



## United International University (UIU)

Dept. of Computer Science & Engineering (CSE)  
CSE-2233, Theory of Computation - Class Test-3 (F,G)  
Time : 30 minutes (SET-1)

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1. Construct a CFG that generates the following languages: 2+2

i)  $L = \{ a^m b^n c^k \mid k = 3m+n, m \geq 0, n > 0 \}$

ii)  $L = \{ w \text{ is consisted of } \{0,1\} \mid w \text{ is even and mid symbol is } 01 \}$

2. Consider the following context-free grammar (CFG) and answer the questions that follows: 3

$$S \rightarrow A \mid XP$$

$$A \rightarrow 0A11 \mid Z$$

$$Z \rightarrow 0Z2 \mid 02$$

$$X \rightarrow 0X2 \mid Y$$

$$Y \rightarrow 0Y \mid 0$$

$$P \rightarrow 1P \mid 11$$

Perform **Leftmost derivation** for the string: **0000221111**

3. Consider the following context-free grammars (CFG): 3

$$S \rightarrow 0S3 \mid 00S3 \mid A$$

$$A \rightarrow 0A2 \mid 0A22 \mid B$$

$$B \rightarrow 0B1 \mid 2S3 \mid \varepsilon$$

With the help of **Top-Down Parse tree** generate the following string:  
**000001233**