

(Time: 3 hours)

Total marks: 80

Note:

1. Q1 is compulsory
2. Attempt any Three from remaining Five questions

**Q.1(a)** Given a set of symbols & corresponding frequency table as below explain the steps to find the Huffman's code. **10**

P	Q	R	S	T	U	V	W	X
24	18	7	10	13	22	8	12	6

- (b) Define Binary search tree? Write an algorithm for the following. **10**
1. Find smallest number
  2. Search an element.

**Q.2(a)** Define Singly linked list. Write the algorithms for **10**

- i. Insert an element into singly linked list
- ii. Delete the element from singly linked list.

- (b) Define Heap .State and explain it's types. Construct a Max heap for the following array of numbers. **10**
- 35, 28, 33, 45, 33, 54, 12, 20, 65

**Q.3(a)** Define Expression tree? Draw an expression tree for the following expression and also Write it's prefix and postfix traversal. **10**

$((P/Q) + (M+N)) / (Y*Z)$

- (b) Define Collision in hashing list. Implement hashing with modulo division (listsize=11) and key offset method for following keys: 23, 54, 35, 79, 80 and 102 . **10**

**Q.4(a)** Define Binary tree? Explain types of Traversal of Binary tree. Reconstruct the binary tree using following traversal **10**

**Inorder: D B F E G A C I H**

**Preorder: A B D E F G C H I**

**After construction also write post- order traversal of the binary tree .**

- (b) Define linear queue with functions possible on queue. Explain circular queue. **10**

**Q.5(a)** Define B-tree and B\* tree. Build a B-tree of order 4 by inserting the data in the sequence **10**

41 13 65 7 75 26 39 88 55 14 22 62 19 32 50

- (b) Explain difference between:  
i. Sequential search and Binary Search  
ii. Stack and Queue

10

- Q.6(a)** Write algorithm for Insertion sort. Implement insertion sort for following list. Show the tracing for passes.  
34, 89, 85, 30, 45, 50, 28, 25

10

- (b) Explain types of Graph. Find out Minimum spanning tree using Prim's algorithm.

10

