**CS 302** **15 December, 2016**

**QUIZ 9**

**Duration : 15 minutes**

*Do not forget to write your name on your paper !*

## QUESTION

Consider the CFG, $G = (\{S,A,B\}, \{a,b,c\}, P, S)$ where productions are :

$P : S \rightarrow SA \mid a \; ; \; A \rightarrow BS \mid Bb \; ; \; B \rightarrow cA$

**(a)** (5 pts) Compute a new CFG $G1 = (V1,T,R1,S)$ such that all productions of $G1$ are of the form $X \rightarrow x\alpha$ or $X \rightarrow e$ where $X \in V1$ , $x \in T$ , $\alpha \in (V1 \cup T)^*$ and $e$ denotes the empty string by eliminating left recursion and common left symbols and applying possible substitutions.

**(b)** (5 pts) If $q_c$ denotes the special state after consuming the input $c$ in a top-down PDA parser then fill in the $Y$ for the transition $(q_c, e, X) \rightarrow (q, Y)$ for all values of $X$ in your PDA for which such a transition is possible.