

(1)

$$S \rightarrow aSf \mid w \mid \varepsilon$$

$$w \rightarrow bWe \mid y \mid \varepsilon$$

$$y \rightarrow cYd \mid \varepsilon$$

(2)

~~$$w \rightarrow aSf \mid w$$~~

$$S \rightarrow aSf \mid w d Z e$$

$$w \rightarrow bWe \mid bc$$

$$Z \rightarrow dZe \mid de$$

(3)

$$w \rightarrow 0w1 \mid 1w0 \mid ww \mid \varepsilon$$

$$S \rightarrow 0w \mid wS \mid 0S$$

④

$$W \rightarrow aaWb \mid aab$$

$$S \rightarrow aW \mid aS$$

⑤

$$W \rightarrow aWa \mid aba$$

$$S \rightarrow aSa \mid abWa$$

⑥

This will have the same leftmost and rightmost parse tree.

⑦

$$S \rightarrow aSc$$

$$\rightarrow aaSec$$

$$\rightarrow aaaSccc$$

$$\rightarrow aaaXccc$$

$$\rightarrow aaabXcccc$$

$$\rightarrow aaabbXccccc$$

$$\rightarrow aaabbeccccc$$

P.T.O

P.T.O

7(a)

$S \rightarrow xy$
 $\rightarrow 0x1y$
 $\rightarrow 00x11y$
 $\rightarrow 000111y$
 $\rightarrow 0001112$

7(b)

$S \rightarrow xy$
 $\rightarrow x2$
 $\rightarrow 0x12$
 $\rightarrow 00x112$
 $\rightarrow 0001112$

7(c)

for the string $\rightarrow "012"$

$S \rightarrow xy$		$S \rightarrow MN$
$\rightarrow 01y$		$\rightarrow 0N$
$\rightarrow 012$		$\rightarrow 012$

So, we are getting 2 left most derivation for the same string. Hence, ambiguous grammar.