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%

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 × 5 sparse matrix and output 3-tuple representation, of the matrix. 10

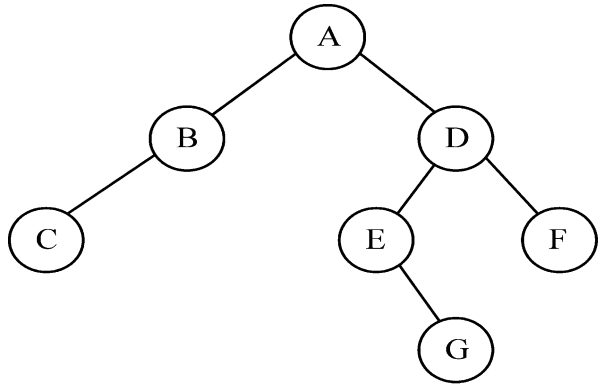
P. T. O.

(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

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