

Roll No. _____

PGIS-N 1044 B-14
M.Sc. Ist Semester Degree Examination
Computer Science
(Data structures Using C++)
Paper : HCT - 1.3
(new syllabus under CBCS w.e.f 2011-12)

Time : 3 Hours

Maximum Marks : 80

Instructions to candidates:

1. *Question No.1 in section A is compulsory*
2. *Answer any 5 questions from section-B*

Section-A

1. Answer the following (10x2=20)

- a) Explain the features of keyword "new" and "delete"
- b) Compare "Struct" and "Class" keywords of C++
- c) What is the need of friend function in C++?
- d) State the important applications of linked list
- e) Explain the node structure of doubly linked list
- f) Convert the infix expression $E:(A+B) \wedge C - (D/C) * E$ into a post fix expression
- g) Explain m-way search tree
- h) Define Huffman code
- i) State the types of graph storage structures
- j) What is an external sorts

Section-B

2. Why should default values be given to function arguments in function prototype and not in function definition? Write a program to add three numbers using function which has one or more default values
3.
 - a) What are virtual functions? What is their use? Give an example. How compilers resolve a call a virtual function
 - b) What is operator overloading? Write a C++ program to compare two values representing distances in feet and inches, using overloading the operator > (6+6)
4.
 - a) Explain the linked list implementation of stack data structures. Design an algorithm to deliver the goods and receiving of goods in an inventory system
 - b) Develop an algorithm to transverse the linked list explain how do you use this algorithm by making appropriate changes to search an element in the linked list (6+6)
5.
 - a) What is recursion? explain the steps to design a recursive algorithm
 - b) Define tree, expression tree and binary search tree. Design an algorithm to tranverse the binary tree. (6+6)
6.
 - a) Define heap tree. Design an algrorithm to insert the data "ITEM" into the heap tree.
 - b) Explain the steps that are to be adopted to balance an unbalance tree due to insertion of a node. (6+6)
7.
 - a) Define the term sorting and explain how do you sort the given list with selection sort technique
 - b) What are the graph storage structures? Design an algorithm to insert a vertex into a undirected graph (6+6)

8. Write short note on any **two** of the following

- a) Binary search tree
- b) queue applications
- c) ADT-linked list

(6 each)