|  |  |
| --- | --- |
| **CodeNo.22CA202011** |  |

MOHANBABU UNIVERSITY



SreeSainath Nagar, Tirupati - 517102

**II MCA III Semester (MBU22)**

**(22CA202011)R PROGAMMING**

**QUESTION BANK**

# PART-A

**Answer All Questions. All Questions Carry Equal Marks 10x2=20Marks**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | **Question(MODULE-1)** | **BL** | **CO** |
| **1.** | a) | Define R programming | L1 | CO1 |
|  | b) | Differentiate between Scalars, vector, list, Matrix and Data frame. | L4 | CO1 |
|  | c) | List out any five features of R. | L1 | CO1 |
|  | d) | Differentiate between R and Python in terms of functionality. | L4 | CO1 |
|  | e) | Define return value.. | L1 | CO1 |
|  | f) | Explain RStudio. | L2 | CO1 |
|  | g) | Define Merging and accessing list elements | L1 | CO1 |
|  | h) | Explain the use of subset() | L2 | CO1 |
|  | i) | Explain how to retrieve the columns from data frame in R | L2 | CO1 |
|  | j) | Explain why for loop is not advised in R. | L2 | CO1 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Q. No.** | | **Question** | **Marks** | **BL** | | **CO** |
|  |  | **MODULE-I** |  |  |  | | |
| 1. | a) | Explain R has five “atomic” classes of objects. What are they? Quote examples. | 8Marks | L2 | CO1 | | |
|  | b) | Explain data types available in R .Give examples. | 8Marks | L2 | CO1 | | |
| 2. | a) | Explain operators available in R.Give examples. | 8Marks | L2 | CO1 | | |
|  | b) | List the advantages and disadvantages of R? | 8Marks | L3 | CO1 | | |
| 3. | a) | Explain classes present in R.Explain in detail with proper examples | 8Marks | L2 | CO1 | | |
|  | b) | Execute a R program to take input from the user (name and age) and display the values. | 8Marks | L3 | CO1 | | |
| 4. | a) | Explain merge or join function available in R. | 8Marks | L2 | CO1 | | |
|  | b) | Execute a R program to create three vectors numeric data, character data and logical data. Display the content of the vectors and their type. | 8Marks | L3 | CO1 | | |
| 5. | a) | Execute the following:  a. Access the element at 3rd column and 1st row in a matrix.  b. Access only the second row  c. Access the element at 2nd column and 4th row in a matrix | 8Marks | L3 | CO1 | | |
|  | b) | Execute R program to create a data frame using two given vectors and display the duplicated elements and unique rows of the data frame. Explain with a syntax. | 8Marks | L3 | CO1 | | |
| 6. | a) | Explain list data structure and its operations with examples | 8Marks | L2 | CO1 | | |
|  | b) | List out few basic statistic functions | 8Marks | L1 | CO1 | | |
| 7. | a) | Explain the operations that can be performed on a Data frame. Demonstrate with syntax how to select the subset of the data frame | 8Marks | L2 | CO1 | | |
|  | b) | Define Factor in R and its function? ii. Distinguish two types of variables with an example | 8Marks | L1 | CO1 | | |
| 8. | a) | Explain categorical variables with an example | 8Marks | L2 | CO1 | | |
|  | b) | Test whether the value of the element of a given vector greater than 10 or not. Return TRUE or FALSE. | 8Marks | L4 | CO1 | | |
| 9. | a) | Interpret the usage of all logical operator in R. ii. Explain the use of length () and mean() function. | 8Marks | L3 | CO1 | | |
|  | b) | Execute a R program to find the maximum and the minimum value of a given vector. Explain the functions with syntax | 8Marks | L3 | CO1 | | |
| 10. | a) | Explain How to create a list and demonstrate all the ways of accessing a list component. | 8Marks | L4 | CO1 | | |
|  | b) | Describe major components of R environment? | 8Marks | L2 | CO1 | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | **Question(MODULE-2)** | **BL** | **CO** |
| **1.** | a) | Differentiate between matrix and dataframes | L4 | CO2 |
|  | b) | Differentiate between lapply and sapply | L4 | CO2 |
