Student ID :
Name   :

Automata Theory course final exam (2016-2017 Fall)
(Please use free space for draft and fit your answer to boxes.)

1. (25*P*) Write CFL grammar rules of language $L = a*ba(ab*)*$.

2. (25*P*) Let be a function as $f(x) = ax^2 + bx + c$. For this function, *a*, *b* and *c* numbers is given by the user. For example, if string "aaabbcccc" is given, it is interpreted as "$3x^2+2x+4$". According to text entered the first tape and x = 2, design a Turing machine so that it writes letter "a"s to the second tape as much as the value calculated by the function.

3. (25*P*) Can a compiler be written that specifies that a code written in A_{TM} language contains an infinite loop? Why?

4.   (25*P*) Describe a transform in polynomial time for HC $<_p$ TSP. HC: Here, HC represents Hamilton Cycle problem and TSP is Traveling Salesperson problem.