



B.Tech III Semester Regular Examinations, February 2022
DATA STRUCTURES
(Common to CSE & CSE(AI&ML))

Maximum Marks: 70

Date: 25.02.2022 Duration: 3 hours

- Note:**
1. This question paper contains two parts A and B.
 2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
 3. Part B consists of 5 Units. Answer any one full question from each unit.
 4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks

(10x2M=20 Marks)

- 1 Define data abstraction.
- 2 Define time and space complexity.
- 3 Define node and give the syntax for node creation.
- 4 Convert the given infix expression $(a+b)/(c+d)-(d*e)$ into post fix.
- 5 List out the types of binary tree traversal.
- 6 Define heap and give the structure of max heap.
- 7 Write the time complexity of linear search and binary search.
- 8 Define seek time, latency time and transmission time in external sorting.
- 9 Compare DFS and BFS.
- 10 Give the formula to calculate balance factor in AVL tree.

Part-B

Answer All the following questions.

(5X10M=50Marks)

- 11 (a) Develop a recursive algorithm to implement Fibonacci series. 5M
(b) Explain briefly about Asymptotic notation. 5M
OR
- 12 Solve towers of Hanoi problem using recursive algorithm. 10M
- 13 (a) State the difference between array and linked list. 5M
(b) Develop an algorithm to insert a new node at the beginning in doubly linked list. 5M
OR
- 14 Define circular queue and develop an algorithm to insert, delete an element from a circular queue. 10M
- 15 (a) Create a binary tree using the following data elements 1,2,3,4,5,6,7,8,9,10,11,12 and represent in linked list and sequential representation. 5M
(b) Explain binary tree traversal algorithm with example. 5M
OR
- 16 (a) Explain smart union algorithm with an example. 5M

- (b) Define min heap and construct min heap for the following 2,7,4,10,8,6 5M
- 17 (a) Develop an algorithm to find the element using binary search and compare its time complexity. 5M
 (b) Define hashing and explain i) Division method ii) Multiplication method iii) Mid square method and iv) Folding method. 5M
- OR
- 18 Define divide and conquer algorithm and develop an algorithm for merge sort for the given data elements 39,9,81,45,90,27,72,18. 10M
- 19 (a) Define graph and what are the two ways to represent graph with example. 5M
 (b) Write short notes on DFS and BFS algorithm. 5M
- OR
- 20 Define AVL tree and what are the types of rotations exist in AVL tree 10M