

Seat No. : _____

MB-111

March-2019

B.C.A., Sem.-III

CC-202 : Data Structures
(Old & New Course)

Time : 2:30 Hours]

[Max. Marks : 70

1. (A) Answer the following :

- (1) Define data structure. Give its classification with example. 7
- (2) What is a prerequisite to implement Binary search ? Write algorithm for Binary search. 7

OR

- (1) List various sorting methods. Explain bubble sort with example.
- (2) What is a linked list ? Explain types of linked list with its representation and example.

(B) Attempt any **four** :

- (1) _____ are used to manipulate data contained in the data structure. 4
 - (a) Algorithms
 - (b) Programs
 - (c) Array
 - (d) None of these
- (2) First node in a linked list is known as _____ :
 - (a) PTR
 - (b) START
 - (c) END
 - (d) STOP
- (3) _____ means sorting two sub-arrays recursively using merge sort.
 - (a) Divide
 - (b) Conquer
 - (c) Combine
 - (d) None of these
- (4) In a bubble sort method for sorting N elements, _____ passes are required.
 - (a) N
 - (b) N - 1
 - (c) N + 1
 - (d) 2N
- (5) A _____ matrix has relatively few non-zero elements.
 - (a) Unit
 - (b) Binary
 - (c) Linear
 - (d) Sparse
- (6) _____ Data structure has fixed size.
 - (a) Array
 - (b) Linked List
 - (c) Tree
 - (d) Graph

2. (A) Answer the following :

(i) List various notations of stack. Convert following infix expression into postfix.

$$(A + B) * C - (D - E) * (F + G) \quad 7$$

(ii) What is queue ? List and explain different types of queue. 7

OR

(i) What is stack ? Explain stack operations. Draw stack structure of each case when following operations are performed on an empty stack.

Add A, B, C

Delete Top element

Add D

Add E

(ii) Write an algorithm to insert an element in a circular queue.

(B) Attempt any **four** :

4

(1) Prefix expression of infix $(A + B) - (C * D)$ is _____.

- (a) $-+AB * CD$ (b) $-AB + CD*$
(c) $-*CD + AB$ (d) None of these

(2) Stack is also called _____ data structure.

- (a) LIFO (b) FILO
(c) FIFO (d) LILO

(3) A line in a grocery store represents

- (a) Array (b) Linked List
(c) Stack (d) Queue

(4) An _____ allows insertion to be done at only one end, while deletion operation to be done at both the ends.

- (a) Input Restricted Dequeue
(b) Output Restricted Dequeue
(c) Both (a) & (b)
(d) None of these

(5) _____ operation deletes an element from stack.

- (a) Push (b) Pop
(c) Peep (d) Display

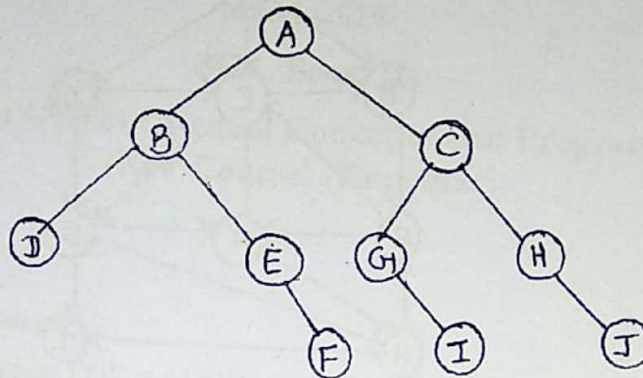
(6) Elements can be deleted at the _____ of the queue.

- (a) Top (b) Front
(c) Bottom (d) None

3. (A) Answer the following :

- (1) Define Tree and Binary tree. Give in-order, pre-order and post-order for the following Binary tree.

7



- (2) Explain Binary Search Tree in detail. Draw BST for the following data.
30, 25, 45, 27, 40, 100, 10, 68, 18, 76.

7

OR

- (1) Write a short note on AVL tree with its types and rotations.
(2) Explain heap tree with its types and example.

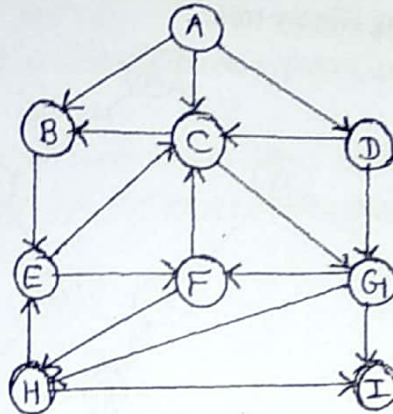
(B) Attempt any **three**.

3

- (1) Tree is _____ data structure.
(a) Linear (b) Non-linear
(c) Primitive (d) None of these
- (2) When new node is inserted in the right sub-tree of the critical node, then __ rotation is done.
(a) LL (b) RR
(c) LR (d) RL
- (3) In a _____, all leaf nodes are at the same level.
(a) BST (b) MST
(c) B-Tree (d) Threaded Binary Tree
- (4) The sequence for post-order traversal is _____.
(a) Root-Left-Right (b) Left-Root-Right
(c) Left-Right-Root (d) None of these
- (5) The nodes with no successor are called _____.
(a) End nodes (b) Final nodes
(c) Terminal nodes (d) Last nodes

4. (A) Answer the following :

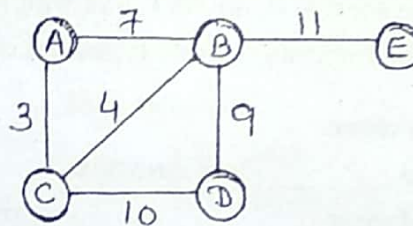
- (1) Consider the given graph G to find out its depth first traversal scheme. Consider node H as a starting node.



- (2) What is Graph ? Give its representation with proper example.

OR

- (1) Write a note on Dijkstra's algorithm.
 (2) What is MST ? Find MST for the following graph using Prim's algorithm.



(B) Attempt any **three**.

- (1) A _____ is collection of vertices and edges.
 (a) Graph (b) Tree
 (c) Source (d) Array
- (2) The term optimal means _____.
 (a) Shortest (b) Cheapest
 (c) Fastest (d) All of above
- (3) _____ algorithm is an example of greedy algorithm.
 (a) Prim's (b) Dijkstra's
 (c) Kruskal's (d) None of these
- (4) MST stands for _____.
 (a) Maximum Span Tree (b) Minimum Spanning Tree
 (c) Multi Spanning Tree (d) My Span Tree
- (5) Total numbers of edges containing the node u are called _____.
 (a) Degree (b) In-degree
 (c) Out-degree (d) None of these