

You have to use the designated spaces for your answers. No extra pages will be provided.

Problem 1: Designing Context-Free Grammar (10 points)

Let  $\Sigma = \{0, 1, 2\}$ . Give a context-free grammar for the following language over  $\Sigma$ .

$$L = \{1^i 0 2^j 1^k \mid i, j, k \geq 0, 3i \geq 4k + 2, j \text{ is not divisible by three}\}$$