

Roll No.

Total No. of Pages : 02

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B.Tech. (IT) (Sem.-4)  
**DESIGN & ANALYSIS OF ALGORITHMS**

Subject Code : BTIT-403-18

M.Code : 77540

Date of Examination : 14-05-2024

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Answer briefly:

- (a) Algorithm
- (b) Time space trade-off
- (c) Branch and bound
- (d) Bin packing
- (e) Transitive closure
- (f) Heuristics
- (g) Tractable problems
- (h) Topological sorting
- (i) Recursive algorithm
- (j) Graph.

## SECTION-B

2. Write a recursive algorithm for computing the nth fibonacci number.
3. Elaborate the asymptotic analysis of an algorithm with an example.
4. Discuss the knapsack problem in detail. Give suitable examples.
5. What is backtracking? How backtracking is used to solve the N-Queen problem?
6. Briefly explain the classes : NP-hard and NP-complete.

## SECTION - C

7. Differentiate between depth first search and breadth first search traversal algorithms.
8. *“A randomized algorithm uses a source of randomness as part of its logic to decide what to do next anywhere in its logic. The purpose of random variable is to get an idea about result of a particular situation where we are given probabilities of different outcomes.”* Justify.
9. Discuss the approximation algorithms. Solve the following recurrence relation using substitution method.  $T(n) = 2T(n/2) + n$ . Here  $T(1) = 1$ .

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**