CSE/CI 313 (R-20)

Total No. of Questions : 10] [Total No.of Pages : 03

III/IV B. Tech. DEGREE EXAMINATIONS, DECEMBER - 2022

First Semester

CSE / CI

DESIGN & ANALYSIS OF ALGORITHMS

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

Answer ONE Question from each Unit.

All questions carry equal marks. 5x12=60 M

UNIT - I

1. a) Define time and space complexity. Describe different notations used to represent these complexities.

   b) Write an algorithm to Binary search and explain with an example.

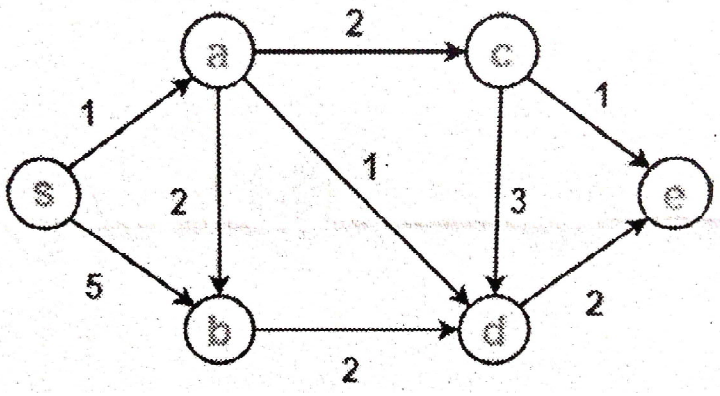
(OR)

2. a) Define time and space complexity. Describe different notations used to represent these complexities.

   b) Write an algorithm to find the factorial of a number and find the time complexity of the algorithm.

UNIT - II

3. Write Dijkstra's Algorithm to find shortest path in a graph. Apply Dijkstra Algorithm for the following graph ("a" is starting vetex).



(OR)

P.T.O.

4. a) Explain in detail about Optimal Storage on Tapes.

   b) Define Greedy Method ? Explain the General structure and applications of Greedy Method.

UNIT - III

5. a) Solve the following instance of 0/1 KNAPSACK problem using Dynamic programming n=3, (W1, W2, W3) = (2, 3, 4), (P1, P2, P3) = (1, 2, 5) and m = 6.

   b) Explain in detail about Optimal Binary Search Tree and the Algorithm.

(OR)

6. a) Explain how Matrix - Chain Multiplication problem can be solved using dynamic programming with suitable example.

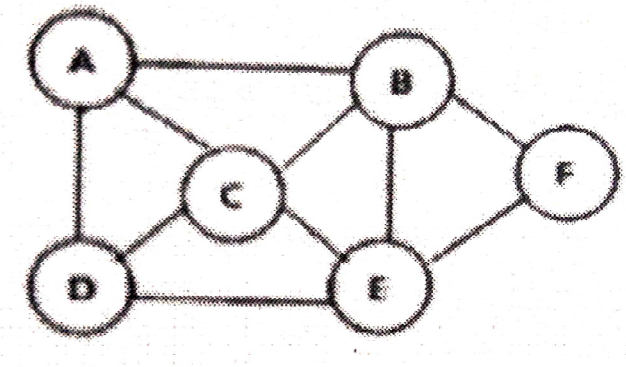
   b) Find the shortest tour of Travelling sales person for the following cost matrix using Dynamic Programming

$$\begin{bmatrix} \infty & 12 & 5 & 7 \\ 11 & \infty & 13 & 6 \\ 4 & 9 & \infty & 18 \\ 10 & 3 & 2 & \infty \end{bmatrix}$$

UNIT - IV

7. a) Write the algorithm for general iterative backtracking method and explain various factors that define the efficiency of backtracking.

   b) Explain the Hamiltonian Cycle in the following Graph.



(OR)

8. a) Explain 4-Queens problem and its Algorithm with an example.

   b) What is sum-of-subsets problem ? Write a backtracking algorithm for sum of subsets problem.

UNIT - V

9. a) What is travelling salesman problem ? Solve the following salesman problem instance using Branch and Bound.

$$\begin{bmatrix} 0 & 10 & 15 & 20 \\ 5 & 0 & 9 & 10 \\ 6 & 13 & 0 & 12 \\ 8 & 8 & 0 & 0 \end{bmatrix}$$

   b) Define Deterministic Algorithms and also explain in detail with an example.

(OR)

10. a) Distinguish between backtracking and branch - and bound techniques.

    b) Explain P, NP, NP - Hard and NP complete problems.