

015403

May 2023

B.Tech. (ENL) IV 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) Differentiate in terms of time complexity for linear, binary search and hashing. (1.5)
- (b) Give one difference between $w(n)$ and $o(n)$ time complexity notations. (1.5)
- (c) Give the formula for calculating depth of a binary tree. (1.5)
- (d) How can we calculate the reachability using adjacency matrix? (1.5)
- (e) Give two application of stack. (1.5)

- (f) Write the algorithm for pushing an element on to the top of the stack. (1.5)
- (g) How can we find immediate successor of a node in Binary search tree? (1.5)
- (h) How sequential files are different from direct file organization? (1.5)
- (i) Which data structure is used in BFS and DFS? (1.5)
- (j) What are the conditions for queue to be full in array form? (1.5)

PART-B

- 2. (a) Write a program in python for insertion sort and explain its time complexity. (7.5)
- (b) Explain time complexity notations with the help of examples. (7.5)
- 3. (a) Write an algorithm to delete an element from a queue using array form. Also, write its time complexity. (7.5)
- (b) Write an algorithm to insert an element in a Queue using link list form. Also, write its time complexity. (7.5)
- 4. Explain using algorithm how an element is inserted and deleted in a Heap tree. Using insertion and deletion algorithm sort a one dimensional array. (15)

- 5. (a) Write the algorithm of deletion in a graph using linked list representation. (7.5)
- (b) What is hashing? List some of the popular hash functions in details. (7.5)
- 6. (a) Explain with the help of algorithm how an element can be deleted in a Binary search tree. (7.5)
- (b) Explain DFS algorithm for traversing a graph. (7.5)
- 7. Write Short note on the following :
 - (a) AVL trees.
 - (b) Skip List. (15)