

Registration No. :

--	--	--	--	--	--	--	--	--	--

Total number of printed pages – 2

B. Tech
BCSE 3102 (Old)

Special Examination – 2012

DATA STRUCTURES USING 'C'

Full Marks – 70

Time : 3 Hours

Answer Question No. 1 which is compulsory and any **five** from the rest.
The figures in the right-hand margin indicate marks.

1. Answer the following questions :  2 × 10

(a) Consider the following C declaration:

```
struct
{
    int s[5];
    union
    { float y;
      long double z;
    } u;
}t[3];
```

What is the memory requirement for variable t[3] of the array of structure ?

- (b) Define Abstract Data Type with some examples.
- (c) What do you mean by linear and nonlinear data structure ?
- (d) Differentiate a binary tree from a binary search tree.
- (e) What is meant by digraph? Define the terms in-degree and out-degree with respect to a digraph.
- (f) What is meant by topological sorting ?
- (g) What is big-O notation ? The following function
 $f(n) = n * (n-1) * (n-2) \dots \dots \dots 3*2*1$
is best described by which big-O notation.
- (h) Draw a directed tree representation of the formula
 $(a + b * c) + ((d * e \div f) * g)$.

P.T.O.

- (i) State two applications of Graphs.
- (j) What are the collision resolution techniques applied in the hash table ?
2. (a) What do you mean by algorithm ? State the criteria that should be satisfied by all algorithms. 5
- (b) What is sparse matrix ? Illustrate the method of storing a sparse matrix efficiently with one example. 5
3. (a) With the sequence of inputs 21, 6, 61, 44, 9, 76, 75, 32, 75, 4 construct a height balanced binary search tree. 5
- (b) Write a program in C to convert a singly linked list to circular linked list. Also compute the number of elements and sum of elements in the initial singly linked list. 5
4. (a) Write a recursive program in C to compute height of a binary tree. 5
- (b) Write a recursive program in C which sort a list of strings. 5
5. Write a C program to perform the following operation on a queue : 10
- (a) Insert
- (b) Delete
- (c) Display.
6. (a) Write an algorithm for covert infix expression to postfix expression with an example of $(A + (B * C - (D/E^F) * G) * H)$. 5
- (b) Illustrate the procedure to construct a binary tree when its inorder and postorder traversal given as : 5
- In-order : H D I J E K B A L F M C N G O
- Post-order : H I D J K E B L M F N O G C A
7. (a) Use radix sort to sort the following integers : 5
- 439, 828, 355, 866, 790, 570, 374, 255, 427, 439
- (b) Explain with one example how a polynomial can be represented by a linked list. 5
8. Write short notes on any **two** : 5×2
- (a) Dynamic Storage management
- (b) Symbol Table
- (c) Depth First Search Algorithm
- (d) Pattern Matching.

