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

ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)

B.E. /B.Tech / B. Arch (Full Time) - END SEMESTER EXAMINATIONS, DECEMBER 2023

GEOINFORMATICS

VII Semester

GI5702 GEOSPATIAL ANALYSIS WITH R PROGRAMMING

(Regulation2019)

Time:3hrs Max.Marks: 100

CO1	State the capabilities of R and its data, variable types
CO 2	Describe various operators, control statements and scoping rules in R
CO 3	Apply R programming for manipulation of datasets
CO 4	Produce various graphs and distribution plots using R
CO 5	Analyse dataset using Statistical Tools available in R

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	Differentiate Scalar and Vector in R Programming.	2	1	L4
2	List four advantages of R Programming.	2	1	L1
3	Differentiate Array from Matrix.	2	2	L3
4	What is the purpose of scoping rules in R?	2	2	L2
5	Find the inverse of a matrix of any 3X2 matrix using R programme	2	3	L3
6	Write any 4 math functions in R with their use.	2	3	L1
7	What are the information plotted in a Box Plot?	2	4	L4
8	Write the syntax of lines() function in R programming	2	4	L1
9	What is survival analysis?	2	5	L1
10	How to detect an outlier using R Programming?	2	5	L4

PART- B(5x 13=65Marks)

(Restrict to a maximum of 2 subdivisions)

Q.No	Questions	Marks	CO	BL
11 (a) (i)	Explain various variable and Data types used in R programming	8	1	BL1
(ii)	Create a dataframe that can store the details of road network data containing the characteristics of roads namely width, no. of lanes, surface type, category. Populate with suitable data using R programmme	5	1	BL3
	OR			
11 (b) (i)	Describe various operators used to subset different R Objects	8	1	BL1
(ii)	Write the syntax of function in R programming. Write a function to calculate volume of cylinder with input of diameter and radius.	5	1	BL3
12 (a) (i)	Explain different types of operators inR Programming with at least one example for each operator	8	2	BL1
(ii)	What is a pointer in R Programming? Write a R code demonstrating the use of pointer for subsetting a dataframe	5	2	BL3
	OR			
12 (b) (i)	Describe various Control Statement in R Programming for looping	8	2	BL1
(ii)	Write R code to the function by using if else command for $f(x) = x^2$ if $x<1/2$ $= (1-x^2)$ if $1/2<x<1$ = 0 otherwise	5	2	BL3

13 (a) (i)	Write the utility of following math functions in R with one example. 1. log() 2. abs() 3. which.min() 4. pmax() 5. prod() 6. cusum() 7. round() 8. floor() 9. ceiling()	**9**	3	BL2
(ii)	Write the R Code for function minimum and maximum of a given vector.	**4**	3	BL3
	OR			
13 (b) (i)	Describe various Algebraic Operations on a Matrix used in R programming. Write a R Program to demonstrate these operations on two matrix A (4,4) and B (4,3)	**9**	3	BL2
(ii)	Write a R code to sort various digital numbers in a panchromatic band satellite imagery to find the lowest and highest values.	**4**	3	BL3
14 (a) (i)	Write a R Code to analyse the landuse landcover map of using Barchart and Piechart (use the attribute table of map for analysis)	**7**	4	BL4
(ii)	How does the arguments of plot command help in designing the graphical visualization of statistical data? Explain with suitable examples.	**6**	4	BL3
	OR			
14 (b) (i)	Write the R Programme to plot a scatterplot depicting the relationship between Red and IR bands of Landsat TM data. Read each band data as vector.	**7**	4	BL4
(ii)	Evaluate various probability distribution functions available in R with their syntax and possible applications.	**6**	4	BL3
15 (a) (i)	What are the functions available in R for Regression Analysis? Explain their syntax with an example.	**6**	5	BL1
(ii)	Write R code to correlate the Land Surface Temperature in a city with NDVI values calculated from Landsat Imagery	**7**	5	BL4
	OR			
15 (b) (i)	What is Decision Tree Classifier? Explain its function to classify a set a values into different classes.	**6**	5	BL1
(ii)	Using suitable function, classify the satellite imagery using Decision Tree algorithm implemented in R environment	**7**	5	BL4

PART- C(1x 15=15Marks)

(Q.No.16 is compulsory)

Q.No	Questions	Marks	CO	BL
16.a	It is proposed by Chennai corporation to find suitable site for dumping solid waste using various parameters like soil type, groundwater depth, slope and landuse. How R based program can help in identification and ranking various sites around the city? Explain the process with required R code.	**8**	5	L5
b.	DN values of pixels inGreen and IR bands are given as input to a R code. Fit a regression line to predict the pixel value in IR band given the pixel value in Green band.	**7**	5	L5