

CS 350 Theory of Computation

Assignment 3 (8 marks)

Question 1 (2 marks)

Design context-free grammars for the following languages

(1.1) $L = \{a^n b^m \mid n = 3m\}$.

(1.2) $L = \{a^n b^m \mid n \leq m + 3\}$.

Question 2 (1 marks)

Decide whether the following grammar is ambiguous.

$$S \rightarrow AB \mid aaB$$

$$A \rightarrow a \mid Aa$$

$$B \rightarrow b$$

Question 3 (1 marks)

Problem 2.12 (page 121).

Question 4 (1 marks)

Problem 2.13 (page 121).

Question 5 (1 marks)

Problem 2.14 (page 121).

Question 6 (2 marks)

Using pumping lemma to prove that the following languages are not context-free.

(6.1) $L = \{a^n b^j c^k \mid k = nj\}$.

(6.2) $L = \{a^n b^j \mid n \geq (j - 1)^3\}$.

Date Due: before the end of class on **Thursday, March 10, 2005**. Late assignment will lose 2 marks for each overdue day.