**20EC306**

**Hall Ticket Number:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **II/IV B.Tech (Regular/Supplementary)DEGREE EXAMINATION** | | | |
| **January, 2024** | **Electronics and Communication Engineering** | | |
| **Third Semester** | **Data Structures Using Python** | | |
| **Time:** Three Hours | | **Maximum:** 70 Marks | |
| *Answer Question No.1 compulsorily.* | | | (1X14 = 14 Marks) |
| *Answer ONE question from each unit.* | | | (4X14=56 Marks) |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1. | | Answer all questions. | | |  | (14X1=14 Marks) | | | |
|  | | a) | | What is a generator? | CO1 | | L2 | 1M |
|  | | b) | | What is an object? | CO1 | | L1 | 1M |
|  | | c) | | What is meant by dynamic array? | CO1 | | L1 | 1M |
|  | | d) | | Write the difference between list and tuple. | CO1 | | L2 | 1M |
|  | | e) | | Differentiate stack and queue. | CO2 | | L2 | 1M |
|  | | f) | | What is meant by double ended queue? | CO2 | | L1 | 1M |
|  | | g) | | Write the applications of stack. | CO2 | | L3 | 1M |
|  | | h) | | Mention the names of insertion and deletion operations in queue. | CO2 | | L2 | 1M |
|  | | i) | | What is a complete binary tree? | CO3 | | L1 | 1M |
|  | | j) | | List the properties of binary search tree. | CO3 | | L1 | 1M |
|  | | k) | | Define AVL Tree. | CO3 | | L1 | 1M |
|  | | l) | | List out any two applications of graphs. | CO4 | | L3 | 1M |
|  | | m) | | Write the difference between BFS and DFS. | CO4 | | L2 | 1M |
|  | | n) | | Define spanning tree. | CO4 | | L1 | 1M |
| **UNIT I** | | | | | | | | |
| 2. | a) | | Explain different types of operators available in Python. | | CO1 | | L1 | 7M |
|  | b) | | Write a Python program to display the list elements using iter() and next(). | | CO1 | | L2 | 7M |
| **(OR)** | | | | | | | | |
| 3. | a) | | Explain about referential arrays and compact arrays. | | CO1 | | L3 | 7M |
|  | b) | | Write a python program to check given string is palindrome or not. | | CO1 | | L1 | 7M |
| **UNIT II** | | | | | | | | |
| 4. | a) | | Explain about push and pop operations of stack using array. | | CO2 | | L2 | 7M |
|  | b) | | Write a python program to implement queue using linked list. | | CO2 | | L3 | 7M |
| **(OR)** | | | | | | | | |
| 5. | a) | | Explain the implementation of dequeue with a collections module. | | CO2 | | L1 | 7M |
|  | b) | | Write a python program to create a single linked list. | | CO2 | | L3 | 7M |
| **UNIT III** | | | | | | | | |
| 6. | a) | | What is a Binary Tree? How do you represent a binary tree? | | CO3 | | L1 | 7M |
|  | b) | | Explain the rotations of AVL tree to keep itself balanced with example. | | CO3 | | L3 | 7M |
| **(OR)** | | | | | | | | |
| 7. | Briefly explain about binary search tree and write a python program to create BST. | | | | CO3 | | L3 | 14M |
| **UNIT IV** | | | | | | | | |
| 8. | a) | | Explain about adjacency list structure and adjacency matrix structure of a graph. | | CO4 | | L1 | 7M |
|  | b) | | Write a python program to create directed graph using graph ADT. | | CO4 | | L3 | 7M |
| **(OR)** | | | | | | | | |
| 9. | a) | | Explain DFS algorithm to traverse a graph. | | CO4 | | L2 | 7M |
|  | b) | | Let G be an undirected graph whose vertices are the integers 1 through 8, and let the adjacent vertices of each vertex be given by the table below:   |  |  | | --- | --- | | vertex | adjacent vertices | | 1 | (2, 3, 4) | | 2 | (1, 3, 4) | | 3 | (1, 2, 4) | | 4 | (1, 2, 3, 6) | | 5 | (6, 7, 8) | | 6 | (4, 5, 7) | | 7 | (5, 6, 8) | | 8 | (5, 7) |   Assume that, in a traversal of G, the adjacent vertices of a given vertex are returned in the same order as they are listed in the table above.  (i) Draw G.  (ii) Give the sequence of vertices visited using a BFS traversal starting at vertex 1. | | CO4 | | L3 | 7M |

****