Code: 15A05201 **SS**

B.Tech II Year I Semester (R15) Supplementary Examinations June 2017

DATA STRUCTURES

(Computer Science & Engineering)

Time: 3 hours Max. Marks: 70

PART – A

(Compulsory Question)

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1 Answer the following: (10 X 02 = 20 Marks)

(a) Define θ notation.

(b) Write the procedure for deleting an element from the list.

(c) Convert ((A + B) * C - (D - E)) $ (F + G) to postfix and prefix notation.

(d) What are the limitations of linear queue? How they can be rectified?

(e) What is complete binary tree?

(f) What are the conditions for a graph to become a tree?

(g) What is the time complexity of exchange sort?

(h) Consider a situation where swap operation is very costly. Which sorting algorithm should be preferred so that the number of swap operations are minimized in general?

(i) What is the recurrence relation for worst case of Binary Search?

(j) Consider a hash table with 100 slots. Collisions are resolved using chaining. Assuming simple uniform hashing, what is the probability that the first 3 slots are unfilled after the first 3 insertions.

PART – B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

2 What are the asymptotic notations used? Explain.

OR

3 Write an algorithm to insert an element into a link list implemented by using arrays (assume already a linked list is in array is available which is available in alphabetical order).

UNIT – II

4 Show the detail content of the STACK for the evaluation of the following expression?

623 + -382 / + * 2$3+

OR

5 Implement a queue so that each element of a queue holds a list of integers. Write the functions add Q and remove Q from such queue.

UNIT – III

6 Write a recursive program to perform in-order and post-order traversal of a binary tree.

OR

7 Write and explain Dijkstra algorithm for finding shortest path. Give an example.

UNIT – IV

8 Construct a procedure to sort N numbers using heap sort and construct a heap for the given values:

97, 53, 59, 25, 42, 50, 30, 15, 23, 32.

OR

9 Write an algorithm for merge sort. State the complexity to sort n numbers.

UNIT – V

10 Modify the binary search algorithm so that in case of unsuccessful search it returns the index i such that k(i)<key<k(i+1).

OR

11 Write a program to implement extendible hashing. If the table is small enough to fit in main memory, how does its performance compare with open and closed hashing?