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Code No.: AI623PE | R20 | H.T.No. | | | 8 | R | | | | | |

CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
III–B.TECH–II–Semester End Examinations (Regular) - June- 2024
R-PROGRAMMING
(CSM)

[Time: 3 Hours] **[Max. Marks: 70]**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 20 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART-A **(20 Marks)**

1. a) Create two numeric vectors and perform element-wise addition, subtraction, multiplication, and division. [2M]
   b) Calculate the modulo and integer quotient in R with example. [2M]
   c) Differentiate between a for loop and a while loop in R. [2M]
   d) Create an R script to concatenate the strings "Hello" and "World" with a space in between. [2M]
   e) Create a list containing a numeric vector, a character vector, and a logical vector. [2M]
   f) Create an R script to subset rows where Age is greater than 28. [2M]
   g) Create a factor in R and explain how to set its levels. [2M]
   h) Explain how to find the maximum value in a numeric vector in R. [2M]
   i) Define S classes in R with syntax and example. [2M]
   j) List the main steps involved in statistical analysis with R. [2M]

PART-B **(50 Marks)**

2. Explain the different data types available in R. Provide examples for each type. [10M]

OR

3. Explain the different methods for subsetting R objects. Discuss subsetting vectors, matrices, and data frames. Provide examples to demonstrate each method. [10M]

4. Discuss the different control structures available in R, including if-else, for, while, and repeat loops. Provide examples of each. [10M]

OR

5. Create R script that: [10M]
   a) Defines a function to compute the mean and standard deviation of a numeric vector.
   b) Use default arguments for missing values handling (ignore by default).
   c) Use variable-length arguments to handle multiple vectors.
   d) Contains a nested function to standardize the values

6. Describe how data frames can be manipulated and reshaped in R. Discuss operations such as merging data frames, handling missing values, and reshaping data frames from wide to long format and vice versa. Provide detailed examples for each operation [10M]

OR

7. Create a list in R containing the following elements: [10M]
   a) A numeric vector, a character vector, and a logical vector.
   b) Add a new element to the list
   c) Remove element from the list.
   d) Check if a specific element exists in the list

8. Describe the use of mathematical functions in R for data analysis, including cumulative sums, products, minima, maxima, and basic calculus. Provide examples of each function. [10M]

OR

9. You are given a dataset containing information about students' test scores in three subjects: Math, Science, and English. The dataset is in the form of a data frame. Perform the following tasks: [10M]

   a) Convert the columns representing test scores into factors with levels "A", "B", "C", and "D" corresponding to grades.
   b) Create a new column named "Average" that calculates the average score of each student.
   c) Generate a summary table that shows the frequency of each grade (A, B, C, D) in each subject.
   d) Extract a subtable that contains the grades of students who scored "A" in all three subjects.

10. Explain the concept of inheritance in S classes. Provide an example demonstrating inheritance in S classes. [10M]

OR

11. Explain the concept of profiling in R. Discuss how profiling can be used to optimize R code. Provide examples of profiling code in R. [10M]

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