

Roll No.

Total Pages : 04

015404

May 2024

B.Tech. (ENC) (Fourth Semester)

Data Structure Using Python (ECP-404)

Time : 3 Hours]

[Maximum Marks : 75

Note : It is compulsory to answer all the questions (1.5 marks each) of Part A in short. Answer any *four* questions from Part B in detail. Different sub-parts of a question are to be attempted adjacent to each other. The python program should be free from errors.

Part A

1. (a) Discuss the importance of a good hash function in hashing. 1.5
- (b) Compute time complexity (Find n^0 and c) of the following relations using Big Oh notation : 1.5
 $T(n) = 213$, $T(n) = 13n^2 - 3n$, $T(n) = 3n^3 + n^2 + 4n$.
- (c) Derive time complexity of selection sort. 1.5

- (d) Discuss the concept of recursion in programming. Provide an example of a problem that can be solved using recursion.

1.5

- (e) What is the difference between a linked list and an array ? When would you prefer to use one over the other ?

1.5

- (f) What is the time complexity of extracting the minimum element from a heap ?

1.5

- (g) Calculate the time complexity of a binary search algorithm.

1.5

- (h) Explain, what is the limitation of linear queue and how it can be resolved ?

1.5

- (i) Write a code in python to check whether given number is prime or not.

1.5

- (j) Write a program in python that prints the following sequence :

1.5

A

BB

CCC

DDDD

ZZZ.....Z (26 times)

Part B

2. (a) Write a functions in Python to implement insertion and deletion of an item in the beginning in a singly linked list. 7.5
- (b) Implement Binary search in Python language using a subroutine. 7.5
3. (a) Write a Python function to check if a given string is a palindrome or not, considering only alphanumeric characters and ignoring cases. 7.5
- (b) Implement selection sort in Python language. Also calculate its time complexity. 7.5
4. Write a program in Python to create a sorted list L3, to merge two sorted lists L1 and L2. 15
5. (a) Implement deletion from a circular Queue operation using Python. 7.5
- (b) Implement a Python function to perform an in-order traversal of a binary tree. 7.5
6. (a) Write code for subroutine to implement insertion of new value in binary search tree using linked representation. 7.5
- (b) Write a program to implement a function to insertion in Priority Queue. 7.5