



K. K. Wagh Institute of Engineering Education & Research, Nashik
(An Autonomous Institute From A.Y. 2022-23)

	InSem Examination-IWinter 2023		
	Exam Seat No.:		
	Academic Year:2023-2024	Semester:III	
	Name of Programme:B.Tech	Pattern:2022	
	Name of Course:Fundamentals of Data Structures	Course Code:COM222001	
	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 ____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)

a) Explain following terms with suitable example.

1)Data structure

(5) CO1

2)Linear & non-linear data structure

3)Persistent and ephemeral

OR

b)

Explain what an algorithm is and illustrate its essential characteristics of good algorithm.

(5) CO1

c)

Explain data type and compare built-in data type and user defined data type with example

(5) CO1

OR

- d) Illustrate an algorithm to compute the sum of the digits of the given number. Justify that your algorithm satisfies all the characteristics of an algorithm. (5) CO1
- e) Explain frequency count and its importance in the analysis of algorithm. (5) CO1

OR

- f) Explain time complexity and space complexity with respect to algorithm. Calculate time complexity of given example

```
void mat_add(int a[][], int b[][])
{
    int c[][];
    for(i=0;i<n;i++)
    {
        for(j=0;j<n;j++)
        {
            c[i][j]=a[i][j]+b[i][j];
        }
    }
}
```

(5) CO1

Question No. 2 Attempt following Question

- a) Make use of two-dimensional arrays with row and column major representation. Consider an integer array, int A[3][4] in C++. It takes 2bytes to store one element. If the base address is 1050, find the address of the element A[2][3] with row- major and column-major representation of the array. (5) CO2

OR

- b) Build an algorithm for fast transpose of sparse matrix. (5) CO2
- c) Select appropriate way to organize / represent polynomial. State its advantages and disadvantages. (5) CO2

OR

- d) Build an algorithm/Pseudo code/ C++ code to perform addition of two polynomials. (5) CO2
- e) Develop a C++ Pseudo code to concatenate two strings using array. (5) CO2

OR

- f) Identify various characteristics, advantages and disadvantages of sequential organization (arrays). (5) CO2