



WALCHAND COLLEGE OF ENGINEERING

(Government Aided Autonomous Institute)
Vishrambag, Sangli - 416415

Second Year B.Tech. Computer Science and Engineering
Supplementary ODD SEMESTER, AY 2022-23

Data Structures (6CS202)



Supplementary

Date: Tuesday, 31/10/2023

Time : 02.00 pm to 05.00 pm

PRN: _____

Max Marks: **100**

IMP: Verify that you have received question papers with correct course code, branch etc.

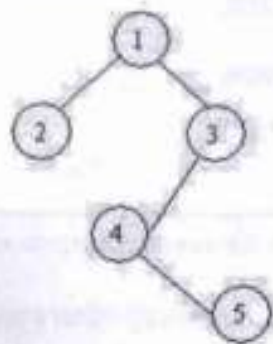
- All questions are compulsory.
- Writing question number on answer book is compulsory otherwise answers may not be assessed.
- Assume suitable data wherever necessary.
- Figures to the right of question text indicate full marks.
- Mobile phones, smart gadgets and programmable calculators are strictly prohibited.
- Except PRN anything else writing on question paper is not allowed.
- Exchange/Sharing of stationery, calculator etc. not allowed.

on the right of marks indicates course outcomes (Only for faculty use).

	Marks	
A) Illustrate the concept of analysis of algorithms in detail.	6	CO2
B) Describe ADT, List the Linear and Non-linear data structures with example.	4	CO1
C) Use the definition of the Ackermann function to find $A(1, 2)$	4	CO2
A) Differentiate between Singly and Doubly Linked Lists.	4	CO1
B) Write a short note on		CO3
i) Representation of a Polynomial using array and linked list	8	
ii) Dynamic storage management		
C) Write an algorithm to search an element in circular linked list.	4	CO1
A) Write steps to convert an infix expression to postfix expression with example.	6	CO2
B) A circular queue has a size of 5 and has 3 elements 10, 20 and 40 where $F=2$ and $R=4$. After inserting 50 and 60, what is the value of F and R . Trying to insert 30 at this stage what happens? Delete 2 elements from the queue and insert 70, 80 & 90. Show the sequence of steps with necessary diagrams with the value of F & R .	4	CO1
C) Write a program to implement stack using linked list.	6	CO1
A) Illustrate delete operation on Binary search tree	4	CO2
B) Construct an expression tree for the expression $(x + y * z) + ((a * b + c) * d)$. Give the outputs when you apply preorder, inorder and postorder traversals.	8	CO3

C) Write answers to the following questions.

- There are 8, 15, 13, 14 nodes were there in 4 different trees. Which of them could have formed a full binary tree?
- In the given binary tree, using array you can store the node 4 at which location?



- What are values of balance factor for each node in an AVL tree?
- What is the Big O running time for search operation in Binary Search Tree?

Q5 A) Write an algorithm for DFS traversal on graph using stack.

B) Define the following terminology for graph

- Path
- Cycle
- Loop
- Multiple edges
- Complete graph
- Directed graph

C) Illustrate representation of graph in memory.

Q6 A) Construct a recursive algorithm for Binary Search. Compare Linear and Binary Search.

B) Illustrate Quick sort algorithm with example and analyze the time complexity of quick sort.

C) Write the need of hashing. List different Hashing methods and explain any one. What are the problems in hashing?

.....End of question paper