

**BRAC UNIVERSITY**  
Merul Badda, Dhaka, Bangladesh  
**CSE331 : Automata and Computability**

**Quiz 3**  
**Summer 2024**

**Duration: 25 minutes**                      **CO3**                      **Total: 30 marks**

<b>Name:</b>	<b>ID:</b>	<b>Section:</b>
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**CFG**

1. Convert the following RE into CFG: (10 x 1 = 10 marks)

**10\*(0|01)\***

Solution:  
S → AB  
A → YD  
D → 0D | ε  
B → EB | ε  
E → X | XY  
X → 0  
Y → 1

2. Remove ambiguity from the following CFG: (10 x 1 = 10 marks)

**E → E + E**  
**E → E \* E**  
**E → a**

Solution:  
E → E + T | T  
T → T \* F | F  
F → a

3. Construct CFG for the following CFL: (10 x 1 = 10 marks)

**$L(M) \rightarrow \{w \in \Sigma^* \mid w \text{ contains balanced parentheses.}\}$ , where  $\Sigma = \{ (, ), \{, \}, [, ] \}$ .**

Solution:

$S \rightarrow (S) \mid \{S\} \mid [S] \mid SS \mid \varepsilon$