



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.Sc. DEGREE EXAMINATION – MATHEMATICS

THIRD SEMESTER – APRIL 2023

PMT 3301 – MATHEMATICAL COMPUTING USING R AND MATLAB

Date: 09-05-2023

Dept. No.

Max. : 100 Marks

Time: 09:00 AM - 12:00 NOON

Answer ALL Questions:

1. (a) Explain the Import command in R language with suitable example.
OR
(b) What is subset in R Language? Give an example. (5)
(c) Explain different kinds of merging dataset with suitable example in R language.
OR
(d) (i) Write a R code to generate 5000 observation between 100 and 500 and, hence construct Histogram and boxplot for the generated data using layout to display diagrams.
(ii) Generate dataset to construct simple bar chart. Also write R code to construct simple bar diagram with specifying colour, x axis, y axis label and title of the chart. (8 + 7)
2. (a) When do you use Pearson Correlation coefficient and Spearman Correlation coefficient.
OR
(b) Explain attach and detach command in R with suitable example. (5)
(c) Explain the three different types of degree of relationship with suitable example in R Language.
OR
(d) Construct a table with random values for the variables name, marks in mathematics, marks in statistics and marks in physics. Also construct multiple bar diagram for the generated data in R language. (15)
3. (a) Explain the following commands in R with suitable example.
(i) rep()
(ii) data.frame()
OR
(b) Explain Parametric and non-parametric tests. Also explain the testing procedure for Paired t-test in R Language. (5)
(c) Write a testing procedure for one sample t-test and two sample independent t-test in R Language.
OR
(d) What is Pearson Correlation coefficient? Also explain different types of Correlation based on correlation value. (15)
4. (a) Write a short note on variables and assignment statements.
OR
(b) Write MATLAB commands for the following mathematical expressions:
(i) $y = \frac{5}{x^3} + 4x^2$ (ii) $y = 4 \frac{\tan 3x}{7}$ (iii) $y = \frac{4}{3}x^{1/4} + 5x^{0.83}$
(iv) $r = \frac{1}{\frac{1}{a} + \frac{1}{b} + \frac{1}{c} + \frac{1}{d}}$ (v) $y = \sqrt{x^7 - 4x^3}$ (5)
(c) Describe Linspace and Logspace functions with examples.

(d) What is a user-defined function? Mention the rules for defining a user-defined function. Explain the above by creating a user-defined function of our own. (6 + 9)

OR

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

(f) Describe the various classes(types) associated with variables and briefly explain type casting using an example. (8 + 7)

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

(i) Inverse of A

(ii) Determinant of A

(iii) Trace of A

(iv) Lower triangular matrix of A

(v) flipud

OR

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

(i) plot

(ii) title

(iii) clf

(iv) hold

(v) loglog

(5)

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

(d) Write a short note on polyval and polyfit commands using suitable examples.

(10 +5)

OR

(e) Write a script file to generate a movie for sine function over the limit -2π to 2π .

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

(5 + 10)

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