

(4) TBC-201/TBI-201/TBS-201

(b) Write a non-recursive algorithm for preorder traversal in a tree with an example. (CO5)

(c) What do you mean by file system organization ? Explain different types of file organization. (CO5)

TBC-201/TBI-201/TBS-201

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Roll No.

TBC-201/TBI-201/TBS-201

B. C. A./B. Sc. (IT)/B. Sc. (CS)

(SECOND SEMESTER)

END SEMESTER

EXAMINATION, June, 2023

**DATA STRUCTURES AND FILE
ORGANIZATION**

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

(ii) Answer any *two* sub-questions among
(a), (b) and (c) in each main question.

(iii) Total marks in each main question are
twenty.

(iv) Each sub-question carries 10 marks.

1. (a) Define algorithm. What are the different characteristics of an algorithm ? (CO1)

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- (b) Write short notes on the following : (CO1)
- (i) Linear Data Structure
 - (ii) Sparse Matrix
 - (iii) Dynamic Memory Allocation
- (c) Given an array, $\text{arr}[1 \dots 10][1 \dots 15]$ with base value 100 and the size of each element is 1 byte in memory. Find the address of $\text{arr}[8][6]$ with the help of row-major order and column-major order.
- (CO1)
2. (a) Implement typical stack operation when stacks are represented using singly linked lists. (CO2)
- (b) Write an algorithm to convert a valid arithmetic infix expression into its equivalent postfix expression. Trace your algorithm for $A-B/C+D * E + F$. (CO2)
- (c) Write short notes on the following : (CO2)
- (i) Applications of queue
 - (ii) Circular queue
 - (iii) Priority queue

3. (a) Write an algorithm/program to add two polynomials when the polynomials are represented using singly linked lists. (CO3)
- (b) Explain 'insertion at end' operation of singly linked list with algorithm/pseudo code. (CO3)
- (c) Write a short note on linked list and its types. What are the advantages of using linked list over using array ? (CO3)
4. (a) Write algorithm for quick sort. Illustrate the quick sort algorithm on list : (CO4)
- 9, 20, 12, 21, 3, 5, 1, 22, 19, 7.
- (b) Write short notes on the following : (CO4)
- (i) Garbage Collection and Compaction
 - (ii) Hash function
- (c) What do you mean by recursion? Differentiate between recursion and iteration. (CO4)
5. (a) With the help of diagrams, construct a Binary Search Tree (BST) with the following keys :
- 86, 12, 42, 69, 38, 57, 74, 6, 49, 71.
- Also delete 42 from the constructed BST.
- (CO5)