Code No: R161213 **R16** SET - 1

I B. Tech II Semester Supplementary Examinations, Nov/Dec - 2017
DATA STRUCTURES
(Com. to ECE, EIE, E Com E)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answering the question in **Part-A** is Compulsory
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1. a) What are the properties of sparse matrix? (2M)
   b) Convert following infix expression into postfix expression: A+B^(C+D)-E*F+G. (2M)
   c) What are the disadvantages of circular linked list? (2M)
   d) What is a threaded binary tree? (2M)
   e) Define priority queue. What is the need for priority queue? (2M)
   f) What are the properties of Minimum Cost Spanning (MST) Tree? (2M)
   g) Give the best, average, worst case time complexity of Quick sort. (2M)

PART -B

2. a) Explain representation of array as an ADT along with their advantages and disadvantages. (7M)
   b) Discuss about transposing of a sparse matrix with an example. Also write a function for its implementation. (7M)

3. a) Write a non-recursive program to convert the given infix expression into postfix expression. (7M)
   b) Explain various operations that are performed on queue with suitable algorithms. (7M)

4. a) Explain how linked list can be used for representing polynomials using a suitable example. (7M)
   b) Explain about insertion and deletion operations on single linked lists. Write pseudo code for the same. (7M)

5. a) What is a binary tree? Construct a binary tree given the pre-order traversal and in-order traversals as follows: (7M)

   Pre-Order Traversal: G B Q A C K F P D E R H
   In-Order Traversal: Q B K C F A G P E D H R

   b) Show that the maximum number of nodes in a binary tree of height H is 2^{H+1}-1. (7M)

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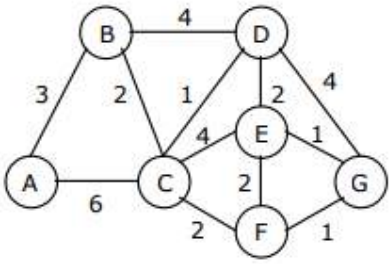
6. a) Use Sollin's algorithm to find a minimal spanning tree for the graph shown below starting with the vertex A. (7M)



b) Write an algorithm for minimum cost spanning tree using Kruskal's algorithm. (7M)

7. a) Explain Heap sort algorithm. Create Heap for the following elements and then sort them. (13, 102, 405, 136, 15, 105, 390, 432, 28, 444) (7M)

b) Explain the recursive merge sort algorithm to sort the following elements: 12, 25, 5, 9, 1, 84, 63, 7, 15, 4, 3. (7M)