|  | c) | Explain how data is aggregated in R. | L2 | CO2 |
|  | d) | Explain how to create new variable in R programming? | L2 | CO2 |
|  | e) | Explain how do you access the elements in the 2nd column and 4 th row of a matrix? | L2 | CO2 |
|  | f) | Explain whichfunction is used for merging of data frames horizontally in R? | L2 | CO2 |
|  | g) | Explain Which function is used for sorting in R? | L2 | CO2 |
|  | h) | Explain How to create a vectors in R.Five example | L2 | CO2 |
|  | i) | Differentiate between sorting and ordering in R? | L4 | CO2 |
|  | j) | Differentiate between print and paste function. | L4 | CO2 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q.No.** | | **Question** | **Marks** | **BL** | **CO** |
|  |  | **MODULE-2** |  |  |  |
| 1. | a) | Explain Decision Making Control Statements in R with proper syntax and examples | 8 Marks | L2 | CO2 |
|  | b) | Explain Looping Control Statements in R with proper syntax and examples | 8 Marks | L2 | CO2 |
| 2. | a) | Explain looping over non vector set in R. | 8 Marks | L2 | CO2 |
|  | b) | Execute a program to a print reverse of a given number in R | 8 Marks | L3 | CO2 |
| 3. | a) | Explain Function in R with syntax and examples | 8 Marks | L2 | CO2 |
|  | b) | Execute a program to check given number is Armstrong number or not in R | 8 Marks | L3 | CO2 |
| 4. | a) | Execute a program to check given number is Palindrome number or not in R | 8 Marks | L3 | CO2 |
|  | b) | Explain about passing arguments to a function | 8 Marks | L2 | CO2 |
| 5. | a) | Execute a program to print sum of digits in R | 8 Marks | L3 | CO2 |
|  | b) | Explain about calling functions with suitable example. | 8 Marks | L2 | CO2 |
| 6. | a) | Execute the R code for the following: a. Subset data frame by selecting columns b. Subset data frame by excluding columns c. Subset data frame by selecting rows | 8 Marks | L3 | CO2 |
|  | b) | Describe about functions that return values with an example. | 8 Marks | L2 | CO2 |
| 7. | a) | Describe how to create user defined functions | 8 Marks | L2 | CO2 |
|  | b) | Execute the following:  i.Create a function that will return the sum of 2 integers.  ii.Create a function that given a vector will print by screen the mean and the standard deviation, it will Optionally also print the median. | 8 Marks | L3 | CO2 |
| 8. | a) | Execute the following:  Create the vectors:  (a) (1, 2, 3, . . . , 19, 20)  (b) (20, 19, . . . , 2, 1)  (c) (1, 2, 3, . . . , 19, 20, 19, 18, . . . , 2, 1)  (d) (4, 6, 3) and assign it to the name tmp. For parts  (e), (f) and (g) look at the help for the function rep. (e) (4, 6, 3, 4, 6, 3, . . . , 4, 6, 3) where there are 10 occurrences of 4. (f) (4, 6, 3, 4, 6, 3, . . . , 4, 6, 3, 4) where there are 11 occurrences of 4, 10 occurrences of 6 and 10 occurrences of 3. (g) (4, 4, . . . , 4, 6, 6, . . . , 6, 3, 3, . . . , 3) where there are 10 occurrences of 4, 20 occurrences of 6 and 30 occurrences of 3 | 8 Marks | L3 | CO2 |
|  | b) | Execute a simple data frame from 3 vectors.  i)Order the entire data frame by the first column.  ii.Create a data frame from a matrix of your choice, change the row names so every row says id\_i (where i is the row number) and change the column names to variable\_i (where i is the column number). I.e., for column 1 it will say variable\_1, and for row 2 will say id\_2 and so on. | 8 Marks | L3 | CO2 |
| 9. | a) | Explain how to extract data from data frame. Explain with an example. | 8 Marks | L2 | CO2 |
|  | b) | Explain how to append rows to R data frame with an example? | 8 Marks | L2 | CO2 |
| 10. | a) | Explain the following  a. rbind() to merge two R data frames  b. cbind() to merge two R data frames  c. merge() | 8 Marks | L2 | CO2 |
