Design context-free grammar (CFG) for the following languages:

1. $\{x^{2n} \# y^{3n} \mid n >= 1\}$ Here, $\Sigma=\{x,y,\#\}$
2. $L = \{a^m b^n c^{3n} d^{2m} \mid$ where $m,n>=1\}$
3. $L = \{x^i y^j z^k \mid$ where i=k or j=k and i, j, k >=0$\}$
4. L = {w is consisted of {0,1} | w is odd and mid symbol is 0}
5. L = { w is considered of {0,1} | w is of even length & w starts and ends with different symbol }
6. $L = \{ a^i b^j c^k \mid$ where $i \neq j$ and $k \geq 1 \}$
7. $L = \{ a^i b^j c^k \mid 2i + 3j >= 6$ and $4i - 8j >= -16$ and $k >= 1 \}$
8. $L = \{ a^{m+n} c^{3n} d^{2m} \mid n,m >= 2 \}$
9. $L = \{ c^p \# d^q g^r h \mid q=4p,$ p,q>=0 and r>2 }
10. $L = \{ a^m b^n c^u d^v \mid m=\frac{n}{2}$, $v=\frac{u}{4}$, m,n,u,v > 0 }

Consider the following *Context-free grammars(CFG)* and answer according to it:

1.	$S \rightarrow S + S \mid S * S \mid A \mid B$ $A \rightarrow aA \mid 1$ $B \rightarrow bB \mid 2$	With the help of Top-Down Parse Trees, find-out if the grammar is Ambiguous or not for the string "bbb2 + aa1 + b2"
2.	$S \rightarrow S + S \mid S - S \mid (S) \mid T$ $T \rightarrow X * X \mid X \% X \mid X$ $X \rightarrow x \mid y \mid z \mid Y$ $Y \rightarrow 0 \mid 1 \mid 2 \mid 3$	With the help of Leftmost derivation, derive the following string "(x + 2*y) - (3*z + 1)"

3.	$E \rightarrow E+E \mid E-E \mid E=E$ $E \rightarrow MNV \mid MN$ $M \rightarrow - \mid \varepsilon$ $N \rightarrow 0 \mid 1 \mid 2 \mid 3 \mid 4 \mid 5 \mid 6 \mid 7 \mid 8 \mid 9 \mid NN$ $V \rightarrow x \| y \mid z$	a. With the help of Top-Down Parse Trees, figure out if the grammar is Ambiguous or not for the string "x + y + z = 2" b. Show the Right Most Derivation for the string "-26x + 3y - 8z = -83"
4.	S → AS | BAC A→ A1 | 0A1 | 0B1 | B B → 0B | 0 | € C → 1 | €	With the help of Top-Down Parse Trees, find-out if the grammar is Ambiguous or not for the string 00011111
5.	E → E+E | E-E | (E) | V V → p | q | r | X X → X*X | X%X | Y Y → 0 | 1	With the help of Leftmost derivation, find-out if the grammar is Ambiguous or not for the string p+(0*1%0)-r
6.	S → 2BA | 1S | 2A B → 1B3 | 1S3 | ε A → A11 |12AS3 | B | ε	Consider the following context-free grammars (CFG). With the help of Top-Down Parse Tree decide whether the grammars are ambiguous or not: **211211313**
7.	B→ 11BS | 0S0B | ε S→ AC01 | 0S | 1S | A1 A→ 1 | B | CA | ε C→ x| y |A	Consider the following context-free grammars (CFG). With the help of Top-Down Parse Tree decide whether the grammars are ambiguous or not: **011010**