

**SSN COLLEGE OF ENGINEERING, KALAVAKKAM**  
**Department of Computer Science and Engineering**  
**CS6503 - Theory of Computation**  
**Tutorial – 2 (UNIT II)**

1. Consider the following grammar:

$S \rightarrow aB \mid bA$

$A \rightarrow a \mid aS \mid bAA$

$B \rightarrow b \mid bS \mid aBB$

Find left most derivation and right most derivation for the word aaabbabbba.

2. Construct a CFG representing the set of palindromes over  $(0|1)^*$

3. Construct CFG for  $L = \{ a^n \mid n \text{ is odd} \}$

4. Consider the grammar

$E \rightarrow E + E \mid E * E \mid (E) \mid id$

Find right most derivation of the expression  $(a+b)*c$ . Check if ambiguous or not.

5. Construct CNF and GNF for the following CFG.

i)  $S \rightarrow ASB \mid \epsilon$

$A \rightarrow aAS \mid a$

$B \rightarrow SbS \mid A \mid bb$

ii)  $S \rightarrow AACD$

$A \rightarrow aAb \mid \epsilon$

$C \rightarrow aC \mid a$

$D \rightarrow aDa \mid bDb \mid \epsilon$

iii)  $S \rightarrow XA \mid BB$

$B \rightarrow b \mid SB$

$X \rightarrow a$

$A \rightarrow a$

iv)  $S \rightarrow aAbB$

$A \rightarrow aA$

$B \rightarrow bBb$