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Roll No. | | | | | | | | | | |

CONTROLLER OF EXAMINATIONS AU CHENNAI 600 025

ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)

B.E. /B.Tech / B. Arch (Full Time) - END SEMESTER EXAMINATIONS, MAY 2025

GEOINFORMATICS
VII Semester
GI5702 GEOSPATIAL ANALYSIS WITH R PROGRAMMING
(Regulation2019)

Time:3hrs Max.Marks: 100

CO1	Understand the principles of R programming and able to work with variables, data types, and functions.
CO2	Perform data manipulation tasks in R such as sorting, filtering to transform datasets.
CO3	Generate and customize various types of graphs, Plots to effectively visualize data using R tools
CO4	Apply statistical analysis techniques such as regression, correlation and other methods to analyze datasets.
CO5	Implement and evaluate machine learning algorithms and statistical models to analyze data for predictions

BL – Bloom's Taxonomy Levels
(L1-Remembering, L2-Understanding, L3-Applying, L4-Analysing, L5-Evaluating, L6-Creating)

PART- A(10x2=20Marks)
(Answer all Questions)

Q.No.	Questions	Marks	CO	BL
1	What are vectors in R? Give an example.	2	CO1	L1
2	State any two differences between data frames and lists.	2	CO1	L2
3	How do you declare a recursive function in R?	2	CO2	L2
4	Mention any two set operations available in R.	2	CO2	L1
5	Define a box plot and state its significance.	2	CO3	L2
6	Differentiate between normal and Poisson distributions.	2	CO3	L2
7	Write the difference between linear and multiple regression.	2	CO4	L2
8	What does the summary() function return when applied to a linear model object in R?	2	CO4	L2
9	How spatial clustering is applied in Geoinformatics using R?	2	CO5	L2
10	Mention two R packages commonly used for spatial data analysis.	2	CO5	L1

PART- B(5x 13=65Marks)
(Restrict to a maximum of 2 subdivisions)

Q.No.	Questions	Marks	CO	BL
11 (a)	Explain different data types in R with suitable examples. Discuss data storage formats.	13	CO1	L2
	OR			
11 (b)	Describe the structure and elements of R sessions. How are objects subsetted and manipulated?	13	CO!	L2
12 (a)	Write an R program using control structures and loop functions to create a multiplication table.	13	CO2	L3
	OR			
12 (b)	Discuss recursion and scoping rules in R with examples. How does R handle variable scope?	13	CO2	L3

13 (a)	Demonstrate linear algebra operations on vectors and matrices in R. Include sorting and simulation	**13**	CO3	L3
	OR			
13 (b)	Perform a simulation to compute cumulative sum, minima, and maxima of a random vector	**13**	CO3	L3
14 (a)	Create spatial plots using base **R** or **sp** package. Explain how spatial data is visualized and interpreted.	**13**	CO4	L3
	OR			
14 (b)	Explain how the **sf** and **ggplot2** packages are used to handle and visualize spatial vector data.	**13**	CO4	L3
15 (a)	Discuss linear and logistic regression techniques in R with appropriate dataset examples	**13**	CO5	L3
	OR			
15 (b)	Explain how R is used in spatial regression and clustering. Include packages and interpretation.	**13**	CO5	L3

PART- C(1x 15=15Marks)

(Q.No.16 is compulsory)

Q.No.	Questions	Marks	CO	BL
16. i)	Create an R program to generate a scatterplot for a given dataset and compute linear regression. Interpret the summary statistics and plot the regression line.	**8**	CO3	L5
ii)	Given a spatial dataset (e.g., coordinates and pollution values), perform k-means clustering in R and visualize the results on a map. Discuss the clustering method used.	**7**	CO5	L5

ADDITIONAL CONTROLLER OF EXAMINATIONS ★ AU CHENNAI 600 025