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25-CS-44-A

**M.Sc. IV SEMESTER [MAIN/ATKT] EXAMINATION
MAY - JUNE 2025**

COMPUTER SCIENCE

Paper - IV

[Python for Data Science]

[Max. Marks : 75]

[Time : 3:00 Hrs.]

[Min. Marks : 26]

Note : Candidate should write his/her Roll Number at the prescribed space on the question paper.
Student should not write anything on question paper.
Attempt all five questions. Each question carries an internal choice.
Each question carries **15 marks**.

- Q. 1 a)** Provide a brief historical background of Python, including its creator and evolution.
- b)** What is the use of dictionary in Python ? Explain with example.

OR

- a)** Describe how Python handles input and output operations with suitable code examples.
- b)** Compare Python' list, tuple and dictionary data types in terms of syntax, mutability performance and use – cases. Provide examples of operations on each.

- Q. 2 a)** Define a function in python. What is the difference between built – in and user – defined functions ? Write a program that uses a function to compute the sum of squares of the first n natural numbers.
- b)** What is pip in Python ? Describe the steps involved in installing and managing external packages using pip.

OR

- a)** What is Recursion in Python ? Explain how it works with the help of a recursive function to compute the n^{th} Fibonacci number. Also mention the advantages and disadvantages of using recursion over iteration.
- b)** Explain the concept of modules in Python. How can you create and import user – defined module ? Demonstrate with an example that defines a module with mathematical operation and imports it in another script.

- Q. 3 a)** What is the purpose of constructors (`__init__`) and destructors (`__del__`) in Python ? Write a program to illustrate their usage.

P.T.O.

- b) Define method overriding in Python with an example. How does Python support polymorphism through dynamic method resolution ?

OR

- a) Write a Python program that defines a Student class with attributes like name, roll_no and marks. Include methods to input and display student details. Create multiple objects and demonstrate accessing class members.
- b) Discuss inheritance in Python with example.

Q. 4 a) Describe the step – by – step process of a typical data science project.

- b) Explain the importance of data visualization in data science. Describe the use of graphical tools (like line chart, pareto chart etc.) with example.

OR

- a) What are the different measures used to assess the reliability of qualitative and quantitative data ? Explain with formula.
- b) Differentiate between structured, unstructured, and semi – structured data with examples. How each type handled in data science workflows ?

Q. 5 a) How files can be read, write and rename in Python ? Explain with example.

- b) Write the steps of installing MongoDB in Python.

OR

- a) How CSV files are read and written in Python ? Explain with example.
- b) What is the use of NumPy and SciPy in Python ? Explain with detail.

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