(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)

H 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)

P. T. O.

(b) Write short notes on the following : (CO1)

(i) Linear Data Structure

(ii) Sparse Matrix

(iii) Dynamic Memory Allocation

(c) Given an array, arr[1 ...10][1...15] with base value 100 and the size of each element is 1 byte in memory. Find the address of 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)

P. T. O.