

PGDCA / MCA (I Yr)
Term-End Examination
June, 2007

**CS-04 (S) : 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.

1. (a) Write an algorithm to implement quick sort technique. Also, show the steps of quick sort on the following given numbers : 10
- "14, 7, 11, 35, 9, 41, 18"

- (b) A traditional tridiagonal *matrix* A is a square matrix in which all elements other than those on the major-diagonal and on the diagonals immediately above and below this diagonal formed by non-zero elements in the diagonals are stored row-wise in a linear array B — the element $A[1, 1]$ being stored at $B[1]$. Obtain an access formula to determine the position of element $A[i, j]$ in the array B . Asterisks in the 4×4 tridiagonal array shown below mark the position of non-zero elements.

$$\begin{bmatrix} * & * & 0 & 0 \\ * & * & * & 0 \\ 0 & * & * & * \\ 0 & 0 & * & * \end{bmatrix}$$

10

- (c) Write a program to count the nodes of a Binary tree. 10

2. It is intended to insert the following data item in a B-tree of order 5

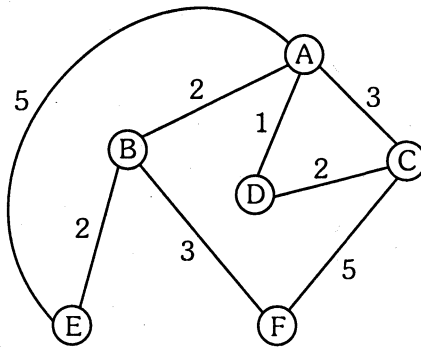
a g f b k d h m j e s i r x c l n t u p

Show how the tree would appear on deletion of each of the following items in sequence :

h, r, p, d

10

3. (a) Find minimal spanning tree for the following graph. Also show the steps involved in it. 6



(Weights have been shown along with the edges)

- (b) Differentiate between Depth first search and Breadth first search techniques. 4
4. (a) Write an algorithm which translates an infix expression to a postfix expression. What is the time complexity of this algorithm ? 6
- (b) Write a function in C language to insert the element in Circular Queue. 4
5. Write short notes on the following (with their advantages and disadvantages) :
- (a) Direct File Organization 5
- (b) Dynamic Memory Allocation 5

