Department of Computer Engineering, SVNIT, Surat
Automata and Formal Languages (CS208)
Tutorial – 6

1 What is Context Free Grammar(CFG)? List down the applications of CFG.

2 Define the following terms:
   a) Derivation
   b) Parse Tree

3 $E \rightarrow E + T / E - T / T$
$T \rightarrow T \times F / T \div F / F$
$F \rightarrow G \uparrow F / G$
$G \rightarrow I$
$I \rightarrow 0 \mid 1 \mid \ldots \mid 9$

Draw the parse tree for the string:
   1) **2 x 1 + 4 ↑ 2 ↑ 1 x 1 + 3**
   2) **2 ↑ 1 ↑ 4 + 3 x 5 x 6 ↑ 1 + 2 ↑ 3**

4 $E \rightarrow E + T / T$
$T \rightarrow F \times T / F$
$F \rightarrow I$
$I \rightarrow 0 \mid 1 \mid \ldots \mid 9$

Derive the string: **2 + 3 x 5 x 6 + 2**

5 What are the different possible strings for the grammar:
   1) $S \rightarrow SS$
      $S \rightarrow a$
      $S \rightarrow b$

   2) $S \rightarrow A / B$
      $A \rightarrow aAb / ab$
      $B \rightarrow abB / \in$

6 Give the left most derivation of the string **w = aabbccdd:**
$S \rightarrow AB / C$
$A \rightarrow aAb / ab$
$B \rightarrow cBd / cd$
$C \rightarrow aCd / aDd$
$D \rightarrow bDc / bc$