



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.Sc. DEGREE EXAMINATION – MATHEMATICS

THIRD SEMESTER – NOVEMBER 2019

18PMT3ID01 – MATHEMATICAL COMPUTING USING R AND MATLAB

Date: 08-11-2019

Dept. No.

Max. : 100 Marks

Time: 09:00-12:00

Answer ALL Questions:

1. (a) What are the major windows available in R Language?

OR

- (b) Generate random sample of size 1000 between 3 and 9 with 0 decimal points. Also construct boxplot and bar chart using layout in R Language. (5)

- (c) The following data describes profit of a commodity and the expenditure on TV and NEWS paper advertisements.

Profit	TV	NEWS
96	5	1.5
90	2	2
95	4	1.5
92	2.5	2.5
95	3	3.3
94	3.5	2.3
94	2.5	4.2
94	3	2.5

Write R code to solve the following questions.

- Fit a multiple regression model.
- Determine the predicted values of the dependent variable based on fitted model.
- Test the normality of errors.

OR

- (d) Explain the different types of correlation coefficient based on correlation value. (15)

2. (a) Explain the testing procedure for Chi-Square test.

OR

- (b) Write the procedure for one sample test and how to solve one sample test in R Language. (5)

- (c) Explain the following statements in R with suitable example.

“rm” “ls()” “attach” “subset” “rep()”

OR

- (d) Explain “inner join”, “outer join”, “left join”, “right join”, and “cross join” in R language with suitable examples. (15)

3. (a) How do you solve matrix multiplication, transpose of matrix, inverse of matrix using R code?

OR

- (b) Explain the syntax of importing CSV file and txt file in R language. (5)

- (c) In a study, on identifying risk factors for cardiovascular disease, the researcher suspects that Waist circumference (X) in cm, and Deep Abdominal adipose tissue area (Y) in cm^2 , Y may have an Association. A sample data from 10 subjects were given below:

X:	74	83	80	73	79	74	76	89	92	86
Y:	25	42	29	32	42	33	36	60	70	78

Write the R code to solve the following questions.

- Present the relationship between Waist circumference and Deep Abdominal adipose tissue area using scatter diagram.
- Compute the Co-efficient of Correlation between Waist circumference and Deep Abdominal adipose tissue area.
- Predict the value of Deep Abdominal adipose tissue area(in cm^2), Y,

OR

(d) Write r code to generate sample of size 100 each for A, B, C, D. Construct histogram for A, boxplot for B, and scatter plot for C and D and hence display all the diagrams in a single window using layout.

(15)

4. (a) Explain the uses of the following MATLAB commands: clear, colon, semicolon, who and ellipsis.

OR

(b) Write a short note on variables and assignment statements.

(5)

(c) Explain the uses of the following MATLAB commands:

- format compact
- grid
- hold
- format short
- whos
- iskeyword
- plot(x, y)

(d) Write a short note on output statements in MATLAB using appropriate examples.

(7 + 8)

OR

(e) How could one refer and modify an element or a group of elements in MATLAB? Explain the above by generating a matrix.

(f) Briefly explain different types of looping statements with suitable examples.

(8 + 7)

5. (a) For a matrix $A = \begin{pmatrix} 9 & 8 & 7 \\ 6 & 5 & 4 \\ 3 & 2 & 1 \end{pmatrix}$ compute the following using MATLAB:

- Inverse of A
- Determinant of A
- Trace of A
- Upper triangular matrix of A
- fliplr

OR

(b) Write down the uses of the following MATLAB commands:

- subplot
- legend
- clf
- semilogy
- axis

(5)

(c) Write a description on the following MATLAB commands:

- sym2poly
- diff
- subs
- factor
- tic/toc
- expand

(d) Generate a multiplication table of order m x n, where m and n are positive integers.

(e) Compute the following MATLAB commands (i) $\frac{d^2}{dx^2}(\cos 3x)$ (ii) $\int \sin x dx$

(iii) $\int_0^2 \int_2^4 (x^3 + y^3) dx dy$.

(6 + 6 + 3)

OR

(f) Write a short note on various 2D and 3D plots in MATLAB.

(g) Explain the method to change the plot colour, line styles, and data markers using a variable.

(7 + 8)
