QP CODE: D4BMT2402	(Pages: 2)	Reg. No : .....
		Name : .....

Fourth Semester B.Sc (FYUGP) Degree Examinations April 2026

Value Added Courses (VAC)

MAT4FV110(1) : Statistics and Mathematics with R

(Credits: 3)

Time: 1.5 Hours **Maximum Marks: 50**

Section A

Answer the following questions. Each carries 2 marks (Ceiling: 16 marks)

1.	Explain the concept of case sensitivity in R with respect to variable names	BL1	CO1
2.	Write the output of a) strptime("02/05/11", "%y/%m/%d") b) format(strptime("8/9/10", "%d/%m/%y"), "%a %b %d %Y")	BL2	CO1
3.	Explain the concept of changing directories in R.	BL1	CO1
4.	a) What error message is produced when attempting to load a package that is not installed? b) What is CRAN?	BL2	CO1
5.	a) Write an R command to extract the second column of a data frame named df. b) Write the R command to find the number of rows in a data frame called women.	BL3	CO1
6.	What do the whiskers in a boxplot indicate?	BL1	CO2
7.	Write the output of R command: answer <- 0 for (j in 1:5) answer <- answer + j	BL2	CO3
8.	Write the general syntax of a repeat loop	BL1	CO3
9.	Write the output of the following code: length <- c(15, 18, 20, 17) breadth <- c(10, 12, 14, 11) rect_matrix <- cbind(length, breadth) rownames(rect_matrix) <- c("R1", "R2", "R3", "R4") rect_matrix	BL3	CO3
10.	State the output obtained from executing the following R code. A <- matrix(c(2, 0, 0, 3), nrow = 2) svd(A)$d	BL2	CO3

(PTO)

	Section B		
	Answer the following questions. Each carries 6 marks (Ceiling: 24 Marks)		
11.	a) Using one line of R code, calculate the respective areas of the circles having radii 3,4,...,100. b) In the expression 48:(14*3), are the brackets really necessary? What happens when you type 48:14*3?	BL3	CO1
12.	The AirPassengers data set records the monthly totals of international airline passengers. a) Write R code to draw a bar chart for the AirPassengers data. b) Explain how to include a main title “Monthly Air Passengers” in the bar chart. c) Show how to add appropriate x-axis and y-axis labels to the plot.	BL2	CO2
13.	Consider the following R commands: par(mfrow = c(1,4)) X <- rnorm(1000) A <- rnorm(1000) qqplot(X, A, main = "A and X are the same") a) Explain the purpose of the command par(mfrow = c(1,4)). b) Describe how the variables X and A are generated. c) Explain the purpose of the command main = "A and X are the same".	BL2	CO2
14.	Write the output of the following: a) X <- matrix(c(1, 2, 3, 1, 8, 27), ncol = 2) b) Y<-2*X Y c) X*Y	BL1	CO3
15.	a) Write the R code to compute the eigenvalues and eigenvectors of a matrix $A = \begin{bmatrix} 2 & 3 \\ 0 & 1 \end{bmatrix}$ and display the output. b) Write R code to compute the trace of the matrix A and compare it with the sum of its eigenvalues.	BL2	CO3
	Section C		
	Answer any one question. Each carries 10 marks (1 x 10 = 10 Marks)		
16.	a) Calculate the sum $\sum_{j=1}^{n} j$, and compare with $\frac{n(n+1)}{2}$, for $n = 100, 200, 300, 600$ in R. b) Use the quick formula to compute the sum $\sum_{j=1}^{n} j$, for all values of n between 1 and 100. Store the 100 values in a vector called sum.	BL3	CO1
17.	Develop an R program to list all prime numbers less than or equal to 100.	BL1	CO3

CO : Course Outcome BL : Bloom’s Taxonomy Levels (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyse, 5 – Evaluate, 6 – Create)