Name of the Student:			

## There are 3 questions in the exam. You have 30 minutes to answer them.

## Question 1

Draw deterministic finite automata for the following languages over the alphabet  $\{a,b\}$ :

(a) (20%) The set of strings NOT containing exactly two a's.

(b) (20%) The set of strings whose every third symbol is an a ('every third' means, third, sixth, ninth, twelfth, and so on).

## **Question 2** (20%)

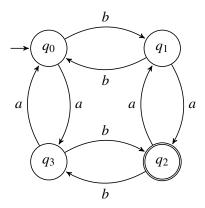
Let L be a subset of  $\{a,b\}^*$  described by the expression

$$(a \cup bb^*)aa^*bb^*$$

Give three strings that are in and three strings that are NOT in L, six strings in total.

## **Question 3**

Here is the state diagram of a dfa *M*:



(a) (20%) Describe in words the language L accepted by M.

(b) (20%) Given that L is the language of M above, let K be the language

 $\{w \in \{a,b\}^* \mid w \text{ is obtained by deleting one symbol from } v \text{ for some } v \in L\}$ 

In other words, K is the set of strings obtained by deleting one symbol from the strings in L. Draw the state diagram for a dfa accepting K.