

Hall Ticket Number:

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Code No. : 14368 N

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD

Accredited by NAAC with A++ Grade

B.E. (E.E.E.) IV-Semester Main Examinations, July/August-2023

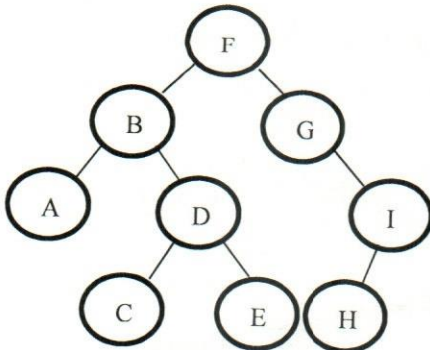
Data Structures Using C

Time: 3 hours

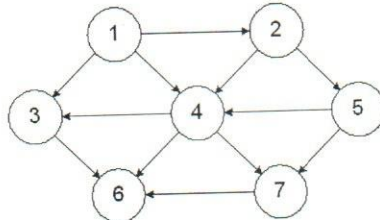
Max. Marks: 60

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 Theta notation with the help of an example.	2	1	1	1
2.	Show how you would set up a 2-Dimensional integer array using dynamic memory allocation in C.	2	1	1	1
3.	What is an abstract data type? Define Stack ADT.	2	1	2	1
4.	The following postfix expression with single digit operands is evaluated using a stack: $8\ 4\ 1\ \wedge / 2\ 4\ * + 5\ 2\ * -$ Give the top two elements of the stack after the first * is evaluated.	2	3	2	2
5.	List out the applications of Circular Queue.	2	2	3	1
6.	Consider a Queue, supporting the operations enqueue and dequeue. $DAT*A*STR***UC***TU*RE***S**$ Assume that for the above sequence, each letter (such as D, A etc..) corresponds to a enqueue of that letter onto the queue and each asterisk(*) corresponds to a dequeue operation on the queue. Show the sequence of values returned by the dequeue operations.	2	2	3	1
7.	Write the steps to delete a node from singly linked list.	2	1	4	1
8.	Illustrate the circular singly linked list representation of the following: 1) Insert an element at the end. 2) Delete a node from the beginning.	2	1	4	1
9.	Define Binary Search Tree and give example.	2	1	5	1
10.	Find the preorder traversal of the given graph.  <pre> graph TD F((F)) --- B((B)) F --- G((G)) B --- A((A)) B --- D((D)) G --- I((I)) D --- C((C)) D --- E((E)) E --- H((H)) </pre>	2	3	5	2
Part-B (5 × 8 = 40 Marks)					
11. a)	What is the difference between time and space complexity. Also describe asymptotic notations used for describing the complexity?	4	2	1	1

12. b)	Write a function to insert the element 'x' into an array at k th position.	4	2	1	1
12. a)	Write function to for push() and pop() operations on stacks with appropriate overflow and underflow conditions.	4	2	2	1
b)	Convert the infix expression $((A + B) * C - (D - E) ^ (F + G))$ to its postfix and prefix notations. Show the steps during conversion.	4	2	2	1
13. a)	Explain Queue ADT?	2	1	3	1
b)	Write a program to implement stack using two queues q1 and q2.	6	3	3	2
14. a)	Compare and contrast Linked List and Array.	2	1	4	1
b)	Write a menu-based program to perform the following operations on a singly linked list: i) insertBegin(int element) ii) deleteEvenNodes()	6	3	4	2
15. a)	Construct Binary Search Tree for the following set of elements: 125, 25, 500, 755, 20, 200, 150, 190	4	2	5	1
b)	Differentiate DFS and BFS techniques in Graphs.	4	2	5	1
16. a)	Write a recursive function to find sum of array of elements.	4	3	1	2
b)	Write the functions to perform push(int element) and printReverse() operations on a growable stack. Growable Stack is the concept of dynamically allocating double the memory to the stack whenever the "stack overflow" condition arises.	4	3	2	2
17.	Answer any <i>two</i> of the following:				
a)	Differentiate between Queue using Arrays and Queue using Linked Lists.	4	2	3	1
b)	Write a C program to merge two sorted linked list of size n1 and n2 in such a way that the duplicates in two linked list should be present only in the final sorted linked list. Example: Input: List1: 1->1->4->5->7 List2: 2->4->5->9 Output: 1->2->4->4->5->7->9	4	4	4	2
c)	Perform the following operations on the given graph. 1) Write the adjacent matrix. 2) Write the adjacent list.	4	3	5	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	40%
iii)	Blooms Taxonomy Level – 3 & 4	40%