|  | b) | Execute the R code for the following a. Calling a function with default arguments b. Calling a function with arguments c. Calling a function without arguments | 8 Marks | L3 | CO2 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | **Question(MODULE-3)** | **BL** | **CO** |
| **1.** | a) | Define how to generate random numbers in R | L1 | CO1 |
|  | b) | Define how to perform matrix addition, subtraction, multiplication in R | L1 | CO1 |
|  | c) | List out any five operations which are performed in matrices. | L1 | CO1 |
|  | d) | Differentiate between eigenvalues and eigenvectors | L4 | CO1 |
|  | e) | Definehow to perform sorting in R. | L1 | CO1 |
|  | f) | Explain how to import a CSV file in R | L2 | CO1 |
|  | g) | Define PDF and CDF. | L1 | CO1 |
|  | h) | Explain **the use of normal distribution.** | L2 | CO1 |
|  | i) | Explain how to multiply two vectors. | L2 | CO1 |
|  | j) | Explain the termProbability. | L2 | CO1 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q.No.** | | **Question** | **Marks** | **BL** | **CO** |
|  |  | **MODULE-3** |  |  |  |
| 1. | a) | Explain how much operations can be performed on vectors. | 8Marks | L2 | CO3 |
|  | b) | Explain types of sampling techniques. | 8Marks | L2 | CO3 |
| 2. | a) | Explain various statistical distribution functions available in R | 8Marks | L2 | CO3 |
|  | b) | Explain how to access keyboard and monitor in R | 8Marks | L2 | CO3 |
| 3. | a) | Explain how to find Stationary Distribution of Markov Chains in R.Write its syntax. | 8Marks | L2 | CO3 |
|  | b) | Explain how to calculate probability in R with example | 8Marks | L2 | CO3 |
| 4. | a) | Explain all set operations which are applicable on sets. | 8Marks | L2 | CO3 |
|  | b) | Define a custom pdf function in R. | 8Marks | L1 | CO3 |
| 5. | a) | Explain R binomial distribution | 8Marks | L2 | CO3 |
|  | b) | Explain four categories of R inbuilt function with example | 8Marks | L2 | CO3 |
| 6. | a) | Define how to calculate Stationary Distribution of Markov Chains in R | 8Marks | L1 | CO3 |
|  | b) | Explain R Guassian distribution | 8Marks | L3 | CO3 |
| 7. | a) | Explain how to access the Keyboard and Monitor in R. | 8Marks | L2 | CO3 |
|  | b) | Define various statistical distribution functions available in R | 8Marks | L1 | CO3 |
| 8. | a) | Explain how to Read and write Files in R. | 8Marks | L2 | CO3 |
|  | b) | Explain the different methods available in R for mathematics | 8Marks | L2 | CO3 |
| 9. | a) | Explain maxima and minima function in R. | 8Marks | L2 | CO3 |
|  | b) | Explain all linear algebra operations with example. | 8Marks | L3 | CO3 |
| 10. | a) | Explain how much operations can be performed on vectors. | 8Marks | L2 | CO3 |
|  | b) | Define how to calculate Stationary Distribution of Markov Chains in R | 8Marks | L1 | CO3 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | **Question(MODULE-4)** | **BL** | **CO** |
| **1.** | **a)** | Define R base graphics | L1 | CO1 |
|  | **b)** | Define ggplot2 | L1 | CO1 |
|  | **c)** | List out base graphics plots. | L1 | CO1 |
|  | **d)** | Differentiate between barplot and boxplot | L4 | CO1 |
|  | **e)** | Define plot() in R. | L1 | CO1 |
|  | **f)** | Explain workhorse in R | L2 | CO1 |
|  | **g)** | Define  the standard font. | L1 | CO1 |
|  | h) | **Explain the use of axis.** | L2 | CO1 |
|  | **i)** | Explain how to make a multiple plots in a single layout. | L2 | CO1 |
|  | **j)** | Explain lattice package in R | L2 | CO1 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q.No.** | | **Question** | **Marks** | **BL** | **CO** |
|  |  | **MODULE-4** |  |  |  |
| 1. | a) | Explain types of R charts. | 8Marks | L2 | CO3 |
|  | b) | Explain how to customize a graph in R. | 8Marks | L2 | CO3 |
| 2. | a) | 1. Explain how to create scatter plot in R | 8Marks | L2 | CO3 |
|  | b) | Explain how to draw boxplot in R.Write its syntax | 8Marks | L2 | CO3 |
