(3 Hours)   **[Total Marks : 80]**

N.B.: (1) **Question No. 1** is **compulsory**.

(2) Attempt **any three** out of the remaining **five** questions.

(3) Assumptions made should be **clearly stated**.

1. (a) Explain recurrences and various methods to solve recurrences.   **5**
   (b) Differentiate between P and NP.   **5**
   (c) Differentiate between Prims and Kruskals algorithm.   **5**
   (d) Explain Dynamic programming with example.   **5**

2. (a) Define Branch and Bound and Explain 15 Puzzle problem.   **10**
   (b) Apply dijkstra's algorithm on the following graph.   **10**
        Consider vertex 0 as source.
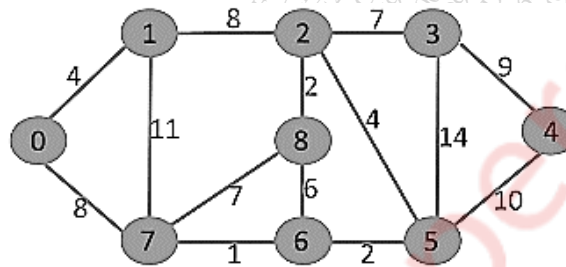
3. (a) Find Longest Common Subsequence for Following strings :   **10**
        X = ababcde
        Y = bacadb
   (b) Explain Backtracking with n-queen problem.   **10**

4. (a) Formulate Knapsack problem , Explain and differentiate between greedy knapsack   **10**
        and 0/1 knapsack.
   (b) Explain Multistage graph with example.   **10**

5. (a) Rewrite KMP algorithm and explain with example.   **10**
   (b) Define chromatic number of graph. Explain Graph coloring algorithm.   **10**

6.   Write a short note on following **(any 4)** :   **20**
       a)   Master theorem
       b)   Rabin Karp algorithm
       c)   Steps for NP Completeness proofs
       d)   Assembly line scheduling problem
       e)   Strassen's matrix multiplication

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