

Total No. of Questions : 8]

SEAT No. :

**PD4326**

[6403]-124

[Total No. of Pages : 3

**T.E. (Information Technology)**

**DESIGN AND ANALYSIS OF ALGORITHM**

**(2019 Pattern) (Semester - V) (314445A) (Elective - I)**

*Time : 2½ Hours]*

*[Max. Marks : 70]*

*Instructions to the candidates:*

- 1) *Solve Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *Assume suitable data, if necessary.*

**Q1) a)** Find out min no. coins to make change of given amount using given coins : Coins {1, 5, 9} [9]

W=10

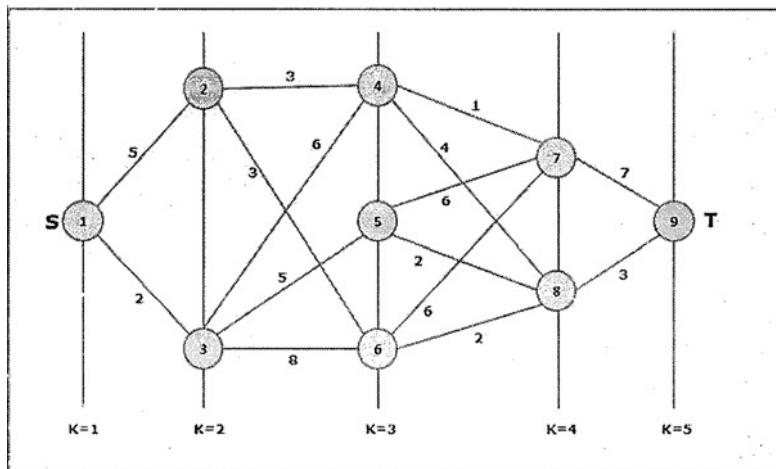
b) Differentiate between dynamic programming method and divide and conquer method along with principle of optimality. [9]

OR

**Q2) a)** Find the optimal solution for the 0/1 knapsack problem making use of dynamic programming approach. [9]

Consider- weight [] = {1, 2, 3}, profit [] = {10, 15, 40}, Capacity = 6

b) Find minimum path cost between vertex s and t for following multistage graph using dynamic programming. [9]

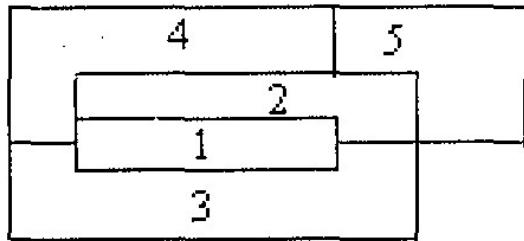


- Q3)** a) How backtracking strategy is useful to solve the graph coloring problem, explain with the help of algorithm and example. [9]
- b) Explain the 0/1 knapsack problem. Provide solution to following problem instance using backtracking. [8]

N=5, M=12, P1-P5 = (10,15,6,8,4), W1-W5 = (4,6,3,4,2)

OR

- Q4)** a) Solve the 4-queen Problem. Draw the state space tree for the same. [9]
- b) Construct planar graph for following map. Explain how to find m - coloring of this planar graph by using m - coloring Backtracking algorithm. [8]



- Q5)** a) What is Traveling Salesman Problem? Find the solution of the following traveling salesman problem using LCBB method. [9]

Cost Matrix :

$$\begin{bmatrix} \infty & 4 & 2 \\ 3 & \infty & 4 \\ 1 & 8 & \infty \end{bmatrix}$$

- b) Describe the branch and bound algorithm strategy for solving the 0/1 knapsack problem. Where Profit: {10, 10, 12, 18} and Weight: {2, 4, 6, 9} with m = 15. [9]

OR

- Q6)** a) Discuss the control abstraction of LCBB Branch and Bound with a suitable example. [9]  
b) Describe branch and bound strategy and its types with example. [9]

- Q7)** a) What are steps to prove NP-completeness of a problem? Prove that vertex cover problem is NP-complete. [9]  
b) What do you mean by NP Hard and NP Complete problems? Give an Example. [8]

OR

- Q8)** a) Explain P Class and NP Class. [9]  
b) Write a non-deterministic algorithm for searching key elements and explain that function. [8]

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