

① Find out whether the language $L = \{xnyzn \mid n \geq 1\}$ is context free or not.

Convert the following CFG into CNF

$$S \rightarrow XY \mid Xn \mid P$$

$$X \rightarrow mX \mid m$$

$$Y \rightarrow Xn \mid o$$

In CNF RHS contains either two non-terminal or one terminal. So in the first production replace 'n' by non-terminal 'C_n' and 'P' by 'C_p' and similarly 'm' by 'C_m' and 'o' by 'C_o'

Hence the grammar becomes

$$S \rightarrow XY \mid XC_n \mid C_p$$

$$X \rightarrow C_m X \mid C_m$$

$$Y \rightarrow XC_n \mid C_o$$

$$C_n \rightarrow n \quad C_p \rightarrow P$$

$$C_m \rightarrow m, \quad C_o \rightarrow o$$

Now the grammar is CNF