

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA**(An Autonomous Institute)**

Affiliated to Dr. A.P. J. Abdul Kalam Technical University, Uttar Pradesh, Lucknow

Course: B.Tech.

Branch: CSBS

Semester 5th

Sessional Examination: 1st

Subject Name: Design and Analysis of Algorithms Year- (2022 - 2023)

Time: 1.15 Hours

Max. Marks:30

General Instructions:

- This Question paper consists of 2 pages & 5 questions. It comprises three Sections -A, B, &C. You are expected to answer them as directed.
- Section A -Q.No- 1 is of one 1 mark each & Q. No- 2 carries 2 mark each.
- Section B - Q. No- 3 carries 5 marks each.
- Section C - Q.No-4 & 5 carries 6 marks each. Attempt any one part a or b
-

SECTION – A**[08Marks]****1. All questions are compulsory-****(4×1=4)**

- a. Which of the following is used for solving the N Queens Problem?

(1) CO 2

1. Greedy algorithm
2. Dynamic programming
3. Backtracking
4. Sorting

- b. To main measures of the efficiency of an algorithm are?

(1) CO 1

1. Time and space complexity
2. Data and space
3. Processor and memory
4. Complexity and capacity

- c. Which of the following data structure is used to perform recursion?

(1) CO 1

1. Linked list
2. Array
3. Queue
4. Stack

- d. Another name of the fractional knapsack is?

(1) CO 2

1. Non-continuous knapsack problem
2. Divisible knapsack problem

3. 0/1 knapsack problem
4. Continuous Knapsack Problem

2. All questions are compulsory-

- a. Explain the Brute force Approach?
- b. What are the Characteristics of Algorithm?

(2×2=4)

(2) CO 2

(2) CO 1

SECTION - B

[10Marks]

3. Answer any two of the following-

- a. Difference between Greedy Technique and Dynamic programming.
- b. Differentiate between Time Complexity with Space Complexity.
- c. Find the O notation of following function: -

(2×5=10)

(5) CO 2

(5) CO 1

(1)

(5) CO 1

$$F(n) = 5n^3 + n^2 + 6n + 2$$

(2) $F(n) = 6n^2 + 3n + 2^n$

~~$F(n) = 2^n$~~

SECTION - C

[12 Marks]

4. Answer any one of the following-

(1×6=6)

- a. Find the Time Complexity through substitution method.

(6) CO 1

$$T(n) = \begin{cases} 1 & \text{if } n=1 \\ T(n-1) + \log(n) & \text{if } n>1 \end{cases}$$

- b. A()

(6) CO 1

```
{
    int n=22;
    for (i=1; i<=n; i++)
    {
        j=2;
        while (j<=n)
        {
            j=j^2;
            printf("CSBS")
        }
    }
}
```

$a=1, b=2$
 $f(n) = \log n$

$j=j^2$
 printf("CSBS")

$\log_2 \log_2 n$

$\log n \times \log 2$
 $O(\log n)$

$O(n \log_2 \log_2 n)$

5. Answer any one of the following-

(1×6=6)

- a. Solve the following recurrence using Master method: $T(n) = 6T(n/3) + n^2 \log n$.

(6) CO 1

- b. Write down Algorithm to compute Knapsack problem. With Example

(6) CO 2

$f(n) = n^2 \log n$
 $f(n) > a \log b^a$
 $O(n^2 \log n)$