

Duration: 3 hrs

Total Marks: 80

- N.B: (1) Question No. 1 is Compulsory
(2) Attempt any **three** questions of the remaining **five** questions
(3) **Figures** to the **right** indicate **full** marks
(4) Make suitable assumptions wherever necessary with proper justifications

1. (a) What is a data structure? Explain with examples. (05)
(b) What are the advantages of using dynamic memory allocation over static memory allocation? (05)
(c) Describe Multiway Search Tree with an example. (05)
(d) Write a function in C to implement Shell Sort. (05)
2. (a) Discuss file I/O operations in C programming language. (10)
(b) Explain sparse matrix as application of linked list with examples. (10)
3. (a) How can we use the QUEUE data structure for simulation? Explain with an example. (10)
(b) Write a function to implement Radix Sort. Sort the following numbers using Radix Sort:
25, 10, 68, 19, 75, 43, 22, 31, 11, 59. Show output after each pass. (10)
4. (a) Write a C program to implement a Circular Linked List which performs the following operations: (12)
 - (i) Inserting element in the beginning
 - (ii) Inserting element in the end
 - (iii) Inserting element after an element
 - (iv) Deleting a particular element
 - (v) Displaying the list
(b) Apply Huffman Coding for the word "MALAYALAM". Give the Huffman code for each symbol. (08)
5. (a) Explain any one application of stack with an example. (08)
(b) Write a program in C to delete a node from a Binary Search Tree. The program should consider all the possible cases. (12)
6. (a) Write a program in C to implement the BFS traversal of a graph. Explain the code with an example. (10)
(b) Hash the following in a table of size 11. Use any two collision resolution techniques: (10)
23, 55, 10, 71, 67, 32, 100, 18, 10, 90, 44.
