Graph Theory | Assignment 2 | Due: March 26, 2025

Student Name: _____

Student Roll Number: | | | | - | | | | - | | | | |

Total Points: 20

Question 1 ..... *10 points*

Prove that the maximum number of edges in a simple graph with n vertices having k components is $\frac{1}{2}(n-k)(n-k+1)$.

Question 2 ..... *10 points*

In class, we discussed that Dijkstra's algorithm fails when a graph contains a negative-weight cycle. However, we did not consider the case where a graph has negative-weight edges but no negative-weight cycles. Provide a simple example of a directed graph with negative-weight edges where Dijkstra's algorithm produces incorrect results.