Suppose that the above data is expressed in the form of a matrix named XYZ.

(a) Give R command of Box-Whisker plot for first three columns of XYZ in one graph.

(b) With the help of pie chart, write the syntax of the following statements:

  (i) Express the sales of product A.

  (ii) Express Q2 results in clockwise direction.

  (iii) Express the sales of product C starting at an angle corresponding to the position of hour hand in a clock when it is 9' O clock.

(c) Plot Cleveland dot chart of XYZ. Explain the "cex" and "pch" argument used in plot command.

(d) You have to express the information with the help of group bar chat. Write the syntax of the following :

  (i) Make group bar chart of matrix XYZ.

  (ii) Label the x-axis & y-axis as QUARTER RESULT & SALES FIGURES respectively.

  (iii) Use the argument "legend" in group bar chart.

[This question paper contains 8 printed pages.]

11/5/23   Your Roll No...............

Sr. No. of Question Paper : 4920   **E**

Unique Paper Code   : 62353607

Name of the Paper   : SEC-Statistical Software-R

Name of the Course   : **B.A. Programme**

Semester   : VI

Duration : 2 Hours   Maximum Marks : 38

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.

2. **All** the questions are compulsory.

3. Attempt any **two** subparts of each part in question **1**. Each subpart is of **1** mark and whole question **1** is of **8** marks.

4. In questions **2** to **6**, attempt any **two** parts out of **four** parts. Each part is of **3** marks and each question is of **6** marks.

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1. Attempt any **two** subparts of each part. Each subpart is of **1** mark. This whole question carries **8** marks.

(a) (i) Write the R syntax for $\tan^{-1}x$.

   (ii) If x=c(1, 2, 3) and y=c(2, 2, 1) then print (x^y) will give _____ .

   (iii) sample() command selects _____ elements from data, (beginning/random)

   (iv) In two digit number, _____ digit represent the stem value in stem-and-leaf plot. (ones/ tens)

(b) (i) _____ command can be used to view the data type of an object. (summary()/class())

   (ii) names () command is used for viewing _____ names in data frame, (rows/columns)

   (iii) Tables can be summarized using the _____ command. (apply(),attach())

   (iv) _____ command is used to generates the sequence of 3 random numbers. (seq(3)/ rseq(3))

(c) State weather TRUE or FALSE

   (i) getwd() command is used to find the default path of the files saved.

   (ii) runif(5) creates five random numbers.

(b) Write the command of the following in R :

   (i) Generate n random variables of the normal distribution with mean = 0 and standard deviation = 1.

   (ii) Select the random sample of 8 items in which repetition of data is allowed from the data named BA which contains 20 items.

   (iii) Generate n random variables of the uniform distribution.

(c) Given Datal: 3, 5, 7, 5, 3, 2, 6, 8, 5 6,9, 4, 5, 7, 3, 4. Write the command of stem and leaf plot for the Datal. Draw the output. Write the command which increase the number of bins.

(d) Put the part (c) of above Datal in a variable 'y' using scan() command in R. Also give R commands for finding first five terms and the items less than 9 & more than 6 in the variable 'y'.

6. Attempt any **two** parts. Each part is of **3** marks.

The XYZ Company has 6 Products named A, B, C, D, E, F and their sales figures in Q1, Q2, Q3 and Q4 are given as follows :

Product	Q1	Q2	Q3	Q4
A	10	20	8	12
B	6	3	13	10
C	20	35	30	50
D	30	45	38	62
E	21	34	8	40
F	60	80	72	90

(c) Given a 5x5 matrix A, write down commands for

making a 5x2 matrix whose first column is the first column of A and the second column is the last row of A. What command will you use to remove the last column from A to make it a 5x4 matrix?

(d) Suppose that 'Data' is the following data frame.

	Gender	Age
Person-1	M	27
Person-2	M	36
Person-3	F	41
Person-4	M	34
Person-5	F	23

Explain what information will be provided when the two commands str(Data) and summary(Data) are run.

5. Attempt any **two** parts. Each part is of **3** marks.

(a) Make a list 'grass.l' with data:

mow: 11 16 19 10 17

unmow: 7 8 6 9

Also create a data frame grass.df from grass.l using stack() command and name the columns as 'rich' and 'graze'.

(iii) Data frames are one dimensional.

(iv) R follows the BODMAS rule for the calculations of mathematical expressions.

(d) State weather TRUE or FALSE

(i) ls() command removes the defined variable.

(ii) barplot() command is used to make bar charts.

(iii) R language is key sensitive.

(iv) sort() and order() commands gives same output.

2. Attempt any **two** parts. Each part is of **3** marks.

(a) Write a command to list all the variables defined ending with 'b'.

Write R syntax to store "Monday", "Tuesday", "Wednesday", "Thursday", "Friday", "Saturday", "Sunday" as a characters in a variable 'days'.

(b) How will you convert a data frame into a matrix and vice-versa?

What are the differences between save() and load() commands for files?

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(c) What is read.csv() command? Differentiate between class() and str() commands.

(d) Save the commands in a file with name "data". Differentiate between ls() and ls.str() commands.

3. Attempt any **two** parts. Each part is of **3** marks.

(a) What is the command for calculating the average of the numbers in the vector x = c (1, 2, 3, 4, 5, NA) in terms of x?

How would you use the seq() command to generate the sequence of first 10 odd numbers?

(b) In each of the following, explain why there is error in the output.

(i) mat = cbind(c(1,2,3), 4:7)

(ii) sort(matrix(1:9, nrow = 3))

(iii) A = matrix(1:6, ncol = 3); B = matrix(1:6, ncol = 2); A*B

(c) Suppose that Data=c(7,8,5,5,3,4,4,6,9,7) is the vector of the 10 numbers. Describe the output of the following commands :

(i) length(Data)

(ii) Data[c(1,10)]

(iii) Data[Data>5 | Data==3]

(d) In each of the following, find the difference between the two commands

(i) sort(x, na.last = NA) and sort(x, na.last = FALSE), where x is a vector of numbers along with NA entries?

(ii) c(1, 2, c(3, 4)) and list(1, 2, c(3, 4))?

4. Attempt any **two** parts. Each part is of **3** marks.

(a) Write the commands to store the data in the following table as a matrix, and find the sum of entries in each column.

	C1	C2	C3	C4
R1	0	15	30	45
R2	5	20	35	50
R3	10	25	40	55

(b) Write the commands to store the data in the following table as a data frame, and then sort it in the increasing order of the entries in the last column.

	Physics	Chemistry	Mathematics
Bob	81	76	91
Alice	84	79	94
James	80	74	89
Henry	89	81	92