| | InSem Examination-IWinter 2023 | | |
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| | Exam Seat No.: | | |
| | Academic Year:2023-2024 | Semester:I | |
| | Name of Programme:MCA | Pattern:2022 | |
| | Name of Course:Data Structures and Algorithms | Course Code:221002 | |
| | Max. Marks:30 | Duration:1 | |

**Instructions:** Candidates should read carefully the instructions printed on the Question Paper
and on the cover page of the Answer Book, which is provided for their use.
1. This question paper contains __2___ page(s).
2. Answer to each new question is to be started on a new page.
3. Assume suitable data wherever required, but justify it.
4. Draw the neat labelled diagrams, wherever necessary.
5. The last columns indicates the Course Outcome and level of Blooms Taxonomy of
the Question/sub-question

**Question No. 1 Attempt following Question**

a)  Illustrate Asymptotic notation- Big-O and Theta                (8)      CO5

**OR**

b)  Describe Sparse Matrix. Write a pseudo C algorithm for simple
    transpose of sparse matrix. Also mention the time complexity      (8)      CO5

c)  Illustrate two-dimensional arrays with row and column major
    implementation. Explain address calculation in both cases with    (7)      CO5
    example

**OR**

d)  Illustrate types of Data structures with example              (7)      CO5

**Question No. 2 Attempt following Question**

a)  Compare singly linked list and doubly linked list with suitable
    example. Write a function in C to traverse the doubly linked list, (8)      CO1
    Printing out the contents of the data field of each node

**OR**

b)

Describe Singly Linked List. State the limitations of single linked list. Write following C functions in SLL:

i) Insert a node at the beginning

(8)   CO1

ii) Delete a node at the end

c)   Describe circular linked list .Write Pseudo C code for inserting node in the circular linked list at beginning

(7)   CO1

**OR**

d)   Illustrate application of Linked List. Explain Polynomial Manipulation using linked list

(7)   CO1