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| **UNITED COLLEGE OF ENGINEERING & RESEARCH, PRAYAGRAJ (010)** | | | | **Department of Computer Science and Engineering** | | | | |
| Special Sessional Examination (Even Semester 2022-23) | | | | SEMESTER: Vth | | | | Date:- 10-12-2022 |
| TIME: 2 hours. | | | SUBJECT : Design and Analysis of Algorithm | Paper code: KCS-503 | | | | MM. 30 |
| **READ ALL INSTRUCTIONS AND QUESTIONS VERY CAREFULLY** | | | | | | | | |
| **SECTION A (Attempt ALL questions) Very short answer** | | | | | **[5]** | **CO** | **Bloom’s Taxonomy Level** | |
| 1 | a | Differentiate between Greedy Technique and Dynamic programming. | | | [1] | 4 | L2(Understand) | |
| 1 | b | Write down the dynamic programming formula to solve 0/1 knapsack problem. | | | [1] | 4 | L1(Remember) | |
| 1 | c | Define NP-Hard and NP- complete problems. | | | [1] | 5 | L1(Remember) | |
| 1 | d | Explain Approximation and Randomized algorithms. | | | [1] | 5 | L2(Understand) | |
| 1 | e | Define feasible and optimal solution. | | | [1] | 3 | L1(Remember) | |
| **SECTION B (Attempt any two questions) Long answer** | | | | | **[10]** |  |  | |
| 2 |  | Find an optimal parenthesization of a matrix chain product whose sequence of dimensions is {10, 5, 3, 12, 6}. | | | [5] | 4 | L3(Apply) | |
| 3 |  | Define Floyd Warshall Algorithm for all pair shortest path and apply the same on following graph: | | | [5] | 4 | L3(Apply) | |
| 4 |  | What is the difference between Backtracking and Branch & Bound? Write Pseudo code for Subset Sum Problem using Backtracking. Give example for the same. | | | [5] | 4 | L4(Analyze) | |
| **SECTION C (Attempt any two question) Long answer** | | | | | **[10]** |  |  | |
| 5 |  | Describe in detail Knuth-Morris-Pratt string matching algorithm. Compute the prefix function 𝜋 for the pattern ababbabbabbababbabb when the alphabet is Σ = {a,b}. | | | [5] | 5 | L3(Apply) | |
| 6 |  | Write and explain the algorithm to solve vertex cover problem using approximation algorithm. | | | [5] | 5 | L4(Analyze) | |
| 7 |  | What is an approximation algorithm? What is meant by P(n) approximation algorithms? Discuss approximation algorithm for Travelling Salesman Problem. | | | [5] | 5 | L4(Analyze) | |
| **SECTION D (Attempt any one question) Long answer** | | | | | **[5]** |  |  | |
| 8 |  | Define spanning tree. Write Kruskal’s algorithm for finding minimum cost spanning tree. | | | [5] | 3 | L4(Analyze) | |
| 9 |  | Consider the following instance for knapsack problem. Find the solution using Greedy method:  N= 10, W=130  P [] = {21, 31, 43, 53, 41, 63, 65, 75}  V [] = {11, 21, 31, 33, 43, 53, 65, 65} | | | [5] | 3 | L3(Apply) | |
| **#### END OF PAPER ####** | | | | | |  |  | |

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| **Course Outcome Wise Marks Distribution** | CO1 | CO2 | CO3 | CO4 | CO5 |
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| **Bloom’s Taxonomy Wise Marks Distribution** | L1 | L2 | L3 | L4 | L5 | L6 |
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