Hall Ticket Number:

Code No. : 14146 AS (C)

VASAVI COLLEGE OF ENGINEERING *(AUTONOMOUS)*, HYDERABAD

Accredited by NAAC with A++ Grade

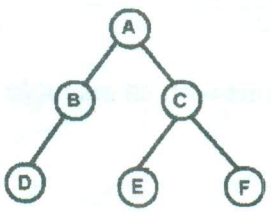
B.E. IV-Semester Advanced Supplementary Examinations, September-2022.

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
1.	Define recursion, Give an example.	2	1
2.	List out the drawbacks of an array.	2	1
3.	Define string. What is the output value you are expecting when comparing first string with second string? String1: Deepak String2: Deepika	2	1
4.	What is the time complexity of following operations in double linked list? Note: Double linked list is maintaining head and tail pointers while implementing. 1. Insert new node at beginning 2. Insert new node at ending 3. Delete existing node from beginning 4. Delete existing node from ending	2	1
5.	Based on which principle stack performs its operations? How do you allocate memory for stack dynamically? Give the syntax for N number of elements.	2	1
6.	What is Prefix notation of given Infix notation? Infix: (A + B) * (C – D)	2	1
7.	Explain the syntax of qsort() method.	2	2
8.	Explain overflow hashing with an example.	2	2
9.	What is the pre-order and post-order traversal of following binary tree? 	2	1
10.	Name any two types of graphs with a diagram.	2	1
	Part-B (5 × 8 = 40 Marks)		
11. a)	How can you measure the performance of an algorithm? Explain in detailed.	4	1

Contd... 2

b) What is sparse matrix? Why to use Sparse Matrix instead of simple matrix? Write a program to represent following sparse matrix using 2D array. — 4 — 3

$$\begin{bmatrix} 0 & 0 & 0 & 5 & 0 \\ 1 & 0 & 2 & 0 & 0 \\ 0 & 0 & 8 & 9 & 0 \\ 4 & 6 & 0 & 0 & 0 \\ 0 & 0 & 0 & 3 & 7 \end{bmatrix}$$

12. a) Given a sentence and a string, search the occurrence of the string in the sentence. Write a C program to fulfill above requirement. — 4 — 4

b) Write the code snippets in C language for the following. — 4 — 3

1. Insert node at the end of single linked list
2. Delete node from the end of double linked list

13. a) Write a C program to covert the following Infix notation into Postfix notation using stack. — 4 — 4

Infix: (A + B) * C / D – E + (F * G)

b) How to implement Queue in C? Explain in detail. — 4 — 2

14. a) Write a C program to sort following list of students based on Grade in ascending order and Score in descending order. — 4 — 3

fName	lName	Score	Grade
Aaron	French	98	A
Jessica	McMurphy	85	B
Michael	Johnson	92	A
Lebron	West	74	C
Steven	McGiver	79	C
Amanda	Stephenson	88	B
Jeremy	Jones	90	A
Amanda	Stephenson	83	B
Samantha	Givens	86	B
Leslie	McRoberts	94	A
Jeremy	Jones	75	C
Brittany	Davidson	91	A
William	O'Connell	97	A
Aaron	French	83	B

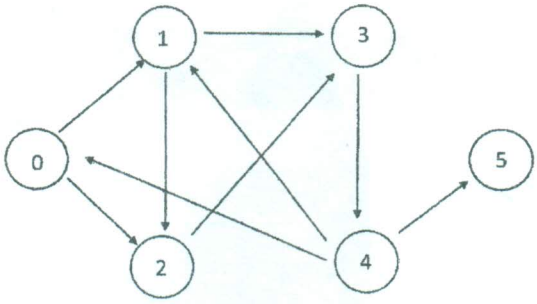
b) Explain the following hash functions with an example — 4 — 2

1. Division Method.
2. Mid Square Method.
3. Folding Method.
4. Multiplication Method.

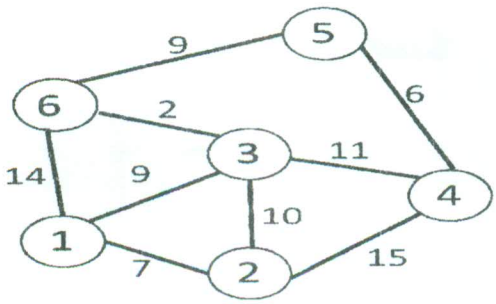
15. a) Construct the Binary Search Tree (BST) with following list of elements. Explain each step in detail. — 4 — 3

List: 56, 25, 75, 60, 30, 90, 85, 70, 20, 28, 15, 23, 35

Contd... 3

b)	Examine the traversals of the given graph by using Breadth First Search (BFS)? Explain in detail. 	4	4

16. a)	Explain the measurement of time complexity for the following program and also give the result of count variable if the value of n has taken as 10.
	`#include<stdio.h>`
	`int main()`
	`{`
	`int i, j, k, count = 0;`
	`for(i=n/2;i<=n;i++)`
	`for(j=1;(j+n/2)<=n;j++)`
	`for(k=1;k<=n;k=k*2)`
	`count++;`
	`printf("%d",count);`
	`return 0;`
	`}`
		4	2

b)	Demonstrate the following operations using circular linked list with code snippet. 1. Insert new node into CLL [Anywhere you can insert] 2. Delete an existing node from CLL [Anywhere you can delete]	4	2
17.	Answer any ***two*** of the following:		
a)	What are the drawbacks did you observed in Queue? How would you overcome with Circular Queue? Explain with an example.	4	2
b)	Write a program to sort a given array using Insertion Sort.	4	3
c)	Prepare the minimum cost spanning tree by using Prim's algorithm. Explain the process in detail. 	4	2

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

i)	Blooms Taxonomy Level – 1	25%
ii)	Blooms Taxonomy Level – 2	35%
iii)	Blooms Taxonomy Level – 3 & 4	40%

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