

**University of Mumbai**  
**Examinations Summer 2022**

Time: 2 hour 30 minutes

Max. Marks: 80

<b>Q1.</b>	<b>Choose the correct option for following questions. All the Questions are compulsory and carry equal marks</b>
1.	Process of inserting an element in stack is called
Option A:	Create
Option B:	Push
Option C:	Evaluation
Option D:	Pop
2.	Consider the usual algorithm for determining whether a sequence of parentheses is balanced. The maximum number of parentheses that appear on the stack AT ANY ONE TIME when the algorithm analyzes: $((()())())$ ?
Option A:	1
Option B:	2
Option C:	3
Option D:	4 or more
3.	Which of the following statements is true?
Option A:	Recursion is always better than iteration
Option B:	Recursion uses more memory compared to iteration
Option C:	Recursion uses less memory compared to iteration
Option D:	Iteration is always better and simpler than recursion
4.	The number of elements in the adjacency matrix of a graph having 7 vertices is
Option A:	7
Option B:	14
Option C:	36
Option D:	49
5.	In a max-heap, element with the greatest key is always in the which node?
Option A:	Leaf node
Option B:	First node of left sub tree
Option C:	root node
Option D:	First node of right sub tree
6.	_____ can be found used to find a minimum spanning tree.
Option A:	Prim's Algorithm
Option B:	Breadth First
Option C:	Dijkstra's Algorithm
Option D:	Flloyd Warshal Algorithm
7.	Which data structure is required to evaluate a postfix expression
Option A:	Stack
Option B:	Queue
Option C:	Array
Option D:	Linked-list
8.	A binary tree in which if all its levels except possibly the last, have the maximum number of nodes and all the nodes at the last level appear as far left as possible, is called
Option A:	Threaded tree

Option B:	Full binary tree
Option C:	Binary Search Tree
Option D:	Complete binary tree
9.	The number of edges from the root to the node is called _____ of the tree.
Option A:	Height
Option B:	Depth
Option C:	Length
Option D:	Width
10.	Which of the following is not a collision resolution technique?
Option A:	Rehashing
Option B:	Clustering
Option C:	Linear Probing
Option D:	Quadratic Probing

<b>Q2.</b> <b>(20 Marks)</b>	<b>Solve any Two Questions out of Three</b> <b>10 marks each</b>
A	Explain Doubly ended queue. Explain the variants of Doubly ended queue.
B	Explain BFS algorithm using an example of your own.
C	Write an algorithm to implement circular linked list.

<b>Q3.</b> <b>(20 Marks)</b>	<b>Solve any Two Questions out of Three</b> <b>10 marks each</b>
A	Find the Minimum spanning tree for the graph shown in figure 1 using Prim's and Kruskal's algorithm by showing all the intermediate steps. <div data-bbox="778 1144 1056 1364" data-label="Diagram"> </div>
B	Explain different collision resolution techniques. Insert the following sequence of keys in the hash table with a size of 10 using linear probing {18, 89, 21, 58, 68, 11}
C	Explain Heap sort with the help of an example.

<b>Q4.</b> <b>(20 Marks)</b>	<b>Solve any Two Questions out of Three</b> <b>10 marks each</b>
A	What are different tree traversal methods? Create a binary search tree for 16, 70, 10, 30, 75, 5, 12, 9 and traverse the tree in in-order, pre-order and post-order.
B	Create a B-tree of order 4 with the following keys: 60, 70, 75, 51, 52, 65, 68, 77, 78, 79
C	Write an algorithm to convert infix to postfix expression.