Roll No. | | | | | | | | | |

(95)

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COER University

END SEMESTER EXAMINATION, EVEN SEM 2022-23

Time : 3 hours
Total Marks : 100
Program Name : B.Tech (CSE/ AI&ML /Cyber Security)
Semester : II
Course Name : Data Structure Using C
Course Code : BTCS204

Note: All questions are compulsory. No student is allowed to leave the examination hall before the completion of the time.

Q. No 1	Attempt Any Four Parts. Each Question Carries 5 Marks.	CO	BL
(a)	Justify the statement, "Any step-by-step process that is completed the same way every time is an algorithm"	CO 1	4
(b)	Explain space and time complexity. Also discuss time-space trade off.	CO 1	2
(c)	Apply the binary search technique to search element 15 in sorted array A with 7 elements 3, 10, 15, 20, 35, 40, 60.	CO 1	3
(d)	Illustrate the working of bubble sort method, consider the sorting of the following array in ascending order 12, 40, 3, 2, 15.	CO 1	2
(e)	Describe the basic principles of algorithm design. What are the key factors to consider when designing an efficient algorithm?	CO 1	2

Q. No 2	Attempt Any Four Parts. Each Question Carries 5 Marks.	CO	BL
(a)	Explain the Self-Referential Structure? How many types of linked list can be implemented in C Programing?	CO 2	2
(b)	Evaluate the following postfix expression using stack.2 3 9 * + 2 3 ^ - 6 2 / +, show the contents of each steps?	CO 2	5
(c)	How a stack can meet overflow and underflow conditions? Write the function for PUSH and POP Operations in C Programming?	CO 2	4
(d)	Define Doubly link-list with an example. Also write a C function to delete the end element from doubly link list.	CO 2	2,5
(e)	How does a linear queue compare with the circular queue?	CO 2	4

Q. No 3	Attempt Any Four Parts. Each Question Carries 5 Marks.	CO	BL
(a)	Apply the Heap Sort Technique on the following element of array 23,56,1,8,55,9,8,7, 11,90,34,88.	CO 3	3
(b)	Do the comparative study between Max Heap and Mn Heap with the help of example?	CO 3	4
(c)	Discuss the role of Tournament tree in Merge Sort Technic with the help of example?	CO 3	4
(d)	Define binary search tree with example. Also write function of pre-order tree traversal.	CO 3	2
(e)	Define AVL tree. Construct an AVL tree having the following elements: H, I, J, B, A, E, C, F, D, G, K, L	CO 3	3

Q. No 4	Attempt Any Two Parts. Each Question Carries 10 Marks.	CO	BL
(a)	Elaborate the term Graph? How many types of graphs we can draw and show the represent a graph in Linked List formation?	CO 4	5
(b)	Analyze a given matrix mentioned in following figure, design a directed graph and identify the source and sink node, self-node, also prove that Graph is fully connected or not?		
(c)	Define graph traversal? Define the breadth first and depth first search algorithm with example	CO 4	2

	0	1	2	3	4	5
0	0	1	1	1	1	0
1	1	0	0	1	0	0
2	1	0	0	1	1	1
3	1	1	1	0	0	1
4	1	0	1	0	0	0
5	0	0	1	1	0	0

Q. No 5	Attempt Any Two Parts. Each Question Carries 10 Marks.	CO	BL
(a)	Elaborate the processes to deduct the collision? How open hashing method used?	CO 5	5
(b)	Define the term Hashing. What is the need of Hashing and define its key components and working?	CO 5	2
(c)	Consider a hash table with a size of 8 and the following set of keys: {5, 12, 8, 17, 3, 21, 10}. Assume we are using a simple hash function that calculates the remainder when dividing the key by the table size.	CO 5	6

----------**End of Paper**----------