

Duration: 3hrs

[Max Marks:80]

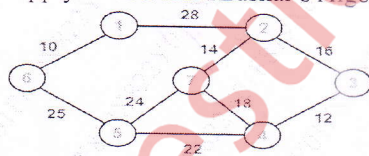
- N.B.: (1) Question No 1 is Compulsory.
 (2) Attempt any three questions out of the remaining five.
 (3) All questions carry equal marks.
 (4) Assume suitable data, if required and state it clearly.

- 1 Attempt any **FOUR** [20]
 a Differentiate between static and dynamic arrays with proper declarations. [5]
 b Compare Linked List vs Array based on memory usage, operations, and flexibility. [5]
 c Convert the following infix expression to postfix and prefix: $(A + B) * (C - D) / E$. [5]
 d Define the any five tree terminologies with examples. [5]
 e Discuss the advantages and disadvantages of Linear Search and Binary Search [5]
 f Explain the working of a circular queue with its advantages over a linear queue.

- 2 a Write a program to check the well-formedness of parentheses in an expression using Stacks. [10]
 b Construct a binary search tree using the given sequence and perform inorder, preorder, and postorder traversals. Elements: 45, 28, 34, 63, 87, 76, 31, 11, 50, 17 [10]

- 3 a Explain the concept of hashing and implement linear probing to store the following values in a hash table of size 10: 15, 26, 32, 45, 78, 99, 85, 66, 55 [10]
 b Write an algorithm to sort an array using Quick Sort and illustrate it with an example. [10]

- 4 a Explain Doubly Linked Lists (DLL) with operations: Insertion, Deletion, and Traversal. [10]
 b Apply Prim's and Kruskal's Algorithm on the following graph: [10]



- 5 a Write a C program to implement a stack using a linked list and perform push and pop operations. [10]
 b Explain Expression Trees and construct an expression tree for: $(2A + 5B)^3 (X - 7Y)^4$ [10]

- 6 a Given the following processes with their respective burst times and a time quantum of 3 ms, compute the completion time, turnaround time, and waiting time for each process using the Round Robin scheduling algorithm. Also, draw the Gantt chart for the scheduling. [10]

Process	Burst Time (ms)
P1	5
P2	7
P3	3

- b Describe Performance characteristics of algorithm. Also explain Asymptotic Analysis and Notations. [10]
