

PG CBCS
M.Sc. Semester-I Examination, 2021
COMPUTER SCIENCE
PAPER: COS 101
(DATA STRUCTURE AND ALGORITHM)

Full Marks: 40**Time: 2 Hours****Answer any FOUR questions from the following:****4X10=40**

1. What is asymptotic notation? Define Big-Oh, big-omega and big-theta notation? Deduce the worst-case time complexity of quick sort algorithm? 2+(2x3) +2
2. Write the steps of binary search algorithm and find its all-cases complexity? What is the difference between linear and no-linear data structure? (5+2) +3
3. Insert the following keys into an empty AVL tree:
 15, 12, 18, 11, 26, 8, 17, 22, 14, 7
 What is heap? Construct a max heap with the following data values. 5+(2+3)
 15, 12, 18, 11, 26, 8, 17, 22, 14, 7
4. Write down the procedure with an example how to delete a node from a BST? What is threaded binary tree? 8+2
5. Write the non-recursive way of in-order traversal of a binary tree? Given a binary tree, whose inorder and preorder traversal are:
 In-order: BXDYCAW
 Pre-order: AXBCDYW
 Draw the binary tree, and hence find its postorder traversal. 5+5
6. With a proper example describe the merge sort algorithm. Find its complexity. 7+3
7. What is sparse matrix? What is the triplet representation of the following sparse matrix?

1	0	0	2
0	-5	0	0
0	0	4	1
-3	0	-6	0

 What is skew binary tree? Define height balanced binary tree. 2+3+2+3
8. Write short note on:
 Linear probing, Chaining 5x2
9. What is circular queue? Write the procedure to insert and delete an element in circular queue. 2+4x2
10. How polynomial is represented using array and linked list with proper example? Which presentation is better and why? Define circular doubly linked list. 3+3+2+2