| 3. | a) | Explain how to draw histogram R.Write its syntax. | 8Marks | L2 | CO3 |
|  | b) | Explain how to draw boxplot in R with example. | 8Marks | L2 | CO3 |
| 4. | a) | Explain how to plot scatter plot from dataframe using ggplot | 8Marks | L2 | CO3 |
|  | b) | Define a case when you will use histogram and barchart in R. | 8Marks | L1 | CO3 |
| 5. | a) | Explain 5 libraries for data visualization in R. | 8Marks | L2 | CO3 |
|  | b) | Explain four categories of R inbuilt function with example. | 8Marks | L2 | CO3 |
| 6. | a) | Explain how to plot bar plot from data frame using ggplot. | 8Marks | L2 | CO3 |
|  | b) | Explain R data visualization. | 8Marks | L2 | CO3 |
| 7. | a) | Explain all R graphics packages. | 8Marks | L2 | CO3 |
|  | b) | Define how to create a heatmap in R | 8Marks | L1 | CO3 |
| 8. | a) | Explain key components of ggplot in R. | 8Marks | L2 | CO3 |
|  | b) | Explain the different methods available in R for mathematics | 8Marks | L2 | CO3 |
| 9. | a) | Explain time series plot in R. | 8Marks | L2 | CO3 |
|  | b) | Explain lattice package in R with example. | 8Marks | L3 | CO3 |
| 10. | a) | Explain how plots can be exported as image file. | 8Marks | L2 | CO3 |
|  | b) | Define what types of chart can be considered for showing relationship. | 8Marks | L1 | CO3 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | **Question(MODULE-5)** | **BL** | **CO** |
| **1.** | **a)** | Define probability. | L1 | CO1 |
|  | **b)** | Define correlation. | L1 | CO1 |
|  | **c)** | List out types of regression. | L1 | CO1 |
|  | **d)** | Differentiate between corelation and covariance. | L4 | CO1 |
|  | **e)** | Define survival analysis R. | L1 | CO1 |
|  | **f)** | Explain **the situation when chi-squaretest is used** | L2 | CO1 |
|  | **g)** | Define  Regression. | L1 | CO1 |
|  | h) | **Explain the situation when T-test is used.** | L2 | CO1 |
|  | **i)** | Explain splines. | L2 | CO1 |
|  | **j)** | Explain in which situation Random Forest is used. | L2 | CO1 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q.No.** | | **Question** | **Marks** | **BL** | **CO** |
|  |  | **MODULE-5** |  |  |  |
| 1. | a) | Explain T-Test ,its types in detail. | 8Marks | L2 | CO3 |
|  | b) | Explain all types of distribution in R. | 8Marks | L2 | CO3 |
| 2. | a) | 1. Explain Chi-square test in R | 8Marks | L2 | CO3 |
|  | b) | Explain Regression and its types in detail | 8Marks | L2 | CO3 |
| 3. | a) | Explain Random Forest algorithm in detail. | 8Marks | L2 | CO3 |
|  | b) | Explain logistic regression in R with example. | 8Marks | L2 | CO3 |
| 4. | a) | Explain application of Regression and Random Forest | 8Marks | L2 | CO3 |
|  | b) | Define Possion Regression in R. | 8Marks | L1 | CO3 |
| 5. | a) | Explain survival analysis in detail R. | 8Marks | L2 | CO3 |
|  | b) | Explain Binomial and passion distribution in R | 8Marks | L2 | CO3 |
| 6. | a) | Explain advantages and disadvantages of  Decision Tree and random Forest | 8Marks | L2 | CO3 |
|  | b) | Explain Multiple regressions in detail with examples. | 8Marks | L2 | CO3 |
| 7. | a) | Explain advantages and disadvantages of linear regression and logistic  regression | 8Marks | L2 | CO3 |
|  | b) | Define hypothesis testing and its type in detail. | 8Marks | L1 | CO3 |
| 8. | a) | Explain parametric and non parametric test. | 8Marks | L2 | CO3 |
|  | b) | Differentiate between chi-square test and T-Test | 8Marks | L4 | CO3 |
| 9. | a) | Explain all basic statistics function In R | 8Marks | L2 | CO3 |
|  | b) | Explain when corealtion and covariance is taken into consideration | 8Marks | L3 | CO3 |
| 10. | a) | Differentiate between Decision Tree and random Forest. | 8Marks | L4 | CO3 |
|  | b) | Define splines and its types in detail. | 8Marks | L1 | CO3 |

**\*\*\***

|  |  |  |
| --- | --- | --- |
| **SignatureoftheFaculty** |  | **ChairmanBOS,XYZ** |