** D.Y. PATIL COLLEGE OF ENGINEERING & TECHNOLOGY**

**Set-: I**

**Q. Paper Code:**

**22CSE301501**

**KASABA BAWADA KOLHAPUR-416006**

**(An Autonomous Institute)**

T. Y. B. Tech (CSE), Sem-V

**END SEMESTER EXAMINATION(ESE), Nov. – 2022**

Course Name: **Design and Analysis of Algorithms** Course Code: **201CSL301**

Seat No:

**Day and Date: Monday, 05.12.2022**

**Time: 2.00 pm to 4.00pm Max. Marks- 50**

***Instructions:***

1. *Figure to the right indicate full marks.*

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| **BT** | **CO’s** | **Q. No.** |  | | **Marks** |
|  |  | **Q.1** | **All Questions are compulsory** | | **20** |
| **3** | **CO1,CO2** | **a** | Write an algorithm for the min-max problem using the divide-and-conquer approach. Show that its time complexity is O(3n/2). |  | **6M** |
| **3** | **CO1** | **b1**  **b2** | What is the solution generated by job sequencing when n=7 , (p1…..p7)=(3,5,20,18,1,6,30) and (d1…..d7)=(1,3,4,3,2,1,2)?  Explain the greedy approach and its control abstraction. | **4M**  **3M** |
| **3** | **CO1** | **c** | Explain the graph coloring problem using the backtracking approach. Write its algorithm. | **7 M** |
|  | | | | | |
|  |  | **Q.2** | **All Questions are compulsory.** | | **10** |
| **4** | **CO3** | **a** | What data structures are used to implement BFS and DFS? Apply BFS traversal to the given graph. Also, identify and mention whether the graph is connected or not. |  | **4** |
| **4**  **2** | **CO3** | **b** | Define the articulation point from the following graph and identify articulation point using DFS spanning tree.  **OR**  Describe traversal techniques for graphs with algorithms. | **6** |
|  | | | | | |
|  |  | **Q.3** | **All Questions are compulsory** | | **10** |
| **4** | **CO3** | **a** | Solve the following instance of knapsack 0/1 problem where ( w1,w2,w3,w4)=(10,15,6,9) and (p1,p2,p3,p4)=(2,5,8,1) where knapsack capacity m=11. |  | **3** |
| **4** | **CO3** | **b** | Find the minimum cost path from ***s*** to ***t*** in the multistage graph using the forward approach.  ***OR***  Solve the following problem on the Travelling Salesperson problem with 1 as the source node. | **7** |
|  | | | | | |
|  |  | **Q.4** | **Attempt any two out of three questions** | | **10** |
| **2** | **CO4** | **a** | Define **P and NP** problems. Explain relationship between P, NP, NP complete and NP hard problems with neat diagram. |  | **5** |
| **2** | **CO4** | **b** | Explain Clique decision problem and show that Clique decision problem is NP-Hard. | **5** |
| **2** | **CO4** | **C** | Explain AND/OR graph decision problem. | **5** |

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