following databases is specifically for protein sequences? **1 4 1**

- ○ GenBank
- ◉ SWISS-PROT
- ○ EMBL
- ○ DDBJ

Q5. Which model organism is a flowering plant used in genomic studies? **1 3 1**

- ○ C. elegans
- ◉ Arabidopsis thaliana
- ○ Drosophila melanogaster
- ○ Mus musculus

Q6. Which of the following is a measure of dispersion? **1 5 1**

- ○ Mean
- ○ Mode
- ○ Median
- ◉ Standard deviation

Q7. Primary data is collected: **1 6 1**

- ○ From government records
- ○ From books and journals
- ◉ Directly by the investigator
- ○ From previously published data

Q8. Which test is used to compare means between two groups? **1 4 1**

- ○ Chi-square test
- ○ ANOVA
- ◉ t-test
- ○ Regression analysis

Q9. The chi-square test is commonly used to: **1 6 1**

- ○ Find correlation between variables
- ◉ Test goodness of fit
- ○ Analyze variance among means
- ○ Estimate central tendency

Q10. Multiple sequence alignment is used to: **1 6 1**

- ○ Identify unique mutations
- ◉ Compare three or more biological sequences
- ○ Translate DNA to protein
- ○ Calculate GC content

Section 2 (Answer all question(s))

Marks CO BL

Q11. Write any two applications of bioinformatics. **2 1 1**

Rubric	Marks
Any 2 applications	2

Q12. Define Open Reading Frame (ORF). **3 2 1**

Rubric	Marks
Definition and one application	3

Q13. (a) Write a short note on the role of the Internet and WWW in bioinformatics. **5 3 1**

Rubric	Marks
Role of Internet in bioinformatics	3
Role of WWW in bioinformatic	2

(OR)

(b) Explain in detail the forms of biological information and types of nucleotide sequences.

Rubric	Marks
Types of biological information and Necluotide databases	5

Section 3 (Answer all question(s))

Marks CO BL

Q14. Define FASTA and BLAST. **3 5 1**

Rubric	Marks
Definition and full form of FASTA and BLAST	3

Q15. (a) Explain the process and importance of multiple sequence alignment. **7 5 1**

Rubric	Marks
Definition and steps in Multiple sequence alignment	7

(OR)

(b) Describe the organization of biological data and formats of database entries.

Rubric	Marks
Format of database entries and organization of biological database	7

Section 4 (Answer all question(s))

Marks CO BL

Q16. Name any two genome databases and model organisms. **2 5 1**

Rubric	Marks
Name of databses	2

Q17. Describe the importance of model organisms in bioinformatics. **3 6 1**

Rubric	Marks
3 Importance	3

Q18. (a) Write a detailed note on the biological databases for plants and animals. **5 5 1**

Rubric	Marks
Animal database details	3
Plant database details	2

(OR)

(b) Explain in detail the types of biological databases with suitable examples.

Rubric	Marks
4 biological database and examples	5

Section 5 (Answer all question(s))

Marks CO BL

Q19. Define primary and secondary data with examples. **3 3 1**

Rubric	Marks
Definitions and examples	3

Q20. (a) Use the given data- **7 6 1**

Wages	250	100	150	200	300	100
People	2	4	2	3	1	6

Calculate Mean, Median, and Mode with suitable formulas.

Rubric	Marks
Answer of mean Mean, Median, and Mode	7

(OR)

(b) What is dispersion? Explain range and standard deviation.

Rubric	Marks
dispersion	4
range and standard deviation.	3

Section 6 (Answer all question(s))

Marks CO BL

Q21. What is a null hypothesis? Give an example. **2 4 1**

Rubric	Marks
null hypothesis and example	2

Q22. Write a note on correlation and regression. **3 5 1**

Rubric	Marks
Definition of correlation and regression	3

Q23. (a) Explain t-test and chi-square test with suitable examples. **5 5 1**

Rubric	Marks
t-test and chi-square test defination	3
suitable examples	2

(OR)

(b) Describe the analysis of variance (ANOVA) with steps and application.

Rubric	Marks
analysis of variance (ANOVA) definition	2
steps and application	3

******