



**LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034**

**M.Sc.DEGREE EXAMINATION – STATISTICS**

THIRD SEMESTER – APRIL 2018

**16PST3ID01- MATHEMATICAL AND STATISTICAL COMPUTING**

Date: 21-04-2018  
Time: 09:00-12:00

Dept. No.

Max. : 100 Marks

**Part A**

**Answer all the questions**

**10 X 2 = 20**

1. Write a Python program to print 1 to 10 numbers
2. How to calculate standard deviation of a variable from the given table?
3. How to calculate 5 to the power 26 in Python.
4. Write a short note on subset of data using Python.
5. Convert 'LOYOLA COLLEGE' into lower case using Python code
6. Explain the output of "ins\_data.iloc[:,100,8:]"
7. Name the four default windows in MATLAB.
8. Specify the use of the command *format loose* and *format compact* in command window.
9. How does the polynomial  $2x^4 - x^2 + 5$  is represented in MATLAB.
10. Let  $X = \{11, 7, 9, 4, 8, 6, 10, 22\}$ . Write down the MATLAB command to compute mean and median of X.

**Part B**

**Answer any five questions**

**5 X 8 = 40**

11. What are the importance of the statement "describe" and "goupy" in Python with examples?
12. Write a Python programme using for loop statement to print "Welcome to Python" 5 times.
13. Explain the application of Python in real world.
14. Explain Pearson correlation and Spearman correlation coefficients using Python.
15. Generate random sample of size 2000 from Normal distribution between 100 and 200 for three variables and hence construct pairwise scatter plot.
16. Mention the uses of: `fliplr`, `flipud`, `rot90` & `repmat` keywords in MATLAB.
17. Write a short note on output statements in MATLAB using appropriate examples.
18. For a matrix  $A = \begin{pmatrix} 1 & 3 & 7 \\ 2 & 5 & 4 \\ 9 & 8 & 6 \end{pmatrix}$  compute the following

Inverse of A.

- a. Determinant of A.
- b. Trace of A.
- c. Upper triangular matrix of A.

Part C

Answer any two questions

2 X 20 = 40

19. (a) In a study of diabetic patients, the following data were obtained

Age (in years)	10-20	20-30	30-40	40-50	50-60	60-70
Number of male patient	4	8	16	10	6	3
Number of female patient	3	5	12	17	5	1

Draw a suitable diagram

b) Draw a pie diagram using python code to represent the following population in a town:

Males	Females	Girls	Boys	
2000	1800	4200	2000	(10+10)

20. (a) How do merge concepts work in python?. Explain with suitable examples.

(b) Explain any two testing of hypotheses tests using python. (10+10)

21. (a) Write MATLAB commands to evaluate the following mathematical expressions:

- (i)  $y = 3x^3 + \frac{5}{x^2}$
- (ii)  $y = \frac{\sin 3x}{5}$
- (iii)  $y = 3x^{1.58} + \frac{1}{x^{0.36}}$
- (iv)  $r = \frac{1}{\frac{1}{a} + \frac{1}{b} + \frac{1}{c} + \frac{1}{d}}$
- (v)  $y = \sqrt{x^3 + 2x}$ .

(b) Explain the method to change the plot colour, line styles, and data markers. (10 + 10)

22. a) Explain descriptive statistics in Python with suitable example

b) Write a script areaMenu that will print a list consisting of “cylinder”, “circle”, and “rectangle”. It prompts the user to choose one, and then prompts the user for the appropriate quantities (e.g., the radius of the circle) and then prints its area. If the user enters an invalid choice, the script simply prints an error message (10 + 10)

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