



PAU-003-0072005

Seat No. _____

M. C. A. (Sem. II) Examination

August / September - 2020

P-2050 : Data Structure & Algorithm

Faculty Code : 003

Subject Code : 0072005

Time : $2\frac{1}{2}$ Hours]

[Total Marks : 70

- 1 (a) Attempt the following : 4
- (1) Define: Data Structure.
 - (2) Define: Tree.
 - (3) What is string?
 - (4) What is text handling?
- (b) Attempt any one of the following : 2
- (1) Compare primitive and non-primitive data structure.
 - (2) Differentiate : Linear data structure V/s Non-Linear data structure
- (c) Attempt any one of the following : 3
- (1) Explain storage representation of string.
 - (2) Discuss Graph as non-linear data structure.
- (d) Attempt any one of the following : 5
- (1) List out and explain various string manipulation and pattern matching functions in brief.
 - (2) List out and write a brief note on various types of primitive data structure.

- 2 (a) Attempt the following : 4
- (1) Define Linked List.
 - (2) Which data structure follows LIFO (Last- in-First- out) method?
 - (3) What is circular linked list?
 - (4) What is priority queue?
- (b) Attempt any one of the following : 2
- (1) Discuss doubly linked with its various operation in brief.
 - (2) Write an algorithm to insert an element in simple queue.
- (c) Attempt any one of the following : 3
- (1) List out and explain any one application of stack in brief.
 - (2) Discuss applications of Linked list.
- (d) Attempt any **one** of the following : 5
- (1) Write an algorithm to insert at beginning and to delete last node operation in singly linked list.
 - (2) Write an algorithm to perform push, pop and peep operation on stack.
- 3 (a) Attempt the following : 4
- (1) Define: complete binary tree.
 - (2) Define: siblings.
 - (3) What is parent node and leaf node in tree?
 - (4) What is root node of the tree?
- (b) Attempt any one of the following : 2
- (1) List and explain various properties of binary tree.
 - (2) Write a brief note on sparse matrices.

- (c) Attempt any one of the following : 3
- (1) Discuss how to convert general tree into binary tree by taking suitable example.
 - (2) Discuss depth, level and height of tree.
- (d) Attempt any one of the following : 5
- (1) Write a recursive algorithm for in-order, pre-order and post-order traversal of tree.
 - (2) Discuss how to represent binary tree in detail.
- 4 (a) Attempt the following : 4
- (1) Define : Sorting.
 - (2) Define binary tree.
 - (3) What is searching?
 - (4) What is hash table?
- (b) Attempt any one of the following : 2
- (1) Write an algorithm for insertion sort.
 - (2) Write an algorithm for bubble sort.
- (c) Attempt any one of the following : 3
- (1) Write a brief note on various collision resolution techniques.
 - (2) Compare selection sort, merge sort and radix sort with its time complexity.
- (d) Attempt any one of the following : 5
- (1) Write and explain quick sort algorithm by taking suitable example and also state its time complexity.
 - (2) Write an algorithm for binary search and also compare binary search with linear search.

- 5 (a) Attempt the following : 4
- (1) Define: Greedy algorithm.
 - (2) Define: spanning tree.
 - (3) What do you mean by feasible solution and optimal solution?
 - (4) Which algorithms are used to find minimum spanning tree (MST)?
- (b) Attempt any one of the following : 2
- (1) List out various applications of greedy method.
 - (2) What are the advantages and disadvantages of greedy approach?
- (c) Attempt any one of the following : 3
- (1) Explain job sequencing with deadline by taking suitable example.
 - (2) Write general abstract algorithm for greedy method.
- (d) Attempt any one of the following : 5
- (1) Write and explain Krushkal's algorithm and also State its time complexity.
 - (2) Write and explain Knapsack algorithm and also State its time complexity.
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