

No. of Printed Pages : 3

**MCS-021**

**M. C. A. (REVISED)/B. C. A. (REVISED)**  
**(MCA/BCA)**

**Term-End Examination**

**June, 2023**

**MCS-021 : DATA AND FILE STRUCTURES**

*Time : 3 Hours*

*Maximum Marks : 100*

*Weightage : 75%*

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**Note :** (i) *Question No. 1 is compulsory.*

(ii) *Attempt any **three** questions from the rest.*

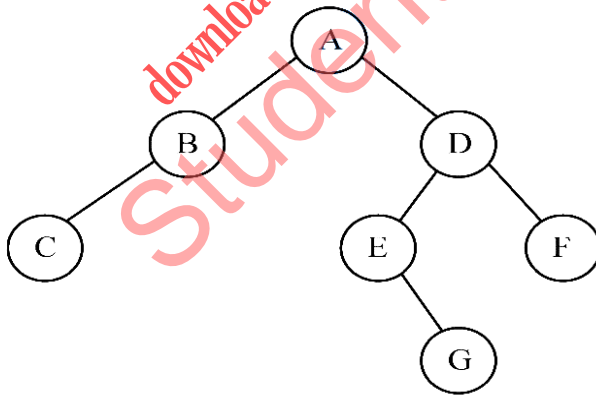
(iii) *All algorithms should be written near to 'C' language.*

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1. (a) Write an algorithm for multiplication of two  $n \times n$  matrices. Calculate both time and space complexity for this algorithm. 10
- (b) What is a sparse matrix ? Write an algorithm that accepts a  $6 \times 5$  sparse matrix and output 3-tuple representation, of the matrix. 10

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- (c) Write an algorithm for array implementation of linked list. 10
- (d) What is a binary search ? Write an algorithm for binary search and find its complexity. 10
2. (a) What is a Splay Tree ? Explain how is it different from a binary tree. 10
- (b) Traverse the following binary tree in *Pre-order* and *In-order*: 10



3. (a) Explain Quick sort algorithm. Sort the following set of data using this algorithm. Show intermediate steps of sorting : 10
- 20, 6, 8, 19, 36, 4, 28, 50
- (b) What is an Indexed Sequential File Organization ? How is it different from direct file organisation ? Explain. 10

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4. (a) What is a spanning tree ? What are its applications ? Write Kruskal's algorithm to find minimum cost spanning tree and explain it in terms of its complexity. 10
- (b) Define AVL tree. Write any *two* applications of AVL tree. 10
5. (a) Write algorithms for the following : 10
- (i) To create doubly linked list.
- (ii) To delete an element from a doubly linked list.
- (b) What is a stack ? Explain PUSH and POP operations of stack with the help of algorithms for each operation. 10

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