We gives a map reduction from PCP to $AMBIG_{CFG}$.

For an PCP instance $\{(a_i, b_i)\}_{i=1}^{n}$ where $a_i, b_i \in \Sigma^*$, We construct a CFG $G = (V, \Sigma', R, S)$ as following:

- $V = \{S, A, B, A', B'\}$.
- $\Sigma' = \Sigma \cap [1, n]$. Here we consider every integer as one symbol.
- R contains the following rules:
    - $S \to A' | B'$.
    - $A \to \epsilon$, $B \to \epsilon$.
    - $A \to iAa_i$ for every $1 \le i \le n$.
    - $B \to iBb_i$ for every $1 \le i \le n$.
    - $A' \to iAa_i$ for every $1 \le i \le n$.
    - $B' \to iBb_i$ for every $1 \le i \le n$.

G does not accept ϵ. For every string $w = st$ where $s \in [1, n]^+$ and $t \in \Sigma^*$, G accepts w first changing S to A' if and only if $t = a_{s_{|S|}} \cdots a_{s_1}$; G accepts w first changing S to B' if and only if $t = b_{s_{|S|}} \cdots b_{s_1}$. So G accepts a string w with two distinct parse tree if and only if the PCP instance is a YES instance.