LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

THIRD SEMESTER – **NOVEMBER 2022**

PST 3301 – MATHEMATICAL AND STATISTICAL COMPUTING

Date: 30-11-2022   Dept. No.   Max. : 100 Marks
Time: 09:00 AM - 12:00 NOON

Part - A

Answer all the questions   **(10 × 2 = 20)**

1. State any four features of Python Programming.
2. Define "continue" statement in Python with suitable example.
3. Describe "indentation" in Python with suitable example.
4. What is the output of the following Python code?

   ```
   x = ['ab', 'cd']
   for i in x:
       i.upper()
   print(i)
   ```

5. Write the Python code to generate 100 random integers between 5 and 10 for x and y separately and hence construct scatter plot for x and y.
6. What is the output of the following Python code:

   ```
   sum=0
   for i in range(0,6):
     sum += 110
     print("Sequence of values", sum)
   ```

7. Specify the use of the commands *format compact* and *format short* in MATLAB.
8. Define interpolation
9. What is the use of the built-in function 'poly2sym'? illustrate it by an example.
10. How do we represent the polynomial $4x^3 + 3x^2 - 5$ in MATLAB?

Part - B

Answer any five questions   **(5 × 8 = 40)**

11. Explain the following:

    a) Python List   b) Python Tuble   c) Python Dictionary   d) Python Numbers

12. Write a python program to find out the sum of odd numbers and even numbers using for..loop statement.

13. Develop your own dataset using dictionary for three variables in Python and construct multiple bar diagram for the same.

14. The life time of electric bulbs for a random sample of 10 from a large consignment gave the following data:

Item:	1	2	3	4	5	6	7	8	9	10
Life in'000 hrs:	4.2	4.6	3.9	4.1	5.2	3.8	3.9	4.3	4.4	5.6

Can we accept the hypothesis that the average life time of bulbs in 4,000 hours. Write a

Python code to solve this problem using user defined function.

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15. Write a testing procedure for Wilcoxon Singed Rank test using Python.

16. Explain the following MATLAB commands:

    (a) whos   (b) clear   (c) rand   (d) xor

    (e) linspace   (f) flipud   (g) tic/toc   (h) iskeyword

17. 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.

18. Explain the following functions that work on mathematical expressions in MATLAB:

    i) collect   ii) simplify   iii) expand   iv) subs   v) factor   vi) sym2poly vii) polyfit viii) polyder

Part - C

Answer any two questions   **(2 × 20 = 40)**

19. a) Construct multiple bar diagram for your own dataset using user defined function in Python.

    b) How do you build sub-divided bar diagram in Python using user defined function?   **(10+10)**

20. a) Define Python set and explain Union, Intersection and Symmetric with examples.

    b) Salt free diets are often prescribed to people with high blood pressure. The following data were obtained from an experiment designed to estimate the reduction in diastolic blood pressure as a result of following a salt – free diet for two weeks. Assume the diastolic readings are normally distributed.

Before	93	106	87	92	102	95	88	110
After	80	91	79	90	85	91	83	96

    To determine whether Salt free diets had any effect on reduction in diastolic blood
    Pressure. Find out an appropriate statistical tool and solve the above problem using user defined function in Python.   **(10+10)**

21. a) When do we use two sample independent t test? Write a user defined function to calculate test statistic for two sample independent t test in Python.

    b) Write a short note on different looping statements in MATLAB using suitable examples. **(10+10)**

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

    b) Write a short note on various 2D and 3D plots in MATLAB.   **(10+10)**

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