S.E. Sem 4 Data Structures and Algorithms 02/12/08

227 : TIIndHf-1108 I. T.

Con. 5023-08. RC-6113

(3 Hours) [Total Marks : 100

N.B. (1) Question No. 1 is **compulsory**.
(2) Attempt any **four** questions out of remaining **six** questions.
(3) Assume **suitable** data wherever **required**.
(4) **Figures** to **right** indicate **full** marks.

1. Explain the following concepts :— **20**
   (a) B trees
   (b) Complexity of algorithm
   (c) Backtracking
   (d) Binary search technique

2. (a) Explain the stack data structure along with ADT and write a program to implement 2 stacks in an array. **10**
   (b) Write a program to implement merge sort. Give its complexity for all cases. **10**

3. (a) Write a program to implement Queue using linked list with following operations :— **8**
      (i) Insert into queue
      (ii) Delete from queue
      (iii) Display queue
   (b) Write a program to implement circular linked list with following operations :— **12**
      (i) Create list
      (ii) Insert after an element x
      (iii) Delete an element x
      (iv) Search an element x

4. (a) What are different ways graphs can be represented ? Explain with examples. **6**
   (b) Give Algorithm for BFS and DFS Graph traversal techniques. **8**
   (c) Construct Binary search tree for the following numbers and display the tree using all the 3 traversal techniques. **6**
   12 5 10 4 25 35 40 8 50 7 9 11 55 15.

5. (a) Provide the equivalent "Huffman code" for the following :—

Char	a	b	c	d	e	f
Frequency	13	9	12	45	16	10

   (b) Sort the following number using insertion sort. Show the output of each pass. **6**
   23 80 50 09 35 65 18 25 5 30 6
   (c) Explain hashing and its various methods. **8**

6. (a) What are the different methods of file I/O in C language ? What are the different library functions supported by C language to do the same. **10**
   (b) Explain indexed sequential searching with example. **6**
   (c) Explain the macros in 'C' Language. **8**

7. Write short notes on any **four** :— **20**
   (a) Greedy method
   (b) Dynamic programming
   (c) Recursion
   (d) Divide and conquer
   (e) Collision Handling techniques
   (f) Tower of Hanoi.