**CS 414**

**Hall Ticket Number:**

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**IV/IV B.Tech (Supplementary) DEGREE EXAMINATION**

**November, 2019** — **Common to CSE & IT**

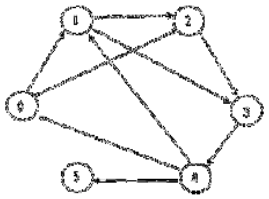
**Seventh Semester** — **Design and Analysis of Algorithms**

**Time:** Three Hours — **Maximum:** 60 Marks

*Answer Question No.1 compulsorily.* (1X12 = 12 Marks)

*Answer ONE question from each unit.* (4X12=48 Marks)

1. Answer all questions (1X12=12 Marks)
   a) Illustrate the factors which effect the running time of the algorithm?
   b) Compare the relation between O and Ω.
   c) What is the best case time complexity of merge sort?
   d) Compare feasible and optimal solution.
   e) Define purging rule.
   f) Discuss principle of Optimality.
   g) Define Bi- connected component.
   h) Discuss the concept of sum of sub set problem.
   i) What is the DFS sequence for the following graph?



   j) Discuss the approach of Branch and Bound?
   k) State satisfiability problem.
   l) Differentiate deterministic and non deterministic algorithms?

**UNIT I**

2. a) Explain about Strassen's Matrix Multiplication with example? 6M
   b) Write the algorithm for merge sort and analyze time complexity. 6M

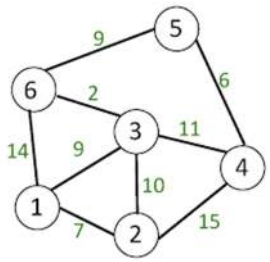
**(OR)**

3. a) Write the algorithm for linear search and analyze the time complexity of binary search algorithm. 6M
   b) Sort the following elements get using quick sort 6M

[310,285,179,652,351,423,861,254,450,520]

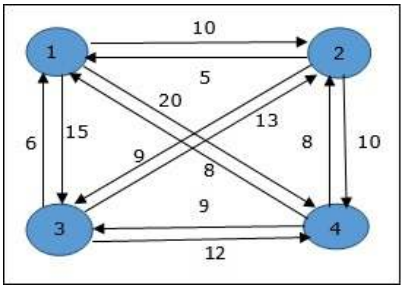
**UNIT II**

4. a) Construct minimum cost spanning tree for the following weighted undirected graph using prim's and kruskal's algorithm.




6M

   b) For the following graph find minimum cost tour for the travelling salesperson problem using dynamic programming.




6M

**P.T.O.**

**(OR)**

5. a) What is the solution generated by function Job Sequencing algorithm when n=6 (P1…p6) = (3, 5, 20, 18, 1, 6), and (d1..d6) = (1, 3, 4, 3, 2, 1). 6M
   b) Apply dynamic programming concept to find the longest common sequence. 6M

**UNIT III**

6. a) Explain Depth first search graph travelling technique with example and write the algorithm for DFS? 6M
   b) Device backtracking algorithm to find all solutions to the n-queens problem and represent the solution space in state space tree. 6M

**(OR)**

7. a) Explain about knapsack problem using back tracking? 6M
   b) Explain Bi connected components with example? 6M

**UNIT IV**

8. a) Generate minimum length tour for the given cost adjacency matrix using branch and bound. 6M

$$\begin{bmatrix} \infty & 18 & 28 & 8 & 9 \\ 13 & \infty & 14 & 2 & 1 \\ 1 & 3 & \infty & 1 & 2 \\ 17 & 4 & 16 & \infty & 1 \\ 14 & 2 & 5 & 16 & \infty \end{bmatrix}$$

   b) Explain NP hard and NP complete problems with examples? 6M

**(OR)**

9. a) Explain the principles of LC Branch- and-Bound? 6M
   b) Differentiate P class and NP class problems and explain with examples? 6M

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**IV/IV B.Tech (Supplementary) DEGREE EXAMINATION**

**November, 2019** — **Computer Science and Engineering**

**Seventh Semester** — **Design & Analysis of Algorithms**

**Time:** Three Hours — **Maximum:** 60 Marks

*Answer Question No.1 compulsorily.* (1X12 = 12 Marks)

*Answer ONE question from each unit.* (4X12=48 Marks)

| | | | |
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| 1. | Answer all questions | | (1X12=12 Marks) |
| | a) | Illustrate the factors which effect the running time of the algorithm? | |
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| | c) | What is the best case time complexity of merge sort? | |
| | d) | Compare feasible and optimal solution. | |
| | e) | Define purging rule. | |
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| | g) | Define Bi- connected component. | |
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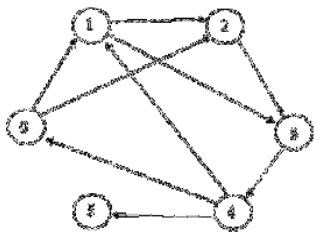
| | i) | What is the DFS sequence for the following graph?  | |
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| | k) | State satisfiability problem. | |
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| | | **UNIT I** | |
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| 3. | a) | Write the algorithm for linear search and analyze the time complexity of binary search algorithm. | 6M |
| | b) | Sort the following elements get using quick sort [310,285,179,652,351,423,861,254,450,520] | 6M |
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| 4. | a) | Construct minimum cost spanning tree for the following weighted undirected graph using prim's and kruskal's algorithm. | 6M |

| | | | |
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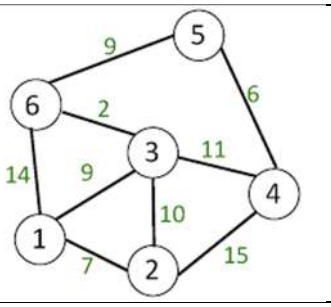
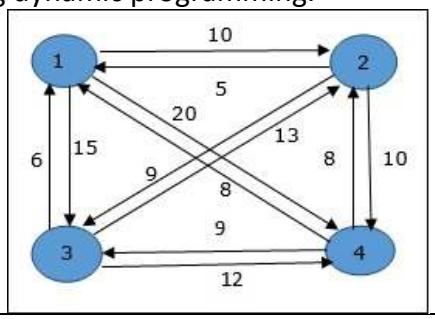
| | |  | |
| | b) | For the following graph find minimum cost tour for the travelling salesperson problem using dynamic programming.<br>  | 6M |
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| 5. | a) | What is the solution generated by function Job Sequencing algorithm when n=6 (P1…p6) = (3, 5, 20, 18, 1, 6), and (d1..d6) = (1, 3, 4, 3, 2, 1). | 6M |
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| | b) | Explain NP hard and NP complete problems with examples? | 6M |
| | | **(OR)** | |
| 9. | a) | Explain the principles of LC Branch- and-Bound? | 6M |
| | b) | Differentiate P class and NP class problems and explain with examples? | 6M |