Ambiguosity, deterministic PDA

1. Consider the grammar $S \longrightarrow S(S)S \mid \varepsilon$. Is this grammar ambiguous? Is the language generated by this grammar ambiguous?

2. Is the following grammar ambiguous? Is the generated language ambiguous?

$$\begin{aligned} S &\longrightarrow AB \\ A &\longrightarrow \mathtt{a}A\mathtt{b} \mid \mathtt{ab} \\ B &\longrightarrow \mathtt{bb}B\mathtt{a} \mid \mathtt{bba} \end{aligned}$$

3. Is the following grammar ambiguous? Is the generated language ambiguous?

$$\begin{aligned} S &\longrightarrow XY \mid B \\ B &\longrightarrow \mathtt{ab}B \mid \mathtt{aa}B \mid \mathtt{ba}B \mid \mathtt{bb}B \mid \mathtt{a} \mid \mathtt{b} \\ X &\longrightarrow \mathtt{a}X\mathtt{a} \mid \mathtt{a}X\mathtt{b} \mid \mathtt{b}X\mathtt{a} \mid \mathtt{b}X\mathtt{b} \mid \mathtt{a} \\ Y &\longrightarrow \mathtt{a}Y\mathtt{a} \mid \mathtt{a}Y\mathtt{b} \mid \mathtt{b}Y\mathtt{a} \mid \mathtt{b}Y\mathtt{b} \mid \mathtt{bb} \end{aligned}$$

4. Is the PDA given in the first problem of Practice problems #8 deterministic?

5. Give deterministic PDA for the languages of problem 2 of Practice problems #8.