**Discrete Mathematics Final Exam (Spring 2024)**

No :

Name:

1. (Graphs - 30*P*) Starting from the vertex in the first row of the weight matrix given below, find the shortest paths to all other vertices with the Dijkstra algorithm. (Please answer by explaining each step)

1. (Trees - 35P) In a complete graph K4, how many spanning trees can be found? If we view all these spanning trees as graphs and eliminate the isomorphic duplicates, how many unique structures will we obtain? (Please answer by explaining each step)
2. (Languages - 35P) Design a context-free grammar of a language that accepts words with an odd number of letters "a" and an even number of letters "b". (Please answer by explaining each step)