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Sub Code:EEC012

Paper Id:

131612

Roll No:

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B.TECH.
THEORY EXAMINATION (SEM-IV) 2017-18
DATA STRUCTURES

Time : 3 Hours

Max. Marks: 100

Note: Be precise in your answer. In case of numerical problem assume data wherever not provided.

SECTION - A

1. Attempt all of the following questions:

(10 x 2 = 20)

- (a) What is an abstract data type? Give a suitable example for ADT.
- (b) Define time complexity and space complexity of an algorithm.
- (c) What is link list? How it is different from an array?
- (d) Difference between overflow and underflow condition in link list.
- (e) What are the merits and demerits of array data structures?
- (f) Differentiate linear and non linear data structures.
- (g) Give the worst case and best case time complexity of binary search.
- (h) Define a complete binary tree with suitable example.
- (i) Define minimum spanning tree with suitable example.
- (j) What is row major and column major order? Define the formula for both.

SECTION – B

Attempt any five of the following questions:

(5 x 10 = 50)

2. What is circular queue? Write a C code to insert an element in circular queue.
3. What is stack? Implement stack with singly link list.
4. Convert the following infix expression into its equivalent postfix expression.
Expression: $A-B/C+D*E+F$
5. What is tower of Hanoi problem? Write the steps for movement of 3 plates.

P.T.O

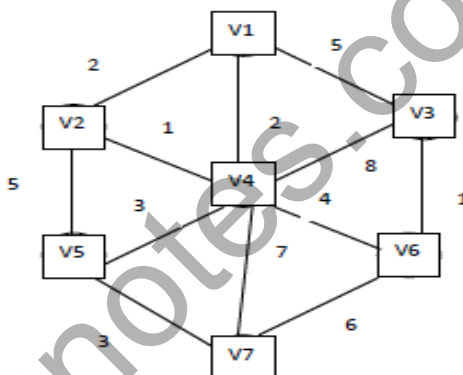
6. Sort the given values using quick sort; shows all steps/iterations:
38,81,22,48,13,69,93,14,45,58,79,72.
7. What is a Threaded Binary Tree? Explain the advantages of using a threaded binary tree.
8. Define the recursion. Write a recursive and non-recursive program to calculate the factorial of the given number.
9. Draw a binary tree with following traversals:
In-order: B C A E G D H F I J
Preorder: A B C D E G F H I J

SECTION – C

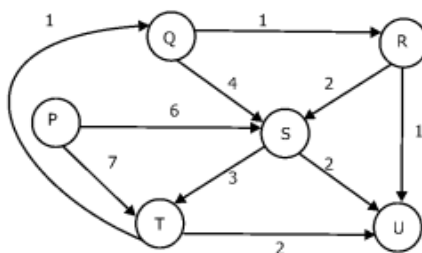
Attempt any two of the following questions:

(2 x 15 = 30)

10. Write Kruskal's algorithm. Find the minimum Spanning tree using Kruskal's algorithm in below figure:



11. Find the single source shortest path from the following graph using Dijkstra's algorithm. Show all the steps of algorithm properly.



12. Write short note on any three :
 - a. Hashing Technique.
 - b. Heap Sort
 - c. Garbage collection
 - d. Radix Sort