

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)**

**CLASS: MSc.
BRANCH: BIOINFORMATICS & COMPUTATIONAL BIOLOGY**

**SEMESTER : II
SESSION : SP/2025**

SUBJECT: BI204 DATA ANALYTICS USING R

TIME: 3 Hours

FULL MARKS: 50

INSTRUCTIONS:

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
 2. Attempt all questions.
 3. The missing data, if any, may be assumed suitably.
 4. Before attempting the question paper, be sure that you have got the correct question paper.
 5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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Q.1(a)	What are the prominent data types in R language, explain in detail with example .	[5]	CO1	BL1
Q.1(b)	Differentiate between Vector, List, Matrix, and Data frame in R with suitable example.	[5]	CO1	BL2
Q.2 (a)	Find the skewness of the given Data (17,23,16,11,22,34,27) and give your comment on the significance of same.	[5]	CO3	BL3
Q.2 (b)	What is a contingency table in R, write the steps to create same? What statistics are summarized in a contingency table? Explain with an example.	[5]	CO3	BL2
Q.3 (a)	Show the relationship between two categorical data with suitable example.	[5]	CO1	BL1
Q.3 (b)	How we perform data transformation by normalization. Explain Min _Max technique.	[5]	CO2	BL3
Q.4(a)	How we do the hypothesis testing. Explain null and alternate hypothesis. A snack company claims their new protein bars contain on average 20 grams of protein. A nutritionist takes a random sample of 8 bars and finds an average protein content of 18.5g with a sample standard deviation of 1.2g.	[5]	CO3	BL4
Q.4(b)	How are random samples generated? Explain different types of random sampling with suitable example.	[5]	CO4	BL2 BL2
Q.5(a)	How does the Bioconductor package in R handle normalization and differential expression analysis for RNA-Seq data?	[5]	CO2	BL1
Q.5(b)	How do different representation styles in protein structural visualization highlight specific features of a protein structure while de-emphasizing others?	[5]	CO5	BL2

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