

PGDCA / MCA (I Yr)**Term-End Examination****December, 2007****CS-04 : DATA STRUCTURES THROUGH
"C" & "PASCAL"**

Time : 2 hours

Maximum Marks : 60

Note : Question number 1 is **compulsory**. Answer any **three** questions from the rest. All algorithms should be written nearer to C or PASCAL language.

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1. (a) How will you implement a linked list of integers in C ? Write a 'C' function to obtain the sum of the elements in the above list. 6
 - (b) Write a 'C' or 'Pascal' function to sort an array of numbers using insertion sort. Give appropriate variable declarations. 6
 - (c) What do you mean by traversal of a tree ? Explain with illustration the difference between Preorder and Postorder traversal. Given that the preorder traversal of a binary tree is CBAD, whereas the postorder traversal of the same tree is ABDC. Can you construct the tree uniquely ? Justify your answer. 8

- (d) What are the characteristics of a B-tree ?
Construct a B-tree of order 3 from the following data :
10, 20, 30, 40, 50, 60, 70, 80, 90, 100,
showing the structure after each insertion. 10
2. (a) Distinguish between a queue and a priority queue. 2
(b) How will you implement a priority queue ? Give appropriate data structure in C. 4
(c) Write an algorithm for deletion from a priority queue. 4
3. (a) Give appropriate variable declaration in 'C' or 'Pascal' to implement a Binary Search Tree. 2
(b) Why do you need to balance a Binary Search Tree ? Explain with examples. 3
(c) Write a function to compute the balance of each node of a Binary Search Tree. 5
4. (a) Explain the difference between an array and a record as a storage scheme for multiple data items. 4
(b) Distinguish between row-major and column-major schemes of storing a multi-dimensional array. Explain the access mechanism of individual array elements. 6

5. (a) Explain with example the terms “field”, “record” and “index” with respect to a data file. 3
- (b) What are the basic features that should be considered for choosing a file organization scheme ? 2
- (c) Explain the term “hashing” with respect to direct file organization. 2
- (d) Discuss in detail one technique of resolving collisions in hashing. 3

