

END TERM EXAMINATION

THIRD SEMESTER [B.TECH] DECEMBER 2015-JANUARY 2016

Paper Code: ETCS-209	Subject: Data Structures
Time: 3 Hours	Maximum Marks: 75
Note: Attempt any five questions including Q.no.1 which is compulsory.	

- Q1 (a) What does it mean to say that a "graph G is connected" and what does it mean to say that "graph is strongly connected"?
 (b) Define B Tree with example.
 (c) What is complexity of selection sort and insertion sort for average case?
 (d) What are the various Graph traversal techniques? Explain.
 (e) Define infix expression and postfix expression with example. Mention its advantage. **(5x5=25)**

- Q2 (a) Write an algorithm/program which convert a postfix express to a prefix expression. Give one example. **(6)**
 (b) Write an implementation of the Queue Abstract Data Type using two stacks. Write algorithm for Enqueue and Dequeue operations. **(6.5)**

- Q3 Draw Tree with following information: **(12.5)**
 Preorder: G, B, Q, A, C, K, F, P, D, E, R, H
 Inorder: Q, B, K, C, F, A, G, P, E, D, H, R
 Find Postorder of the above Tree.

- Q4 Define Bubble sort and Quick sort with example. Which one is better if data set is small? **(12.5)**

- Q5 Suppose you have an AVL Node class that stores integers: **(12.5)**

```
Public class AVLNode {
Public int item; public AVLNode left;
Public AVLNode right;
Public AVLNode (int i, AVLNode l, AVLNode r)
item = i; left = l; right = r; ;}
```

Write a complete method that takes a height h, and returns a reference to the roof of an AVL tree of height h that contains the minimum number of nodes. The integers stored in the nodes (the item instance variables) should satisfy the binary search tree property, and they should all be distinct (but they do not have to be consecutive). You can define helper methods and/or classes if you wish.

- Q6 Write Algorithm for Prims Algorithm. Show how to generate MST using Prims algorithm. **(12.5)**

- Q7 Define following collision resolution method with example. **(12.5)**
 (a) Open Addressing (b) Linear Probe (c) Quadratic Probe

- Q8 Write short notes on **any two** of following with example: **(6.25x2=12.5)**
 (a) 2-way merge sort
 (b) B+ Tree
 (c) Circular List

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