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B.C.A. Third Semester Examination, 2018

Second Paper

(Data Structure Using C & C++)

Time : Three Hours

Maximum Marks : 75

Note : Attempt any **five** questions. **All** questions carry equal marks.

Note : The Answer to short answer type questions should not exceed 200 words and the answers to long answer type questions should not exceed 500 words.

1. (a) What do you mean by complexity of an algorithm? Explain the meaning of worst case analysis and best case analysis with an example. (8+7)
- (b) Why do we use a symptotic notation in

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the study of algorithm? Describe commonly used asymptotic notations and give their significance.

2. (a) Define list. What are the types of linked list. What are the advantages and disadvantages of linked list and applications of linked list. (7+8)
- (b) Write a complete programme in C to create a single linked list. Write functions to do the following operations.
 - (i) Insert a new node at the end.
 - (ii) Delete the first node.
3. (a) Given the following inorder and preorder traversal reconstruct a binary tree
Inorder sequence D, G, B, H, E, A, F, I, C
Preorder Sequence A, B, D, G, E, H, C, F, I <http://www.mgkvponline.com> (5+10)
- (B) What is a Binary Tree? What is the maximum number of nodes possible in a Binary Tree of depth d. Explain the following terms with respect to Binary trees
 - (i) Strictly Binary Tree

(ii) Complete binary tree

(iii) Almost complete binary tree

4. (a) Sort the following list using Heap Sort.

(8+7)

66, 33, 40, 20, 50, 88, 60, 11, 77, 30,
45, 65 <http://www.mgkvponline.com>

(b) Describe insertion sort with a proper algorithm. What is the complexity of insertion sort in the worst case?

5. (a) Define Hashing. How do collisions happen during hashing? Explain the different techniques resolving of collision.

(8+7)

(b) The following values are to be stored in a hash table :

25, 42, 96, 101, 102, 162, 197

Describe how the values are hashed by using division method of hashing with a table size of 7. Use chaining as the method of collision resolution.

6. (a) What is post fix notation? Explain with examples. <http://www.mgkvponline.com>

(b) Write the algorithm for converting from infix to post fix. (5+10)

7. (a) How do you push and pop elements in a stack. Explain the applications of stack? (5+10)

(b) What are queues? Write down algorithm for inserting and deleting elements from a queue implemented using arrays.

8. (a) Distinguish between stack and queue. (5+10)

(b) State the difference between array and linked list.

(c) Explain the application of a stack for implementing function call and return mechanism. 5+5+5

9. Write short notes on : (5+5+5)

(a) Sparse Arrays

(b) Tridiagonal Matrix

(c) B-Tree