

**COS 210**

**Worksheet 7**

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**Question 1**

$G = (V, \Sigma, R, S)$

Where

$V = \{S, A\}$

$\Sigma = \{0, 1\}$

S is the start symbol

R contains the following rules:

$S \rightarrow A1A1A1A$

$A \rightarrow 0A \mid \varepsilon \mid 1A$

**Question 2**

$G = (V, \Sigma, R, S)$

where

$V = \{S\}$

$\Sigma = \{a, b\}$

S is the start symbol

R contains the following rules:

$S \rightarrow bSb \mid bSa \mid aSb \mid aSa \mid b$

**Question 3**

$G = (V, \Sigma, R, S)$

where

$V = \{S, Q, T, F, R, W\}$

$\Sigma = \{a, b, (, ), \cup, *, \emptyset, \varepsilon\}$

S is the start symbol

R contains the following rules:

$$S \rightarrow S \cup S \mid SS \mid S * \mid (S) \mid a \mid b \mid \emptyset \mid e$$