[6180]-278

T.E. (Artificial Intelligence and Machine Learning)
DESIGN AND ANALYSIS OF ALGORITHMS
(2019 Pattern) (Semester-I) (318541)

Time : 2½ Hours]   *[Max. Marks : 70*

Instructions to the candidates :

1) *Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8.*
2) *Neat diagrams must be drawn wherever necessary.*
3) *Figures to the right side indicate full marks.*
4) *Assume Suitable data if necessary.*

Q1) a) Explain principal of optimality with 0/1 Knapsack problem. **[8]**

b) Differentiate between dynamic programming and greedy method. **[6]**

c) Explain Warshal's algorithm with suitable example. **[4]**

OR

Q2) a) Explain Floyd's algorithm and give example. **[8]**

b) Consider following instance for simple knapsack problem. Find the solution using greedy method. **[6]**

N=8

P= {11,21,31, 33, 43, 53, 55, 65}

W= {1, 11,21,23, 33, 43, 45, 55}

M=110 .

c) What is optimal binary search tree? Explain with optimality. **[4]**

Q3) a) Apply backtracking technique to solve the following instance of the subset sum problem S = [1, 3, 4, 5] and d=[11 16] **[7]**

b) Write the backtracking algorithm for N-Queen problem and explain with suitable example. **[6]**

c) Draw state space tree for 4-Queen's problem. **[4]**

OR

P.T.O.

Q4) a) Explain algorithm of graph coloring using backtracking. Give suitable example. **[7]**

b) Write an algorithm to find Hamiltonian Path using backtracking method.**[6]**

c) Write recursive backtracking algorithm for sum of subset problem. **[4]**

Q5) a) What is travelling salesman problem? Find the solution of following travelling salesman problem using branch and bound method. **[8]**

Cost Matrix	∞	20	30	10	11
	15	∞	16	4	2
	3	5	∞	2	4
	19	6	18	∞	3
	16	4	7	16	∞

b) Compare backtracking and branch and bound method. **[6]**

c) Write an algorithm for least cost(LC) branch and bound. **[4]**

OR

Q6) a) Explain the concept of bounding function using branch and bound. **[8]**

b) Explain strategies of branch and bound. **[6]**

c) Write an algorithm for FIFO Branch and Bound. **[4]**

Q7) a) Prove that Clique problem is NP complete. **[7]**

b) Explain Vertex Cover Problem in detail. **[6]**

c) Write applications of NP classes of computational complexity. **[4]**

OR

Q8) a) Write non deterministic algorithm for sorting elements of an array. **[7]**

b) Write an algorithm for pointer doubling problem. What is its time complexity. **[6]**

c) Explain in detail Parallel Computing. **[4]**

〇〇〇〇