

Hall Ticket Number:

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Code No. : 14144 C

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD*Accredited by NAAC with A++ Grade***B.E. IV-Semester Main & Backlog Examinations, July-2022****Data Structures and Algorithms (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.	List the characteristics of Computer Algorithms.	2	1	2	1
2.	Why is recursion required in functions?	2	1	2	1
3.	Define Sparse matrix. What are the two important applications of the sparse matrix?	2	1	1	1
4.	How circular linked list is different from single linked list?	2	1	1	1
5.	Identify that in which notation the following expression is given $*+AB-CD$ Convert this into the other two notations.	2	2	3	2
6.	Define stack. Write various operations performed on a stack with an example.	2	2	3	2
7.	Define hashing and write it's applications.	2	1	5	1
8.	Which are the functions used in C, for dynamic memory allocation? Explain their significance.	2	2	1	1
9.	What are the important properties of complete binary tree?	2	1	1	1
10.	Define min heap with an example	2	1	1	1
Part-B (5 × 8 = 40 Marks)					
11. a)	What are the steps to identify/compute the time complexity of the programme snippet?	3	2	2	1
b)	Derive the time complexity of matrix multiplication programme in the form of a polynomial in terms of its input size.	5	3	2	2
12. a)	What are the advantages and disadvantages of doubly linked lists	4	2	1	1
b)	Write a C program to insert an element into the doubly linked list at the end.	4	3	1	2
13. a)	Illustrate with an example that how a stack can be used to evaluate an expression	6	3	3	2
b)	A process waiting for an I/O operation is made to wait in a queue, not on a stack. Refute or Justify this statement.	2	3	3	2

14. a)	"4, 0, 1, 5, 9, 56, 12" Hand simulate the insertion sort on the list given and show all intermediate steps	5 3 5 3
b)	Explain merge sort with an example.	3 3 5 2
15. a)		6 4 3 3
	Why do you normally use Kruskal's algorithm? Apply Kruskal's algorithm on the above graph and get the required result.	
b)	Define a BST (Binary Search Tree) with a proper example	2 1 1 1
16. a)	In the era of very fast parallel machines, time complexity of an algorithm is not so important. What is your opinion about the above statement? Explain in detail.	4 3 2 1
b)	Write a short note on Abstract Data Types (ADT)	4 2 1 1
17.	Answer any <i>two</i> of the following:	
a)	What do you mean by dynamic array? Give a code snippet in C language to declare, read and print the elements of dynamic array.	4 2 3 2
b)	Write algorithm for quick sort and explain with an example	4 2 5 2
c) i)	Write the algorithms for preorder, inorder and postorder traversals for a binary tree.	4 3 4 3
ii)	Give preorder and postorder traversal sequences of the below binary tree.	

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

i)	Blooms Taxonomy Level – 1	20%
ii)	Blooms Taxonomy Level – 2	31.25%
iii)	Blooms Taxonomy Level – 3 & 4	48.75%