

2021**STATISTICS— GENERAL****Paper : SEC-A-1****(Statistical Data Analysis using R)****Full Marks : 80***The questions are of equal value.**The figures in the margin indicate full marks.**Candidates are required to give their answers in their own words as far as practicable.**Answer question nos. 1 and 2 and any two from the rest.***1.** Answer *any fifteen* questions:

2×15

- (a) What is meant by 'R is a GNU software'?
- (b) Give two advantages of R Software.
- (c) Give two ways in which looping can be achieved in R.
- (d) Write a code to read data from a .csv file.
- (e) How would you install any additional new R package from the internet?
- (f) Write a one-line code to draw a box plot in R.
- (g) Give one difference between NA and NaN.
- (h) How to change the line width in plot() function?
- (i) How would you deal with a program having an infinite loop due to some error in the code?
- (j) How would you carry out some arithmetic operations in a table by making sure the program recognizes the header?
- (k) "R functions are also R objects"—Justify.
- (l) Write a program to illustrate the use of rbind().
- (m) Define a vector and find out its median.
- (n) Write the output for `z<- c(1:20); y<- c(1:10); x=y+z; x.`
- (o) The inbuilt coding of R is primarily done in which programming languages?
- (p) How can one access files on remote machines via URLs?
- (q) Is there any difference between a data frame and a table in R?

Please Turn Over

- (r) Write the output of `x<-1:10; y<-ifelse(x%%2==0, 5, 12); y`.
- (s) Write the output of `a<-matrix(c(1,2,3,4,5,6,7,8,9),nrow=3, ncol=3); a[-1,]`.
- (t) Give one usage of `split()`.

2. Answer **any six** questions:

5×6

- (a) Name different kinds of R objects. Write a code to define a 3×3 matrix in R and filter out the 1st and third row from it. Also from a new matrix with these two rows. 3+2
- (b) How would you find out the mode of an R object? How would you change the character of an R object from numeric to character? 5
- (c) How can looping be achieved with the help of a vector or matrix in R? Differentiate between `rbind()` and `cbind()`. 3+2
- (d) Write a code to use data from R packages in your own program and find out the summary statistics. 5
- (e) Write a program to draw scatter plot and also carry out linear regression analysis. 5
- (f) What features make R attractive for data analysts? Write the output for `z<-c(1:10); x<-z[3*1:3]`. 3+2
- (g) Describe in details how to draw a histogram in R. Also draw a frequency polygon on the same plot with the color red. 3+2
- (h) Illustrate with examples, 2 different methods of input and 2 methods of output in R. How can one access different elements from a data frame? 4+1

3. What do you mean by indexing in R? Demonstrate how it can be achieved using the functions `subset()`, `which()`, `all()` and `any()`. Write codes for all 4 cases. Write the output for `a<-c(3:10); mean(a[3:5])`. (3+4+3)

4. (a) Define a 3×3 matrix and find out its transpose without using the function `t()`.

- (b) How can one deal with NA in R?

5+5

5. (a) Write a vector and illustrate through an example how to develop a filtering index based on some specific condition.

- (b) What does one mean by libraries in R? How are they useful? Give an example.

- (c) Illustrate the importance of using the command line `rm(list=ls(all=TRUE))`. What are the inbuilt help options in R? 4+3+3
