



B.E DEGREE EXAMINATIONS: NOV/DEC 2023

(Regulation 2018)

Fourth Semester

INFORMATION SCIENCE AND ENGINEERING

U18IST4001: Design and Analysis of Algorithms

COURSE OUTCOMES

CO1: To understand and apply the various algorithm analysis techniques

CO2: To discuss the various representation and applications of graphs

CO3: To study the different problem solving techniques

Time: Three Hours

Maximum Marks: 100

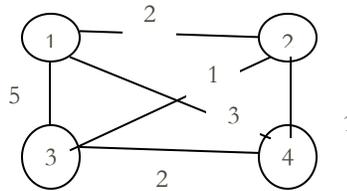
Answer all the Questions

PART A (10 x 2 = 20 Marks)

(Answer not more than 40 words)

1. Construct the minimum spanning tree for the given graph

CO2 [K4]



2. Write an algorithm to solve Depth First Search .

CO2 [K2]

3. Write euclid's algorithm to find GCD(m,n).

CO1 [K2]

4. Prove that $(1/2)n(n-1) \in (n^2)$

CO1 [K5]

5. Write the formula to calculate the distance in closest pair algorithm

CO3 [K2]

6. Write the complexity of strassen's algorithm and compare with brute force technique.

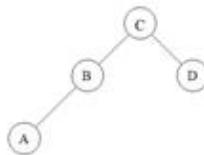
CO3 [K2]

7. Compare Divide and conquer and Dynamic programming.

CO3 [K4]

8. What is the OBST in the given diagram for the keys A,B,C and D with search probabilities as 0.1, 0.2, 0.3. And 0.4 respectively

CO2 [K4]



9. Define NP problem

CO3 [K2]

10. What is graph colouring ?

CO2 [K2]

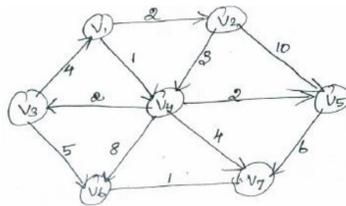
Answer any FIVE Questions

PART B (5 x 16 = 80 Marks)

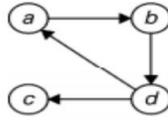
(Answer not more than 400 words)

11. a) Determine the shortest path using Dijkstra's algorithm and write the algorithm for the same

CO2 [K3]



- b) Determine the transitive closure for the given graph using warshall's algorithm 6 CO2 [K3] and write the complexity for the same.



12. a) Solve the recurrence equation for factorial along with the algorithm 8 CO1 [K3]
 b) Derive the complexity for the algorithm for determining unique elements in an array and write the algorithm for the same. 8 CO1 [K4]
13. a) Write the algorithm for brute force string matching and write its complexity 8 CO1 [K2]
 b) Using divide and conquer technique, multiply 2 large integers given as 2135 * 4014. How much multiplications are performed in this method? 8 CO3 [K3]
14. a) Consider the following knapsack problem $n=3, m=20, (p_1, p_2, p_3) = (25, 24, 15)$ and $(w_1, w_2, w_3) = (18, 15, 10)$. Determine the optimal solution for the same using greedy method. 16 CO3 [K3]
15. a) Solve the 4-Queens problem using backtracking technique. Draw the state space for the same. 8 CO3 [K3]
 b) Solve the Assignment problem for the given set of task using using branch and bound technique. 8 CO3 [K3]

Job1	Job2	Job3	Job4	Persons
9	2	7	8	Person A
6	4	3	7	Person B
5	8	1	8	Person C
7	6	9	4	Person D

16. a) Differentiate between NP hard and NP problem 6 CO3 [K2]
 b) Write the algorithm for prim's shortest path and determine the shortest path for the given graph. 10 CO2 [K3]

