

Hall Ticket Number:

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Code No. : 14144 B

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD*Accredited by NAAC with A++ Grade***B.E. IV-Semester Main & Backlog Examinations, July-2022****Principles of Data Structures (OE-II)**

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.	Why is recursion required in functions?	2	1	4	1
2.	List the properties of Asymptotic notations of big-oh and big-theta	2	1	2	1
3.	Why Linked Lists are used?	2	1	3	1
4.	List the steps in accessing an array element.	2	1	1	2
5.	Define Overflow and Underflow in stack.	2	1	3	1
6.	List the auxiliary Queue operations.	2	1	3	1
7.	Define Skew Tree.	2	1	1	1
8.	How many different binary trees are possible with n nodes?	2	2	3	2
9.	Write the Time complexity and Space complexity of unordered and ordered Linear search.	2	2	2	2
10.	Which sorting techniques follow divide and conquer approach?	2	1	1	1
<i>Part-B (5 × 8 = 40 Marks)</i>					
11. a)	Analyze the general rules used in determining runtime complexity of an algorithm.	4	2	2	1
b)	Write a C program to print Fibonacci series using recursion.	4	3	4	3
12. a)	Compare Linked list with arrays	4	2	3	2
b)	Devise an algorithm to insert a node at the end of the linked list.	4	3	3	2
13. a)	Evaluate the given Postfix expression 123*+4- using stacks.	5	4	3	3
b)	List applications of Queue	3	2	1	1
14. a)	Write the properties of binary tree with example.	4	2	3	1
b)	Write an algorithm to find the minimum element in the binary search tree.	4	4	3	2

15. a)	Given a sorted array of n elements with duplicates. Devise an algorithm to find the number of occurrences of number using binary search. .	5	4	3	3
b)	Explain Quick sort technique with an example.	3	2	3	1
16. a)	Define Data Structure and explain various types of Data structures with examples	4	2	1	1
b)	Develop an algorithm to delete an intermediate node in a singly linked list.	4	3	3	2
17.	Answer any <i>two</i> of the following:				
a)	Construct an algorithm for reversing a Queue Q. Illustrate with example.	4	3	3	2
b)	Write the algorithms for Preorder, Inorder and Postorder traversals with examples.	4	4	3	1
c)	Sort the array 7 8 1 2 5 3 6 4 using bubble sort. List all the steps.	4	3	3	3

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

i)	Blooms Taxonomy Level – 1	20%
ii)	Blooms Taxonomy Level – 2	32.5%
iii)	Blooms Taxonomy Level – 3 & 4	47.5%

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