

INDIRA UNIVERSITY, PUNE

SCHOOL OF INFORMATION TECHNOLOGY-MSC (CA)

Term End Examination (2025 Pattern) December – 2025 - Semester – I

Subject Name: - Python Programming and Data Structures
Subject Code: 25PCA102T

Max. Marks: 50
Time: 2:30 Hrs.

Instructions

- All Questions are Compulsory.
- Draw neat diagram wherever necessary.

CO #	Cognitive Ability	Course Outcome
CO1	Remember	Recall and describe various data structures (e.g., lists, dictionaries, tuples, and sets) in Python and their applications.
CO3	Apply	Apply Python programming techniques to solve problems using fundamental constructs like data types, operations, conditions, loops, and functions
CO5	Evaluate	Evaluate and compare different methods of solving the same problem using Python, selecting the most efficient or effective approach.
CO6	Construct	Design and implement custom data structures and related algorithms to address complex problem-solving requirements.

Q1.	<p>Attempt any 5 out of 7. (2 marks each) (10 Marks)</p> <p>a) List and explain any two features of Python. b) What is a list in Python? Explain use of indexing in list. c) What is a function? Types of function in Python. d) Define time complexity. What is its use in program development? e) Define queue data structure and how to implement in Python. f) State the code snippet to create a single node. g) What is adjacency matrix? Give an example h) Define BFS and list its application.</p>	CO1
Q2.	<p>Attempt any 4 out of 6. (5 marks each) (20 Marks)</p> <p>a) Explain mutable and immutable data types in Python with examples. b) Construct a Python program to implement stack operations using a list. Do not use library function. c) Construct Python Program having student class to represent a Student with attributes and display method. d) Discover the distinguishing points for linear and binary search algorithms with examples.</p>	CO3

	<p>e) Apply your knowledge for differentiating between stack and queue with examples.</p> <p>f) Develop a Python program to perform inorder traversal of a binary tree.</p>	
Q.3.	<p>Attempt any 2 out of 3. (5 marks each) (10 Marks)</p> <p>a) Construct Python code to implement adjacency list representation.</p> <p>b) Develop a Python program to implement merge sort. Analyze its time complexity.</p> <p>c) Develop a Python code to reverse a linked list without using extra space.</p>	CO5
Q.4	<p>Attempt all questions (10 marks)</p> <p>Write a Python program to convert a given postfix expression into its equivalent infix and prefix expressions using stack implementation. Do not use library function.</p>	CO6
Q.4	<p>OR (10 marks)</p> <p>Write a Python program to represent a directed weighted graph using adjacency list and implement Dijkstra's shortest path algorithm. Analyze the result for given sample input. Do not use library function</p>	CO6
