VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD
Accredited by NAAC with A++ Grade

B.E. III-Semester Supplementary Examinations, August-2023

Data Structures
(Common to CSE & AIML)

Time: **3 hours**   Max. Marks: **60**

Note: Answer all questions from Part-A and any FIVE from Part-B

Part-A (10× 2 = 20 Marks)

Q. No.	Stem of the question	M	L	CO	PO
1.	Define Space and Time complexity	2	1	1	1
2.	Represent the polynomial using arrays efficiently $20X^8+10X^6+10X^5+20X^4+9X$	2	3	1	1,2
3.	Write a function to insert the element in the beginning of the Circular linked list.	2	2	2	1
4.	Show the content of a stack after reading each character while evaluating the following postfix expression and evaluate it $6\ 3\ 2\ 4\ /\ *\ +\ 9\ 8\ -\ /$	2	3	2	1,2
5.	How you can represent graph efficiently. Give example	2	1	3	1,2
6.	Construct the binary tree for the given traversal of the tree Preorder : X B L D G H C E I F K Inorder : L B G D H X E I C K F	2	3	3	1,2
7.	What is hashing? give example	2	1	4	1
8.	Write an efficient sorting algorithm to give rank list of students of 2/4-CSE class by modifying already existing rank list when the revaluation list is announced.	2	3	4	1,2
9.	What are the conditions to be satisfied by a binary search tree to be a RED-BLACK Tree?	2	1	1	1
10.	What is balancing factor? What all possible balancing factor value a node can have after Deleting a value in the right subtree of a node in an AVL tree .	2	2	2	1

Part-B (5×8 = 40 Marks)

		M	L	CO	PO
11. a)	Find the time complexity of the following code segment.	2	3	1	1,2

```
for (c = 0; c < m; c++) {
    for (d = 0; d < q; d++) {
        Sum=0;
        for (k = 0; k < p; k++) {
            sum = sum + first[c][k]*second[k][d];
        }
        third[c][d] = sum;
    }
}
```

b)	Write a program to maintain the list of players(Roll No, Name, Height) who all applied for the competition where only 20 players are allowed. It is required to shortlist the only 12 players based on their height . Display selected players and print the tallest person details and also shortest person details.	6	3	1	1,2
12. a)	Develop an algorithm to count the number of elements in a circular queue and perform insertion & deletion operations in a circular queue.	4	2	2	1,2
b)	A project expo contest is being organized in a college as part of Techfest activity. The coordinators are supposed to keep track of student details such as roll number, name, class and branch who are shortlisted in the first round . Design a C program to store the student details in a linked list and count the number of students participated from CSE department	4	3	2	1,2
13. a)	Write a function to insert the element into the Binary search Tree and show the content of a tree after inserting the value '25' and deleting the value 10	4	2	3	1,2

b)	Find the cost of minimum cost spanning tree using Kruskal's Algorithm and minimum cost.	4	3	3	1,2

14. a)	What is Collision? Explain Chaining method to avoid collision.	4	1	4	1
b)	Show the heap structure and sequence of elements during each iteration of heap sort algorithm when applied to following set of elements.	4	3	4	1,2

<p style="text-align:center">10, 35, 25, 45, 33, 44, 88, 90</p>

			M	L	CO	PO
15.	a)	Explain inserting an element into AVL tree by giving examples for all types rotations.	4	2	5	1,2
	b)	Build a splay tree by inserting the following elements in the sequence shown in below. 18, 11, 5, 40, 10, 150, 35,0 85, 280, 100	4	3	5	1,2
16.	a)	What is Sparse matrix? Explain the efficient representations of Sparse matrix with example.	4	1	1	1,2
	b)	Write a function that delete the employee details having emp_number as 'E06'. Imagine that the following details of the 'n' employee are available {emp_number, name, salary, address}	4	3	2	1,2
17.		Answer any *two* of the following:				
	a)	Explain the Breadth First Search algorithm with example.	4	2	3	1
	b)	Write a program to sort the customer information based on the total cost of the items purchased using quick sort technique.	4	2	4	1,2
	c)	Construct the B-tree of order 4 by inserting the given set of elements in the order 100, 20, 10, 60, 30, 40, 45, 70, 80, 90 105	4	3	5	1,2

M : Marks;   L: Bloom's Taxonomy Level;   CO; Course Outcome;   PO: Programme Outcome

i)	Blooms Taxonomy Level – 1	20%
ii)	Blooms Taxonomy Level – 2	30%
iii)	Blooms Taxonomy Level – 3 & 4	50%

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