Student ID :
Name :

Theory of Computation final exam (2017-2018 Fall)

(Please use free space for draft and fit your answer to boxes.)

1. (25*P*) Prepare Chomsky normal form of A->aA | Ad | B , B-> bBc | b

2. (25*P*) Design such a Turing machine that writes letter "c"s to the second tape as much as $|a|^{|b|}$. Here, |a| is the number of “a”s and |b| is the number of “b”s in the first tape. For example, if the user enters “aabbb” in the first tape, the Turing code writes “cccccccc” into the second tape because of 2^3 (the number of “a”s is 2 and the number of “b”s is 3) computation.

3. (25*P*) Assume that any electrical car in the world can run infinite time. When we want to prepare a software to compute the total road amount (as distance) where all electrical cars in the world can go, how can we comment this software in terms of decidability?

4. (25*P*) Describe a transform 3SAT problem into 3COLORING with an algorithm in polynomial time.