Registration No : | | | | | | | | | | |

Total Number of Pages: 02

Course: B.Tech
Sub_Code: RCS3C002

3rd Semester Regular/Back Examination: 2022-23
SUBJECT : Data Structure
BRANCH(S): CSE,CSEAI,CSEAIME,CSIT,CST,ELECTRICAL & C.E,ELECTRONICS & C.E,IT
Time: 3 Hour
Max Marks : 100
Q.Code:L543

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.
The figures in the right hand margin indicate marks.

Part-I

Q1 **Answer the following questions:** **(2 x 10)**

a) What is data structure? Give an example each of linear and non-linear data structure.
b) Arrange the following elements in order of their growth: log n, $(\log n)^3$, 2^n, nlog n.
c) Differentiate between stack and queue.
d) What is a Complete Binary tree? Give an example.
e) Write the conditions to test "Queue is Empty" and "Queue is Full".
f) Express in big-O notation: $10n^3+6n^2+ n^4$
g) Diffrentiate between BFS and DFS.
h) What will be the minimum and maximum height of a binary tree having 8 numbers of key values?
i) What is a deque? Explain its two variants.
j) Convert the expression ((A+B)-C)/(D-E) to equivalent prefix notations.

Part-II

Q2 **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)** **(6 × 8)**

a) Apply the postfix evaluation algorithm to evaluate the expression 1 5 7 3 - 2 ^ * +.
b) What are the different asymptotic notations used for algorithm analysis?
c) Define a threaded binary tree. What are its different types?
d) Make a BST for the following sequence of numbers:
45,36,76,23,89,115,98,39,41,56,69,48.
e) Create a binary tree given the following Inorder and Preorder Traversal
Inorder: D B H E A I F J C G Preorder: A B D E H C F I J G
f) Design a pseudocode to count the number of nodes in a Linked List.
g) Write down the graph representation methods with examples.
h) Apply Quicksort algorithm on the list {18,23,17,9,4,26,22,40}
i) What is inplace sorting and stable sort. Explain each one with an example.
j) Explain the advantage of Circular queue over Linear queue.
k) Find the element 10 in the given list 12,15,3,32,7,19,10,35,67 using Binary Search algorithm.
l) Construct an AVL tree by inserting the following values one after the other <23,34,12,11,6,2,45,4,25,24>

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3 Write the algorithm to convert an infix expression to postfix expression.Using the algorithm convert the infix expression (A + B) * C + D / (E + F * G) – H into a postfix expression. **(16)**

Q4 Write analgorithm/program to create a single linked list and perform the following operations: a) Find out the largest element. b) To search an element **(16)**

Q5 Given the following list of keys create the Maxheap and sort them using the Heap Sort technique. **(16)**

8, 20, 9, 4, 15, 10, 7, 22, 3, 12.

Q6 What are the different collision resolution techniques? Apply chaining and linear probing to store the following values in a hash table of size 7: **(16)**

25, 42, 96, 101, 102, 162, 197.