

(3 Hours)

[ Total Marks : 80

**N.B. :** (1) Question No. 1 is **compulsory**.(2) Attempt any **three** questions out of remaining **five** questions.(3) Make **suitable** assumptions wherever **necessary** but **justify** your assumptions.(4) **Figures** to the **right** indicate **full** marks.

1. (a) Explain linear and non-linear data structures with examples. 5  
 (b) Explain various techniques of graph representations. 5  
 (c) Write a 'C' program to convert decimal to binary using any appropriate data structure you have studied. 7  
 (d) Define ADT with an example. 3
2. (a) What is Huffman Coding. Construct the Huffman Tree and determine the code for the following characters whose frequencies are as given :- 10

Characters	A	B	C	D	E
Frequency	20	10	10	30	30

- (b) Write a program in 'C' to evaluate a postfix expression. 10
3. (a) Write a program in 'C' to implement a circular queue. The following operations should be performed by the program :- 12
- Creating the queue.
  - Deleting from the queue.
  - Inserting in the queue.
  - Displaying all the elements of the queue.
- (b) Sort the following elements using Radix Sort :- 8
- 121, 70, 965, 432, 12, 577, 683.

What is the limitations of Radix Sort?

TURN OVER

**Con. 8613 - GX-12113-13.**

**2**

4. (a) Write a 'C' program to create a "Single Linked List" ADT. The ADT should support the following functions :- **12**
- (i) Creating a Linked List.
  - (ii) Inserting a node after a specific node.
  - (iii) Deleting a node.
  - (iv) Displaying the list.
- (b) Explain various graph traversal techniques with examples. **8**
5. (a) Discuss AVL trees. Insert the following elements in a AVL search tree :- **10**  
27, 25, 23, 29, 35, 33, 34
- (b) Using linear probing and quadratic probing insert the following values in a hash table of size 10. Show how many collisions occur in each technique :- **10**  
99, 33, 23, 44, 56, 43, 19
6. (a) Explain indexed sequential search with a suitable example. What are the advantages and disadvantages of indexed sequential search? **10**
- (b) Write a program in 'C' for deletion of a node from a Binary Search Tree. The program should consider all the cases. **10**

-----