CS 350 Theory of Computation

Assignment 4 (8 marks)

Question 1 (1 marks)

Let $\mathcal{B}$ be the set of all infinite sequences over $\{0, 1\}$. Show that $\mathcal{B}$ is uncountable, using a proof by diagonalization.

Question 2 (1 marks)

Let $T = \{(i, j, k) | i, j, k \in \mathcal{N}\}$. Show that T is countable.

Question 3 (2 marks)

Let $INFINITE_{PDA} = \{< M > | M$ is a PDA and $L(M)$ is an infinite language$\}$. Show that $INFINITE_{PDA}$ is decidable.

Question 4 (2 marks)

Show that EQ_{CFG} is undecidable.

Question 5 (1 marks)

Show that EQ_{CFG} is co-Turing-recognizable.

Question 6 (1 marks)

Problem 5.3 (page 195—first edition; page 211—second edition).

Date Due: before the end of class on **Friday, March 24, 2006.** Late assignment will lose 2 marks for each overdue day.