**18CS406/18IT406**

**Hall Ticket Number:**

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| **II/IV B.Tech (Regular/Supplementary) DEGREE EXAMINATION** | | | |
| **August, 2021** | **Common to CSE and IT** | | |
| **Fourth Semester** | **Design and Analysis of Algorithms** | | |
| **Time:** Three Hours | | **Maximum: 5**0 Marks | |
| *Answer Question No. 1 Compulsorily.* | | | (10X1 = 10 Marks) |
| *Answer* ***ANY ONE*** *question from each Unit.* | | | (4X10=40 Marks) |

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| 1. | a) | What is time complexity of an algorithm? | CO1 | |  |
|  | b) | Define algorithm. | CO1 | |  |
|  | c) | State single source shortest path problem. | CO2 | |  |
|  | d) | What are the advantages of greedy approach? | CO2 | |  |
|  | e) | When does worst case occurs for quick sort? | CO2 | |  |
|  | f) | What is principle of optimality? | CO3 | |  |
|  | g) | List the merits and demerits of BFS. | CO3 | |  |
|  | h) | What is a multi-stage graph? | CO3 | |  |
|  | i) | What is the state-space tree? | CO4 | |  |
|  | j) | Define NP- hard problem. | CO4 | |  |
| **Unit - I** | | | | | |
| 2. | a) | What is asymptotic notation? Elaborate on Asymptotic Notations with examples. | CO1 | **5M** | |
|  | b) | Analyze the time complexity for the sum of n array elements. | CO1 | **5M** | |
|  |  | **(OR)** |  |  | |
| 3. | a) | Write in detail about pseudocode conventions. | CO1 | **5M** | |
|  | b) | Write an algorithm to add two m X n matrices. Determine the time complexity of the algorithm in terms of program steps by using the step count approach. | CO1 | **5M** | |
| **Unit - II** | | | | | |
| 4. | a) | What is divide and conquer strategy? Write control abstraction for it. | CO2 | **5M** | |
|  | b) | Write an algorithm for sorting the given elements using Quick sort. | CO2 | **5M** | |
|  |  | **(OR)** |  |  | |
| 5. | a) | What is a Minimum Cost Spanning tree? Find Minimum cost spanning tree for the following graph using krushkal’s algorithm.  C:\Users\exam\Desktop\CSE1.png | CO2 | **5M** | |
|  | b) | State the Job – Sequencing with deadlines problem. Find an optimal sequence to the instance n=5 Jobs where profits (P1, P2, P3, P4, P5) = (20,15,10,5,1) and deadlines (d1, d2, d3, d4, d5) = (2,2,1,3,3). | CO2 | **5M** | |
| **Unit - III** | | | | | |
| 6. | a) | Define Feasible solution and Optimal solution. Describe each by means of appropriate examples. | CO3 | **4M** | |
|  | b) | Assume that there are 4 cities A,B,C,and D that are to be visited by a salesperson. Following matrix represents the cost of moving from one city to the other. Solve this TSP using dynamic programming approach.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | A | B | C | D | | A | 0 | 2 | 9 | 10 | | B | 1 | 0 | 6 | 4 | | C | 15 | 7 | 0 | 8 | | D | 6 | 3 | 12 | 0 | | CO3 | **6M** | |
|  |  | **P.T.O.**  **18CS406/18IT406**  **(OR)** |  |  | |
| 7. | a) | By means of an example graph, illustrate the working of DFS algorithm. | CO3 | **5M** | |
|  | b) | Explain how to find the biconnected components of the following graph: | CO3 | **5M** | |
| **Unit – IV** | | | | | |
| 8. |  | Find the optimal solution for the following sum of subsets problem.  (w1,w2,w3,w4) = (7,11,13,24) where n=4 and m=31. | CO4 | **10M** | |
|  |  | **(OR)** |  |  | |
| 9. | a) | Explain in detail about P, NP and NP-Complete problems. | CO4 | **6M** | |
|  | b) | Briefly describe least cost branch and bound technique. | CO4 | **4M** | |

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