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**015404**

**August/September 2022**  
**B.Tech. (ENC) 4th SEMESTER**  
**Data Structure using Python (ECP-404)**

Time : 3 Hours]

[Max. Marks : 75

**Instructions :**

1. It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.
2. Answer any four questions from Part-B in detail.
3. Different sub-parts of a question are to be attempted adjacent to each other.

**PART-A**

1. (a) What do you mean by Python programming? (1.5)  
(b) What is data structure? Classify it. (1.5)  
(c) Explain the root, subtree, siblings, path and height of a tree. (1.5)  
(d) Write a simple program on inserting a element in an array of 5 elements using python. (1.5)

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- (e) What do you mean by strings and tuples in Python? (1.5)
- (f) Explain ADT stack. (1.5)
- (g) How a complexity of an algorithm is analyzed? (1.5)
- (h) Differentiate between stack and queue. (1.5)
- (i) How many types of search operations are available in a queue? (1.5)
- (j) Differentiate between sorting and hashing. (1.5)

### PART-B

2. (a) What is a graph? Explain various types of graphs. (7.5)
- (b) Write an algorithm for searching a target on a doubly linked list. (7.5)

3. (a) How will you detect a cycle in a directed as well as in an undirected graph. Explain with the help of an example. (7.5)
- (b) Write a program in python to implement linear linked list, showing all the operations that can be performed on a linked list. (7.5)

4. Explain and write a program in python for bubble sort and merge sort. (15)

5. (a) Explain the logic of using Threaded Binary Tree in data structure. Draw a labelled diagram for working of threaded binary tree. (7.5)
- (b) Create a Heap when the values 100, 200, 10, 30, 60, 90, 80, 300 are entered. (7.5)

6. (a) Explain organization and operation on queue with example. (7.5)
- (b) Explain memory allocation and implementation of arrays in memory. (7.5)

7. Write short note with algorithm on :  
(a) Binary Search Tree.  
(b) Simple and Circular Queue. (15)