Reg No.:_____ Name:_____

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**

B.Tech Degree S6 (R,S) Examinations April 2026 (2019 Scheme)

## Course Code: AIT362
## Course Name: PROGRAMMING IN R

Max. Marks: 100 Duration: 3 Hours

### PART A
*Answer all questions, each carries 3 marks.*

| | | Marks |
|---|---|---|
| 1 | Explain data coercion in R with suitable example. | (3) |
| 2 | Explain the concept of attributes in R objects with examples. | (3) |
| 3 | Differentiate between lapply() and sapply() functions. | (3) |
| 4 | Explain the use of cut() function in R. | (3) |
| 5 | Name the functions used to merge data frames in R. | (3) |
| 6 | Explain the concept of confidence interval in R. | (3) |
| 7 | Describe why residual plots are important in model diagnostics. | (3) |
| 8 | List and explain any three graphical parameters in base R. | (3) |
| 9 | Define a Generalized Linear Model (GLM) | (3) |
| 10 | Write details about the lm function in R. | (3) |

### PART B
*Answer one question from each module, each carries 14 marks.*

**Module I**

| | | | |
|---|---|---|---|
| 11 | a) | Explain different object types in R and discuss their internal representation. | (7) |
| | b) | Write an R program to sort a vector in ascending and descending order without using built-in sort(). | (7) |

**OR**

| | | | |
|---|---|---|---|
| 12 | a) | Discuss argument matching in R functions and explain default arguments with example. | (7) |
| | b) | Write an R function to compute the sum of digits of a given number. | (7) |

**Module II**

| | | | |
|---|---|---|---|
| 13 | a) | Explain data reshaping in R. Illustrate with reshape() or tidyr functions. | (7) |
| | b) | Write an R program to group a data frame by a categorical variable and compute mean and standard deviation. | (7) |

**OR**

14 a) Explain how R connects to databases and retrieves data. Mention relevant packages. (7)

b) Given a CSV file containing student marks, write an R program to: (7)

- Read the file
- Identify missing values
- Replace missing values with column mean
- Export cleaned data

**Module III**

15 a) Explain correlation analysis in R. Write R code to compute Pearson and Spearman correlation. (7)

b) Describe the Wilcoxon signed-rank test and illustrate with example. (7)

**OR**

16 a) Explain power analysis in hypothesis testing and mention the function used in R. (7)

b) Write an R program to simulate a normal distribution and verify empirical rule (68–95–99.7 rule) (7)

**Module IV**

17 a) Explain the concept of layered grammar of graphics in ggplot2. (7)

b) Write an R program to create a multi-line plot with legend and title customization. (7)

**OR**

18 a) Explain different graphics functions in R and their uses. (7)

b) Write an R program to create a boxplot comparing multiple groups and customize its appearance. (7)

**Module V**

19 a) Explain model diagnostics in linear regression. (7)

b) Write an R program to fit a multiple linear regression model and interpret summary output. (7)

**OR**

20 a) Explain logistic regression model fitting using glm() function with binomial family. (7)

b) Compare Poisson regression and linear regression. When is Poisson regression preferred? (7)

****