**20EC306**

**Hall Ticket Number:**

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| **II/IV B.Tech (Regular) DEGREE EXAMINATION** | | | |
| **March, 2022** | **Electronics and Communication Engineering** | | |
| **Third Semester** | **Data Structures using Python** | | |
| **Time:** Three Hours | | **Maximum:7**0 Marks | |
| *Answer Question No.1 compulsorily.* | | | (14X1 = 14 Marks) |
| *Answer ONE question from each unit.* | | | (4X14=56 Marks) |
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| 1. | a) | | Why python is called dynamic typed language? | CO1 |  |
|  | b) | | Define Data Structure. What are different operations that can be performed on a data structure? | CO1 |  |
|  | c) | | Give an example for low level array in python. | CO1 |  |
|  | d) | | Define a linked list. | CO2 |  |
|  | e) | | List out any two applications of queue. | CO2 |  |
|  | f) | | Define Deque and give an example. | CO2 |  |
|  | g) | | What are the properties of a binary tree? | CO3 |  |
|  | h) | | Construct binary tree for the elements 10,20,None, 30,None,40,50,60,None,70 using arrays. | CO3 |  |
|  | i) | | Define degree of a node in a tree. | CO3 |  |
|  | j) | | Write recursive logic for pre order traversal in a tree. | CO3 |  |
|  | k) | | Define Graph data structure. | CO4 |  |
|  | l) | | What is complete graph? | CO4 |  |
|  | m) | | Differentiate Tree and Graph data structures. | CO4 |  |
|  | n) | | What are the data structures that are used in BFS and DFS graph traversal techniques. | CO4 |  |
| **Unit - I** | | | | | |
| 2. | a) | Explain different control flow statements in python with suitable examples. | | CO1 | 7M |
|  | b) | What is the use of generator? Write a Python program that implement generator for finding factors of a given number. | | CO1 | 7M |
| **(OR)** | | | | | |
| 3. | a) | Illustrate how to implement dynamic array in python. | | CO1 | 7M |
|  | b) | Write a Python program that contains a function returning first ‘N’ Fibonacci numbers. | | CO1 | 7M |
| **Unit - II** | | | | | |
| 4. | a) | Explain single, double and circular linked list with a suitable example. | | CO2 | 7M |
|  | b) | Write a Python program to reverse data in a file using stack. | | CO2 | 7M |
| **(OR)** | | | | | |
| 5. | a) | Explain implementation of Stack using linked list in python. | | CO2 | 7M |
|  | b) | Implement queue with a circularly linked list. | | CO2 | 7M |
| **Unit - III** | | | | | |
| 6. | a) | Write a Python program to create a binary tree using linked list. | | CO3 | 7M |
|  | b) | Write a Python program to create binary tree using arrays. | | CO3 | 7M |
| **(OR)** | | | | | |
| 7. | a) | Construct a Binary Search Tree for the following elements: 10,12,11,15,5,8,7,6. Write Pre-order, In-order and post-order traversals for the above binary search tree. | | CO3 | 7M |
|  | b) | Write an algorithm to search an element from a binary search tree. | | CO3 | 7M |
| **Unit - IV** | | | | | |
| 8. | a) | Explain different ways for representing a graph in memory. | | CO4 | 7M |
|  | b) | Write a Python program to create following graph using graph ADT. | | CO4 | 7M |
| **(OR)** | | | | | |
| 9. | a) | Differentiate BFS and DFS graph traversal techniques. | | CO4 | 6M |
|  | b) | Write an algorithm for breadth first search graph traversal and simulate with an example. | | CO4 | 8M |

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