9. (a) Write an R program to create a bar chart and a histogram for a given dataset and customize them by adding title, axis labels and colors using appropriate functions. 7

(b) Write an R program using ggplot2 to create a well-labeled bar chart and customize it with titles, axis labels and colors. 7

❖❖❖❖❖❖❖

(T) Roll No. .....

PAPER ID—21136

B.Tech. EXAMINATION, 2026

(Fourth Semester)

R-PROGRAMMING

Time : 3 *Hours* *Maximum Marks :* 70

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. **1** is compulsory. All questions carry equal marks.

Compulsory Question

1. (a) Discuss the features of R that make it suitable for data analysis and statistical modeling. **2**

   (b) Write any *two* commands used for installing and loading packages in R. **2**

   (c) What is a user-defined function ? Why is it important ? **2**

   (d) Define a vector in R. How is it different from a list ? **2**

   (e) What is a CSV file ? Why is it commonly used in data analysis ? **2**

   (f) Create a 3-dimensional array in R and demonstrate how to name rows and columns. **2**

   (g) What is the use of summary() in data analysis and explain it with suitable example in R. **2**

Unit I

2. (a) Explain the concept of R-programming language. Discuss its advantages over other programming languages in the context of statistical computing and data analysis. 7

   (b) Explain the role of RStudio in managing R programs. Discuss how console and script file differ in execution of commands. 7

3. (a) Explain the various data types in R including vectors, lists, matrices, arrays, factors and data frames with suitable examples. 7

   (b) Discuss variable assignment in R. Explain how variables are created, listed and removed using appropriate functions. 7

Unit II

4. (a) Write an R-program that performs arithmetic and relational operations on two vectors and displays the results. 7

(b) Write a program that checks if a given number is a prime number. A prime number is only divisible by 1 and itself. Use while loop and decision-making statements to check whether the number is prime or not. 7

5. (a) Explain decision-making structures in R with examples. Write a program that uses if, if-else and switch to demonstrate their usage. 7

(b) Write a function in R to generate Fibonacci series up to n terms and display the result. 7

Unit III

6. (a) Discuss vectors operation in R including sequence generation, repetition and recycling. 7

(b) Write an R program in which a student's marks in three subjects are stored in separate vectors, these vectors are combined into a data frame, the average

marks for each student are calculated, and the structure and summary of the data frame are displayed. Explain the output obtained at each stage. 7

7. (a) Explain the concept of array in R. Discuss how to create, access and manipulate them with suitable examples. 7

(b) Write an R program that creates two data frames, merges them using merge(), adds a new column, extracts specific rows and columns, after that combines them in 2nd data frame using rbind() and cbind(). Explain each operation clearly. 7

Unit IV

8. (a) Explain the concept of working directory in R and discuss the use of getwd(), setwd() and dir() functions. 7

(b) Explain how CSV files are read and written in R. Write an R program to read a CSV file and apply statistical functions summary(), mean(), median() and min(). 7