Total No. of Questions: 6 *Total No. of Printed Pages:3*

Enrollment No.....

Faculty of Engineering

End Sem Examination May-2024

OE00051 R Programming

Programme: B.Tech. Branch/Specialisation: All

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

Q.1 i. Which of the following is NOT an advantage of using R programming? **1**

(a) Open-source (b) High learning curve

(c) Excellent graphical capabilities (d) Active community support

ii. In R, what type of object can be used to store both numeric and character data? **1**

(a) Vectors (b) Factors (c) Lists (d) Data frames

iii. Which of the following is NOT a basic data type in R? **1**

(a) Numeric (b) Character (c) Logical (d) Tree

iv. What function is used to create a data frame in R? **1**

(a) make_dataframe() (b) new_dataframe()

(c) data.frame() (d) create_dataframe()

v. What is recursion in R programming? **1**

(a) A loop construct used for iterating over a sequence of values

(b) A data structure for storing hierarchical relationships

(c) A programming technique where a function calls itself

(d) A debugging tool for identifying errors in code

vi. Which debugging tool in R allows the user to step through code line by line? **1**

(a) debug() (b) browser() (c) trace() (d) options(error =)

vii. What does the interface to the outside world in R allow users to do? **1**

(a) Communicate with external hardware devices

(b) Interact with other programming languages

(c) Access and manipulate data from external sources

(d) Connect to social media platforms

viii. Which function is used to export data from R to a CSV file? **1**
(a) export.csv() (b) write.csv() (c) save_csv() (d) export_data()

ix. Why we use regular expressions in R? **1**
(a) To perform mathematical calculations
(b) To manipulate strings and search patterns within text data
(c) To create graphical plots
(d) To generate random numbers

x. How are legends added to plots in R? **1**
(a) Using the legend() function
(b) Automatically generated by default
(c) Legends cannot be added to plots in R
(d) Using the plot_legend() function

Q.2 i. What are the limitations of R programming? **2**

ii. Define vectors in R and provide an example of a vector operation. **3**

iii. Explain the advantages of using R for statistical analysis and data visualization, providing examples where applicable. **5**

OR iv. Explain the concept of factors in R. How are factors useful in statistical analysis and data manipulation? Provide examples illustrating their usage. **5**

Q.3 i. Explain the difference between arrays and matrices in R. **2**

ii. What is a data frame in R? Give an example. **3**

iii. Describe the characteristics and uses of lists in R, providing examples of how they can be manipulated. **5**

OR iv. What is an array in R? Explain the types of array in detail. Write a R program to create a two-dimensional 4x5 array of sequence of even integers from 10 to 50. **5**

Q.4 i. Define recursion in R and provide an example of a recursive function. **3**

ii. Discuss the importance of debugging in R programming and describe common debugging techniques and tools available in R. Provide examples of how these techniques can be used to identify and fix errors in code. **7**

OR iii. Write an R function that calculates the sum of digits of a given positive integer. Test the function with various input values to validate its correctness. **7**

Q.5 i. What are the common file formats for storing tabular data that can be read into R? Explain their difference. **4**

ii. Write an R program that reads a text file named "notes.txt" containing important notes and saves it as an R object for future use. **6**

OR iii. Write steps to design a table to store information about a “Department” in MS excel and import the table in R. **6**

Q.6 Attempt any two:

i. Explain the purpose of string operations in R and provide examples of commonly used string functions. **5**

ii. What functions are available in R for working with time data? Provide an example of how to extract components such as hours and minutes from a time object. **5**

iii. Develop an R program that reads a CSV file containing stock price data for a particular company. Plot the closing prices over time as a line graph, including a title, axis labels, and a legend indicating the company name. **5**

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Marking Scheme

OE00051(T) R-Programming

Q.1	i)	B	**1**
	ii)	C & D Both are correct	**1**
	iii)	D	**1**
	iv)	C	**1**
	v)	C	**1**
	vi)	B	**1**
	vii)	C	**1**
	viii)	B	**1**
	ix)	B	**1**
	x)	A	**1**
Q.2	i.	What are the limitations of R programming? At least 3.	**2**
	ii.	-Definition of vector.	**1**
		-Example of a vector operation.	**2**
	iii.	-Explain the advantages of using R for statistical analysis and data visualization.	**4**
		-Example	**1**
OR	iv.	-Explain the concept of factors in R.	**2.5**
		-How are factors useful in statistical analysis and data manipulation?	**2.5**
		-Example	**3**
Q.3	i.	-Explain the difference between arrays and matrices in R. At least 3.	**2**
	ii.	-What is a data frame in R?	**2**
		-Example.	**1**
	iii.	-Describe the characteristics and uses of lists in R.	**3**
		- Examples of how they can be manipulated.	**2**
OR		-What is an Array in R?	**1.5**
		-Explain the types of array in detail.	**1.5**
		Write a R program to create a two-dimensional 4x5 array of sequence of even integers from 10 to 50.	**2**
Q.4	i.	-Define recursion in R.	**1**
		- Example of a recursive function.	**1**
OR	ii.	-Discuss the importance of debugging in R.	**2**
		-Describe common debugging techniques and tools available in R.	**3**
		-Provide examples of how these techniques can be used to identify and fix errors in code.	**2**
		-Write an R function that calculates the sum of digits of a given positive integer.	**4**
		-Test the function with various input values to validate its correctness.	**3**
Q.5	i.	-What are the common file formats for storing tabular data that can be read into R? At least -XLX, CSV formats	**2**
		-Explain their difference.	**2**
	ii.	-Correct Program or Steps	**4**
		-Output	**2**
OR	iii.	-Correct Program	**4**
		-Output	**2**
Q.6		Attempt any two:	
	i.	-Explain the purpose of string operations in R.	**3**
		-Examples.	**2**
	ii.	-What functions are available in R for working with time data?	**3**
		- Provide an example of how to extract components such as hours and minutes from a time object.	**2**
	iii.	-Program.	**3**
		-Plot	**2**

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