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## ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)

B.E. /B.Tech / B. Arch (Full Time) – ARREAR EXAMINATIONS, APRIL/MAY 2024

GEOINFORMATICS

VII Semester

GI5702 GEOSPATIAL ANALYSIS WITH R PROGRAMMING

(Regulation 2019)

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 Matrix and Array type of data in R Programming.	2	1	L3
2	List any two advantages of R Programming.	2	1	L1
3	List any two arithmetic operators used in R programming with an example.	2	2	L3
4	Write a R Program to find mean of a given set of random numbers using while loop	2	2	L2
5	Find the transpose of any given 2 x 2 matrix using R program	2	3	L3
6	Differentiate tolower() and toupper() functions used in R	2	3	L1
7	What are the arguments provided to hist function in R programming? Write their use.	2	4	L2
8	Write the syntax of lines() function in R programming	2	4	L1
9	Differentiate Static and Dynamic Scoping in R Programming	2	5	L3
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 variables and Data types used in R programming	8	1	L1
(ii)	Create a dataframe that can store the population details in a given study area containing the characteristics such as Name, Age, Gender and Educational Qualification. Create the dataframe function for the above case and populate with set of data using R Programming	5	1	L3
OR				
11 (b) (i)	What is a Factor data type in R and list all attributes of Factors in R Language	8	1	L1
(ii)	Write the syntax of a function in R programming. Write a function to calculate area and perimeter of a square polygon with required inputs	5	1	L3
12 (a) (i)	Explain with an example for the following control statements in R Programming: if condition, if-else condition, for loop and nested loops	8	2	L1

(ii)	What is a pointer in R Programming? Write a R code demonstrating the use of pointer with a suitable example	5	2	L3
<b>OR</b>				
12 (b) (i)	Explain with an example Arithmetic Operators, Relational Operators, Logical Operators, Assignment Operators	7	2	L1
(ii)	Write R code for the built-in functions mean(), max(), sum()	6	2	L3
13 (a) (i)	Write the utility of following math functions in R with one example. 1. log() 2. abs() 3. trunc() 4. pmax()	8	3	L2
(ii)	Write the R Code for determining sum and mean of a given vector.	5	3	L3
<b>OR</b>				
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 (3,3) and B (3,3)	9	3	L2
(ii)	Write a R code to sort various digital numbers in a panchromatic band satellite imagery to find the natural breaks available in the data.	4	3	L3
14 (a) (i)	Write a R Code to analyse the given thematic map using Barchart and Piechart (use the attribute table of map for analysis)	7	4	L4
(ii)	Discuss the utility of various arguments of plot command in designing the graphical visualization of data? Explain with suitable examples.	6	4	L3
<b>OR</b>				
14 (b) (i)	Draw a Pie Chart for distribution of zone wise population in Chennai city assuming required population data for each zone using R Programme	7	4	L4
(ii)	List the probability distribution functions available in R with their syntax with an example for each	6	4	L3
15 (a) (i)	What is T-Test? Write the syntax of T-test in R Programme with the arguments used in the function.	6	5	L1
(ii)	Write a R code to correlate the Land Surface Temperature of Ground and Water pixels in a City for a given time series data	7	5	L4
<b>OR</b>				
15 (b)	A satellite data contains 300 x 300 pixels with pixel value indicating the spectral reflectance. Apply R programming for the classification of the data into four landuse classes namely, built-up, vegetation, water and barren land	13	5	L4

**PART- C(1x 15=15Marks)**  
(Q.No.16 is compulsory)

Q.No	Questions	Marks	CO	BL
16.	It is proposed by Chennai corporation to find suitable site for establishing Health Center in each corporation zone. List the various spatial and non-spatial data to be considered for the same. How R based program can help in identification and ranking various sites around the city? Explain the process with required R code.	15	5	L5

