Department of Computer Science and Engineering
Quiz III

Course No.: CS 207 Course Name: Discrete Structures
Date: 10/11/2023 Time: 8-25 to 9-25 a.m. Marks: 10

Q1 Let $T(n)$ denote the number of strings of length n over 3 letters $\{a, b, c\}$ that do not contain any of the strings $\{aaa, bbb, ccc\}$ as a substring. In other words, no letter occurs consecutively 3 or more times in the string. Write down a recurrence relation for $T(n)$ and explain how you got it. Solve the recurrence relation to get a closed form expression for $T(n)$. (5)

Q2 Prove that every graph with n vertices and more than $3(n-1)/2$ edges contains a cycle of even length. Show that for all odd $n \geq 1$, there exists a graph with n vertices and $3(n-1)/2$ edges that does not contain a cycle of even length. (5)