

## N.G.M.COLLEGE (AUTONOMOUS) : POLLACHI

## END-OF-SEMESTER EXAMINATIONS : MAY 2025

BSc.Computer Science(Aided &amp; Sf)

MAXIMUM MARKS: 50

SEMESTER-VI

TIME : 3 HOURS

## PART – III

## 22UCS619 – R PROGRAMMING

SECTION – A

(10 X 1 = 10 MARKS)

## ANSWER THE FOLLOWING QUESTIONS:-(K1)

1. What is the R Project primarily used for?
  - a) Video Editing
  - b) Data Analysis and Statistical Computing
  - c) Game Development
  - d) Web Development
2. What is the class of the following R object: `x <- c(1, 2, 3, 4)`?
  - a) Matrix
  - b) List
  - c) Vector
  - d) Data frame
3. What does the `str()` function in R do?
  - a) Displays the structure of an object
  - b) Strips spaces from a string
  - c) Splits a string into multiple words
  - d) Converts a string to lowercase
- 4 Which of the following functions is used to perform linear regression in R?
  - a) `lm()`
  - b) `reg()`
  - c) `model()`
  - d) `lm.regression()`
5. A box plot is primarily used to display: \_\_\_\_\_.
  - a) Frequency distribution of continuous data
  - b) Relationships between two variables
  - c) The spread and central tendency of continuous data
  - d) Proportions of categories

## ANSWER THE FOLLOWING IN ONE (OR) TWO SENTENCES

(K2)

6. What is the difference between R code and R scripts?
7. What is an array in R, and how does it differ from a matrix?
8. How can you define a function in R that adds two numbers?
9. What function is used to write data to an Excel file in R?
10. Which R function is used to create a pie chart?

(CONT...2)

## SECTION – B (5 X 3 = 15 MARKS)

### **ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS. (K3)**

11. a) What is the role of comments in R? Provide examples of single-line and multi-line comments. (OR)
  - b) What are R packages, and why are they important in R programming?
12. a) Discuss the different variable classes in R and their characteristics. Provide examples for each class. (OR)
  - b) What is a Data Frame? Explain the Characteristics of Data frame.
13. a) Explain how decision-making structures like if statements and the ifelse() function work in R.  
Illustrate with examples. (OR)
  - b) Create a function to print squares of numbers in sequence.
14. a) Discuss how to read and process XML files in R. (OR)
  - b) How do you perform linear regression in R? Explain the steps..
15. a) Create a pie chart for a dataset representing the sales distribution of different products. Customize appearance with additional arguments.  
sales = (150, 200, 120, 80)  
products = ("Product A", "Product B", "Product C", "Product D") (OR)
  - b) Explain the differences between bar charts and histograms, and when each should be used.

## SECTION – C (5 X 5 = 25 MARKS)

### **ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS. (K4 (Or) K5)**

16. a) Explain the role of Graphical User Interfaces (GUIs) in R. (OR)
  - b) What are the R packages for data visualization and data manipulation? Provide an example.
17. a) What is an Array? Give two vectors as input create 3X3 matrices using array function. (OR)
  - b) Write an R script to perform the following tasks:
    1. Create a data frame named employee\_data with the following columns and data:
      - o emp\_id (Employee ID): 1, 2, 3
      - o emp\_name (Employee Name): "Rick", "Dan", "Michelle"
      - o salary (Salary): 623.30, 515.20, 611.00
      - o start\_date (Start Date): "2024-01-01", "2024-09-23", "2014-11-15"
    2. Print the structure of the data frame.
    3. Display a summary of the data frame, showing statistical information for numeric columns and appropriate summaries for non-numeric columns.
18. a) Discuss common string operations like concatenation, splitting, and substitution with examples. (OR)
  - b) Write a function using the switch() statement to return the name of a day of the week based on a numerical input (1 for Sunday, 2 for Monday, etc.). Provide an example of how the function works.
19. a) 1. Write an R script to perform the following tasks:
  - Read a CSV file named data.csv into a data frame in R. Ensure the file exists in the working directory.
  - Print the first 6 rows of the data frame to confirm successful loading.
  1. Create a new data frame named student\_data with the following information:
    - student\_id: 101, 102, 103
    - name: "Alice", "Bob", "Charlie"
    - marks: 87, 92, 78
  2. Write the student\_data data frame to a new CSV file named student\_data.csv in the working directory. (OR)
- b) Calculate mean, median, mode and print the result.
20. a) 1. How do you create a scatter plot in R using the plot() function? Explain its purpose.
  2. Use the mtcars dataset to perform the following tasks:
    - Create a scatter plot to show the relationship between miles per gallon (MPG) and horsepower (hp).
    - Add appropriate labels for the x-axis, y-axis, and the plot title.
    - Use a different color for the points to enhance visualization.
  3. Based on the scatter plot, briefly describe the relationship between MPG and horsepower. (OR)
- b) What are box plots in R, and how can they help in identifying outliers in a dataset? Provide an example.