

**CS 302
QUIZ 5****18 November, 2020*****Duration : 15 minutes******Do not forget to write your name on your paper !*****QUESTION**

(a) (3 pts) Describe a CFG $G = (V, T, P, S)$ that generates the language :

$L = (w \in \{a, b\}^* \mid w = u.u^R ; u \in \{a, b\}^* \text{ and } u^R \text{ denotes } u \text{ written in reverse order})$

(b) (3 pts) Repeat part (a) with

$L = (w \in \{a, b\}^* \mid w = w^R ; w \in \{a, b\}^* ; w^R \text{ denotes } w \text{ written in reverse order})$

(c) (4 pts) Repeat part (a) with

$L = (w \in \{a, b, c\}^* \mid w = u.c.u^R ; u \in \{a, b\}^* ; u^R \text{ denotes } u \text{ written in reverse order})$