Total No. of Question : [4] **Registration No. :** | | | | | | | | | |

Programme Name : Bachelor of Computer Science Engineering
Regular S.Y.B.Tech. ESE (A.Y. 2023-24) Sem. III Nov.2023
III SEMESTER (2022 BATCH)
201CSL204-Data Structures-TH

Duration : [11:00 AM - 01:00 PM]
Date : 30 Nov, 2023
Day : Thursday

Marks : 50

Instructions :

(Q1) **All Questions are compulsory** [20.0]

(a) What is hashing? Explain various types of hash functions. [6.0]

CO :- CO2
Blooms Taxonomy :- Understand

OR [a / b]

(b) What is data structure? Write an algorithm for linear search and binary search. [6.0]

CO :- CO2
Blooms Taxonomy :- Understand

(c) Write an algorithm of Bubble sort & sort the following numbers using Bubble sort & show the contents of an array after every pass. 81, 5, 27, -6, 104, 15. [7.0]

CO :- CO2
Blooms Taxonomy :- Understand

(d) What is the advantage of circular queue? Explain insertion and deletion operation in circular queue with suitable examples. Show overflow and underflow conditions. [7.0]

CO :- CO3
Blooms Taxonomy :- Understand

(Q2) **All Questions are compulsory** [10.0]

(a) What is linked list? Explain types of linked list with the help of example. [5.0]

CO :- CO3
Blooms Taxonomy :- Understand

(b) Write algorithms to insert a node at beginning and delete a node from beginning in the singly linked list. [5.0]

CO :- CO3
Blooms Taxonomy :- Understand

OR [b / c]

(c) Write algorithms to insert a node at end and delete a node from end in the doubly linked list. [5.0]

CO :- CO3
Blooms Taxonomy :- Understand

(Q3) **All Questions are compulsory** [10.0]

(a) What is AVL tree? Construct AVL tree for the following data: 1, 2, 3, 4, 5 [5.0]

CO :- CO4
Blooms Taxonomy :- Apply

OR [a / b]

(b) What is Heap tree? Construct heap tree (maxheap) using following data entered as a sequential set. 44, 30, 50, 22, 60, 55 [5.0]

CO :- CO4
Blooms Taxonomy :- Apply

(c) Construct Binary Search Tree of following data and apply all the tree traversal techniques on that tree. Data:- 11, 6, 19,4,10,43,60 [5.0]

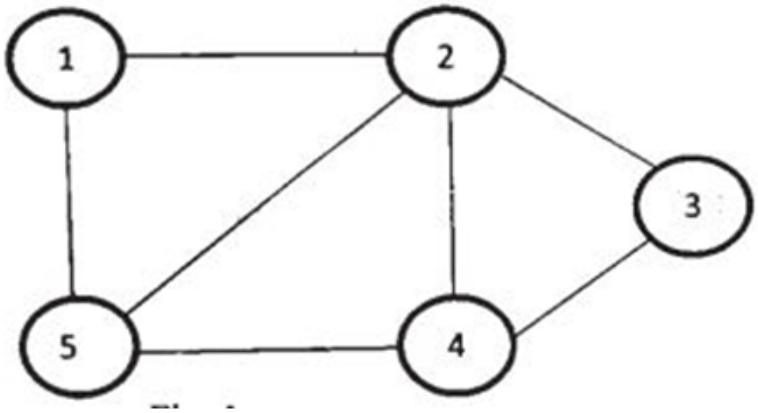
CO :- CO4
Blooms Taxonomy :- Apply

(Q4) **Attempt any two out of three questions** [10.0]

(a) What is graph? Explain representation of directed graph using adjacency matrix and adjacency list with example. [5.0]

CO :- CO3
Blooms Taxonomy :- Understand

(b) Explain Depth First Search (DFS) traversal using following graph. [5.0]



CO :- CO3
Blooms Taxonomy :- Understand

(c) What is sparse matrix? Explain representation of sparse matrix using array and linked list. [5.0]

CO :- CO3
Blooms Taxonomy :- Understand

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