

Student ID :

Name :

**Automata Theory course final exam (2015-2016 Fall)**

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

1. (25P)  $L = \{1^m 0^n 1^{m-n} \mid m \geq n > 0\}$  Prove whether language  $L$  is regular or not by pumping lemma.

2. (25P) In view of decidability, make your comments about  $N \times N$  pieces puzzle problem in which its all pieces are identical to each other.

3. (25P) Design such a grammar in Chomsky form that it has total 5 rules and it can accept "ababababa" string.

4. (25P) Describe a transform in polynomial time for  $HC \leq_p SOS$ . (SOS: Sum of Subsets problem, HC: Hamilton Cycle problem-returns the start node by passing every node at once) Don't confuse HC and TSP (traveler salesperson) problems. Here, HC is wanted.