SYIT/SEM III/REG/DS

Time: 2½ hrs. **Marks:75**

Note:
1. All questions are compulsory with internal choice.
2. Draw neat diagrams wherever necessary.
3. Figures to the right indicate full marks.

Q.1 **Answer the following (Any Three)** **(15)**

(a) What do you understand by best, worst, average case analysis of algorithm.
(b) Define Data Structure. Explain classification of data structures in detail.
(c) Define Array. How Array is declared in C++? Write algorithm/code snippet(C/C++) for inserting an element into Array.
(d) Write algorithm/code snippet(C/C++) for linear search on Array.
(e) Write algorithm/code snippet(C/C++) for binary search on an Array.
(f) What is algorithm? Explain characteristics of algorithm.

Q.2 **Answer the following (Any Three)** **(15)**

(a) What is Sparce Matrix? How Sparce Matrix is represented using Linked List?
(b) Define Linked List. Explain the representation of polynomials using Linked List.
(c) Differentiate between Singly and Doubly Linked List.
(d) Write an algorithm/code snippet(C/C++) to append node in Doubly Linked List.
(e) Write an algorithm/code snippet(C/C++) to delete specific node from Singly Linked List.
(f) Write an algorithm/code snippet(C/C++) to traverse Doubly Linked List in forward and backward direction.

Q.3 **Answer the following (Any Three)** **(15)**

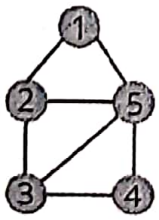
(a) What is Stack in Data Structure? Explain important terminologies used in Stack along with example.
(b) Define Queue in Data Structure. Explain types of Queues.
(c) What is Recursion? Explain recursion to find factorial of number in detail.
(d) Write an algorithm/code snippet(C/C++) for dequeue on Linear Queue.
(e) Write an algorithm/code snippet(C/C++) for evaluation of postfix expression using Stack.
(f) Write an algorithm/code snippet(C/C++) for enqueue on Circular Queue.

Q.4 **Answer the following (Any Three)** **(15)**

(a) What is AVL Tree? Explain different types of rotation in AVL Tree with example.
(b) Explain Heap as a Data Structure. Build a Max Heap by using the following data arriving as a sequential set 23, 7, 92, 6, 12 14, 40, 44, 20, 21.
(c) Write an algorithm/code snippet(C/C++) to create Binary Search Tree. Construct BST for the following elements in sequence:
47,12,75,90,7,57,1,85
(d) Write an algorithm/code snippet(C/C++) for insertion sort.
(e) Write an algorithm/code snippet(C/C++) for bubble sort.
(f) What is Binary tree? Explain different tree traversal methods with example.

Q.5 **Answer the following (Any Three)** **(15)**

(a) Write an algorithm for BFS. Write BFS and DFS for given Graph.



(b) Define Hashing. What is collision in Hash Table? Explain separate chaining.

(c) Write a note on Spanning Tree.

(d) What is shortest path problem? Write Floyd Warshall algorithm for finding shortest path between all the pairs of vertices.

(e) Explain different representation of Graph with example?

(f) Define Graph. Explain different types of Graphs.

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