

Roll No. _____

Examination May-2014

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B.Tech. (Sem.)
DATA STRUCTURE (BTCS 304)
Paper ID A2102

Time: 03 Hours

Maximum Marks: 60

Instruction to Candidates:

- 1) Section - A is Compulsory.
- 2) Attempt any Four questions from Section - B.
- 3) Attempt any two questions from Section - C.

Section-A

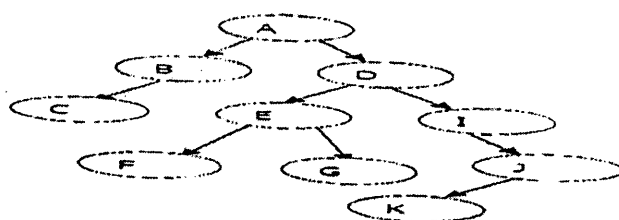
Q1 a)	How do you distinguish between column-major and row-major arrays	02
b)	What data structure is used by compiler to handle function calls and how?	02
c)	Describe big 'O' notation used in algorithms.	02
d)	What is tree data structure? What are different ways of traversing a tree?	02
e)	Work out the computational complexity of the following piece of code assuming that $n = 2^m$ <pre>for(int i = n; i > 0; i--) { for(int j = 1; j < n; j *= 2) { for(int k = 0; k < j; k++) { ... // constant number C of operations } } }</pre>	02
f)	What is garbage collection and how it can be implemented?	02
g)	What are the advantages and disadvantages of threaded trees?	02
h)	Find the number of elements in a queue in terms of FRONT and REAR	02
i)	Distinguish between the tree and graph.	02
j)	How sparse matrices can be represented in memory?	02

Section-B

Q2	Describe three ways in which a simple array can be used as a priority queue. For each give the big Oh for insert an element and remove an element.	05
Q3	Design and implement a Single Linked List method that reverses the order of elements in Single Linked List. This method should run in $O(n)$ time and shall not use recursion.	05
Q4	Define Heap sort. Write a algorithm for sorting numbers using heap sort.	05
Q5	What are stacks and possible operations on stacks? Explain one application using suitable algorithm	05
Q6	Compare Quick Sort and Radix Sort with respect to advantages and disadvantages.	05

Section-C

Q7	Give algorithms for various tree traversal techniques. For the given Tree, perform In-order, Pre-order and Post-order traversal.	10
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Q8	Define Linked list in data structure. How can we use linked list to implement Queue. Write suitable methods to perform enqueue, dequeue operations on queue using linked representation. When implementing Queue with linked list, shall a pointer be kept to the end of the linked list also? What about when implementing Stack using linked list?	10
Q9.	Draw the 11-entry hash that results from using the hash function $h(i) = (2i+5) \bmod 11$ to hash keys 12, 44, 13, 88, 23, 94, 11, 39, 20, 16, 5. (a) Assume collisions are handled by chaining. (b) Assume collisions are handled by linear probing. (c) Assume collisions are handled with double hashing, with the secondary hash function $h'(k) = 7 - (k \bmod 7)$.	10

— End —

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