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

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

Course : B.Tech.

Branch : CSBS

Semester: V

Sessional Examination: Second

Subject Name: Design and Analysis of Algorithms

Year- (2022 - 2023)

Time: 1.15 Hours

Max. Marks:30

General Instructions:

- This Question paper consists of 02 pages & 05 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. If a problem can be solved by combining optimal solutions to non-overlapping problems, the strategy is called _____ (1) CO2
- a. Dynamic programming
b. Greedy
c. Divide and conquer
d. Recursion
- b. If a problem can be broken into subproblems which are reused several times, the problem possesses _____ (1) CO2
- a. Overlapping subproblems
b. Optimal substructure
c. Memoization
d. Greedy
- c. What is the time complexity of Huffman Coding? (1) CO2
- a. $O(N)$
b. $O(N \log N)$
c. $O(N(\log N)^2)$
d. $O(N^2)$

- d. Which of the following standard algorithms is not a Greedy algorithm? (1) CO2
- Dijkstra's shortest path algorithm
 - Prim's algorithm
 - Kruskal algorithm
 - Bellman Ford Shortest path algorithm
2. All questions are compulsory- (2×2=4)
- Explain TSP (Travelling Sales Person) problem with example. (2) CO3
 - Difference between Greedy Technique and Dynamic programming. (2) CO2

SECTION - B

3. Answer any two of the following- [10Marks]
- Explain Reliability Design Problem with Example? (2×5=10)
 - Write down an algorithm to compute Longest Common Subsequence (LCS) of two given strings and analyze its time complexity. (5) CO2
 - Explain Matrix Chain Multiplication with Example? (5) CO2

SECTION - C

4. Answer any one of the following- [12Marks]
- Explain a greedy single source shortest path algorithm with an example. (1×6=6)
 - What is an optimal Huffman Code for the following set of frequencies (6) CO3
A: 05, b:48, c:07, d:17, e:10, f:13 (6) CO2
5. Answer any one of the following-
- State Bellman Ford Algorithm? Explain with Example? (1×6=6)
 - Find the optimal solution for the Knapsack 0/1 problem by using the dynamic problem approach? Consider, (6) CO3
P = {1, 2, 5, 6} (6) CO2
W = {2, 3, 4, 5}
M (Capacity) = 8
N (Objects) = 4