Roll No. □□□□□□□□□□□□ **Total No. of Pages : 02**

Total No. of Questions : 18

B.Tech. (CSE)/(IT) (2012 to 2017)

(Sem.–3)

DATA STRUCTURES

Subject Code : BTCS-304

M.Code : 56594

Time : 3 Hrs. **Max. Marks : 60**

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students has to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students has to attempt any TWO questions.**

SECTION-A

Write Briefly :

1. Differentiate between Stack and Queue.

2. What are the circular queues and their use?

3. Why it is necessary to analyze an algorithm?

4. Define Priority Queue.

5. How heaps are represented in memory?

6. What is data structure for graphs?

7. What are AVL trees?

8. Define Sparse Matrices.

9. What is the purpose of garbage Collection?

10. What is sorting and searching?

SECTION-B

11. Write an algorithm to implement Quick sort.

12. Are B trees of order 2 are full binary trees? If yes, explain how.

13. Make a binary search tree by considering the following eight numbers :

    55, 34, 41, 24, 74, 38, 65, 49

14. Write an Algorithm to traverse a graph using Breadth First Search.

15. Build a heap H from the following list of numbers :

    42, 35, 5, 8, 34, 56, 70, 32

SECTION-C

16. Consider an array: 99, 2, 34, 17, 75, 12 Depict the state of the array after each pass if selection sort is applied.

17. Suppose a binary tree T is in memory. Write non-recursive procedure for each of the following :

    a) Finding the number of nodes in T.

    b) Finding the depth D of T.

    c) Find the number of terminal nodes in T.

18. a) Suppose weighted graph G is maintained in memory by a node array DATA and weight matrix W as follows :

$$W = \begin{bmatrix} 0 & 0 & 3 & 0 \\ 5 & 0 & 1 & 7 \\ 2 & 0 & 0 & 4 \\ 0 & 6 & 8 & 0 \end{bmatrix}$$

Draw the picture of G.

b) Write an algorithm to delete an node from linked list.