

2111040101050002
EXAMINATION MARCH-APRIL 2024
MASTER OF COMPUTER APPLICATIONS
(FIRST SEMESTER)
DATA STRUCTURES AND DESIGN AND ANALYSIS OF
ALGORITHMS (COURSE-105) - LEVEL 5

[Time: As Per Schedule]

[Max. Marks:70]

Instructions:

1. Fill up strictly the following details on your answer book
 - a. Name of the Examination : **MASTER OF COMPUTER APPLICATIONS (FIRST SEMESTER)**
 - b. Name of the Subject : **DATA STRUCTURES AND DESIGN AND ANALYSIS OF ALGORITHMS (COURSE-105) - LEVEL 5**
 - c. Subject Code No : **2111040101050002**
2. Sketch neat and labelled diagram wherever necessary.
3. Figures to the right indicate full marks of the question.
4. All questions are compulsory.

Seat No:

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Student's Signature

Q.1 Do as Directed **14**

[A] Convert infix expression $(P+Q*R/S) *T+U$ in prefix and postfix equivalent using stack table: **6**

OR

[A] Define Stack. Write algorithm/code for Push and Pop operation on stack Implemented using array. Also check for overflow and underflow Conditions where it requires.

[B] Define - (1) DEQUE & (2) CIRCULAR QUEUE. **5**

[C] List - applications of linked list. **3**

Q.2 Do as directed. **14**

[A] Construct the binary tree from given INORDER and PREORDER Traversals. Also find the POSTORDER traversal. **6**

INORDER: R P S O V T X Q U
PREORDER: O P R S Q T V X U

[B] Create expression tree from given infix expression. 5
 $A * B + (C - D) / E ^ F$

[C] Define the following terms for binary tree - Root, Leaf Node, height of tree 3

Q.3 Do as directed. 14

[A] Explain meaning of - growth rate for time complexity. What is logarithmic Growth rate? Discuss any one algorithm having logarithmic growth rate. 6

OR

[A] What is dividing and conquer strategy? Explain with example - any one Sorting algorithm that follows dividing and conquer strategy.

[B] Explain greedy algorithms for problem solving. Discuss - advantages and Limitations of greedy approach. 5

[C] Write advantages of using doubly linked list over singly linked list 3

Q.4 Do as directed. 14

[A] Write algorithm for Bubble sort. Explain the working of bubble sort on the following array with 8 element: 6
{30,25,20,10,60,65,70,40}

OR

[A] Explain structure of 2:3 tree. Show 2:3 tree after adding each of the following values in given order: 5
15, 13, 24 12, 27, 4, 6, 8, 10, 11

[B] Show the Binary Search Tree after adding each of the following values in given order:
15, 13, 24 12, 27, 4, 6, 9, 20, 5

[C] List advantages and limitation of binary search algorithm over linear Search. **3**

Q.5 Do as directed. 14

[A] Define hashing. Explain with example - multiplication and division Method of hash function. **6**

OR

[A] Keys 10, 16, 11, 1, 3, 4, 23, 34, 26 and 15 are inserted (in order) into an initially empty hash table of length 10 using open addressing with hash Function $h(k) = k \text{ mod } 10$ and linear probing. Show mapping of address For each key and the resulting hash table.

[B] Write advantages and limitations of using separate chaining over open addressing. **5**

[C] List various application of data structure tree. **3**
