No. of Printed Pages : 5

MCS–208

POST GRADUATE DIPLOMA IN COMPUTER APPLICATIONS

(PGDCA–NEW)

Term-End Examination

December, 2025

MCS-208 : DATA STRUCTURES AND ALGORITHMS

Time : 3 Hours *Maximum Marks : 100*

Weightage : 70%

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

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

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

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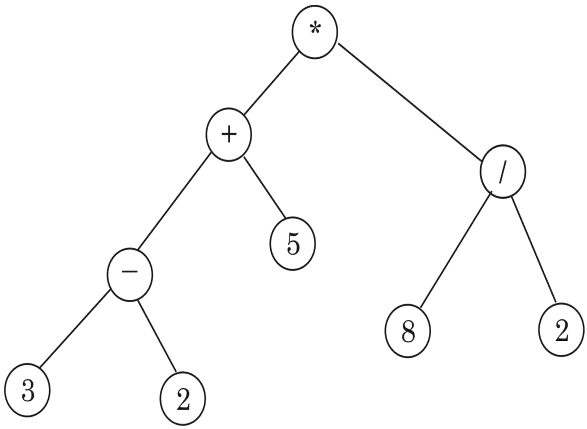
1. (a) What is an algorithm ? What are its properties ? Explain tradeoff between space and time complexity of algorithms. Explain time complexity of linear search algorithm. 10

(b) What is Stack ? Implement stack using array. 10

(c) Write preorder and postorder traversals of the following tree : 10



(d) What is Link List ? Write algorithms for inserting and deleting element in link list. 10

2. (a) What is a binary tree ? What are its properties ? Explain how to create a binary tree with the help of a suitable code. 10

(b) What is queue data structure ? What are its properties ? Implement queue using linked list. Make necessary assumptions. 10

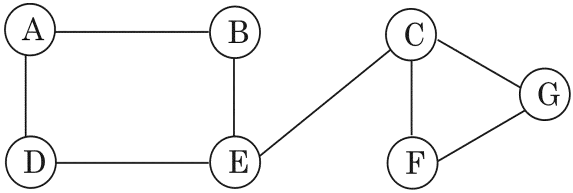
3. (a) What is array ? Explain row major and column major representations of array with examples. 10

(b) What is need of file organisation ? What are key drivers for file organization ? Explain indexed sequential file organization. 10

4. (a) Sort the following lists using Bubble Sort Algorithm. Showing intermediate steps : 10

25 8 22 90 80 60 10

(b) What is graph ? Write adjacency matrix representation of the following graph : 5



(c) What are B-trees ? What are its applications ? 5

5. (a) What is AVL tree ? Explain insertion of a node into an AVL tree. 5

(b) Write binary search algorithm. 5

(c) What is spanning tree ? Write and explain Prim's algorithm to find minimum cost spanning tree. Also, write the applications of spanning tree. 10

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