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0205N161

Candidate's Seat No :_____

MSc Sem.-2 Examination

408

Computer Science

Time : 2-30 Hours] **May-2025** **[Max. Marks : 70**

Q:1 (A) Explain the basic elements of Python, including variables, data types, and operators. How Do branching programs work in Python? Provide an example using if, else, and elif statements. (7)

Q:1 (B) What is a function in Python? Describe how you can define and call a function with parameters. (7)

OR

Q:1 (A) Explain the differences between strings, tuples, lists, and dictionaries in Python. What is mutability in Python? Provide an example to illustrate mutable and immutable types. (7)

Q:1 (B) What are black-box and glass-box testing? How do they differ? Describe the process of debugging in Python. What tools or techniques can be used for debugging? (7)

Q:2 (A) What is a search algorithm? Explain the difference between linear and binary search with examples. (7)

Q:2 (B) Describe the most common sorting algorithms in Python, such as bubble sort, selection sort, and insertion sort. (7)

OR

Q:2 (A) Explain the time complexity of the common search algorithms. How do Python's built-in data structures like lists and dictionaries use hash functions for efficient lookups? (7)

Q:2 (B) What are regular expressions (REs), and how are they used in Python for pattern matching? (7)

Q:3 (A) How do you plot graphs in Python using PyLab? Provide an example of creating a simple graph. (7)

Q:3 (B) Explain encryption and decryption in Python. How do classical ciphers like Caesar and Vigenère work? (7)

OR

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Q:3 (A) How does regular expression matching work in Python? Provide examples for matching digits, letters, and spaces. (7)

Q:3 (B) Discuss the security concerns when implementing encryption and decryption algorithms in Python. (7)

Q:4 (A) Explain the concept of scoping in Python. What is the difference between local and global variables? (7)

Q:4 (B) What is encapsulation in object-oriented programming? How does it help in data protection? (7)

OR

Q:4 (A) Define information hiding in Python. How does it differ from encapsulation? Explain the concept of inheritance in Python with an example. (7)

Q:4 (B) How are exceptions handled in Python? Provide an example using try, except, and finally blocks. (7)

Q:5 True/False Attempt any seven out of Twelve (Each carries 2 Marks) (14)

1 Python is a statically typed language where you must define the data type of a variable before using it.

2 In Python, the if statement is used to make decisions based on boolean expressions.

3 A function in Python can return multiple values.

4 Recursion involves a function calling itself directly or indirectly to solve smaller instances of the problem.

5 Tuples in Python are mutable, and their elements can be changed after initialization.

6 Black-box testing focuses on testing the internal logic of a program.

7 Python supports multiple except blocks for catching different types of exceptions.

8 Inheritance allows a class to inherit methods and attributes from another class.

9 Linear search checks each element in a list sequentially to find a match.

10 Regular expressions are used to define search patterns for text manipulation in Python.

11 PyLab is a Python library that combines the functionality of Matplotlib and NumPy for plotting and numerical operations.

12 Encryption and decryption algorithms in Python can only be implemented using third-party libraries, not built-in functions.