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Total No. of Pages : 02

Total No. of Questions : 07

B.Sc. (IT) (Sem.-2nd)
DATA STRUCTURES THROUGH C
Subject Code : BS-108
Paper ID : [B0408]

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SIX questions carrying TEN marks each and students has to attempt any FOUR questions.

SECTION-A**I. Answer briefly :**

- (a) What is a data structure? Mention the various types of data structures.
- (b) What is an array? Give the formula to find the address of a particular location in the array.
- (c) What is a circular queue? How it differs from linear queue?
- (d) Give the postfix form of an expression: $(a - b * c + d) / (e + f)$
- (e) What is a doubly linked list?
- (f) Give the linked memory representation of a binary tree.
- (g) What is a sparse matrix?
- (h) Mention **any two** applications of linked lists.
- (i) Mention **any two** applications of stack.
- (j) What is the brute force approach?

SECTION-B

2. How a two dimensional matrix is represented in the memory of a computer?
How can you access an element $a[i][j]$ in a two dimensional matrix of dimension $m \times n$? Give the access formula in:
 - (i) Row-major order
 - (ii) Column-major order
3. Order the following functions by growth rate: N , $N^{1.5}$, N^2 , $N \log \log N$, $N \log^2 N$, $N \log (N^2)$, $2/N$, 2^N , $2^{N/2}$, 37 , $N^2 \log N$, N^3 . Indicate which functions grow at the same rate.
4. Explain the merging of two linked lists (existing in ascending order) to generate a sorted list.
5. How can a sparse matrix be represented as an array? Discuss addition, multiplication and transpose operations on a linked list.
6. Explain binary search with the help of an illustrative example.
7. Discuss various Pre-order, Post-order and In-order tree traversal algorithms.