HI TECH INSTITUTE OF ENGINEERING AND TECHNOLOGY ,GHAZIABAD

Hi-Tech Institute of Engineering & Technology
DEPARTMENT OF COMPUTER APPLICATION
Course- MCA.
(SEM-2) EVEN SEMESTER Model paper- 2

Subject Code: KCA-205 **Subject Name: Data Structures & Analysis of Algorithms**
Time: 3: 00 Hours **Total Marks: 100**
Note: 1. Attempt all Sections. If require any missing data, then choose suitably.

SECTION-A

1. Attempt all question in brief. **2x 10 = 20**

Q.No	Question	Marks	CO
a.	Discuss the limitation of array.	2	1
b.	Write a short note on Sparse Array with example?	2	1
c.	What are the 3 different ways in which priority queue can be implemented?	2	2
d.	What do you mean by recursion? Give some examples.	2	2
e.	Can we apply binary search on unsorted array?	2	3
f.	Explain the term Adjacency Matrices in graph with an example.	2	3
g.	What do you mean by Threaded Binary tree? Give an example.	2	4
h.	What do you mean by Binary Search Tree? Explain with example.	2	4
i.	Explain the term Dynamic programming. Give some Examples.	2	5
j.	Write the Prim's algorithm for Minimum spinning tree with example.	2	5

SECTION-B

2. Attempt any three of the following: **10x3 =30**

Q.No	Question	Marks	CO
a.	What do you mean by single linked list? Explain its all operations.	10	1
b.	Write a function or algorithm to implement enqueue and dequeue operations on circular queue.	10	2
c.	What do you mean by Counting sort? Give an example for justification.	10	3
d.	Draw B-Tree of order 3 by inserting following keys in empty tree- { 78, 52, 81, 40, 33, 90, 85, 20, 38}.	10	4
e.	Discuss the function to implement merge sort. What is the time and space complexity of the algorithm.	10	5

SECTION-C

3. Attempt any ONE part of the following: **10x1 = 10**

Q.No	Question	Marks	CO
a.	Define header linked list. Write a function to perform insertion at end in a singly linked list.	10	1
b.	What is data Structure? Explain different types of Data structure.	10	1

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4. Attempt any ONE part of the following: **10x1 = 10**

Q.No	Question	Marks	CO
a.	What is Tower of Hanoi problem? Explain the solutions of Tower of Hanoi problem using recursion where number of disks n=3 and towers are A, B, and C.	10	2
b.	Explain the term Fibonacci numbers with a suitable example.	10	2

5. Attempt any ONE part of the following: **10x1 = 10**

Q.No	Question	Marks	CO
a.	How the graph can be traversed using Depth First Search (DFS). Give an Example.	10	3
b.	Write the algorithm of Bubble sort with an suitable example.	10	3

6. Attempt any ONE part of the following: **10x1 = 10**

Q.No	Question	Marks	CO
a.	Insert the following element in empty AVL tree- { 45, 55, 65, 75, 80, 90, 100, 110, 120, 130, 40, 35, 25, 20, 15, 10, 5 }	10	4
b.	Construct a binary tree when Pre-order and In-order are given as- Pre-order: 1,2,4,3,5,7,8,6 and In-order:- 4,2,1,7,5,8,3,6	10	4

7. Attempt any ONE part of the following: **10x1 = 10**

Q.No	Question	Marks	CO
a.	Perform the Quick Sort on the following data items stored in single dimensional array: { 6,9,5,8,7,4,3,1,2,0}. Also discusses its time complexity.	10	5
b.	What do you mean by Kruskal's algorithm? Explain with an example.	10	5