

Mid Term Examination
Theory of Automata and Formal Languages
 BS(CS), 5th, Regular and Self Support

Total Marks: 30

Course Code: CS-3131

Q1: Define the extended transition function δ^* for a deterministic finite automaton and also discuss it with an example string "abc". [5]

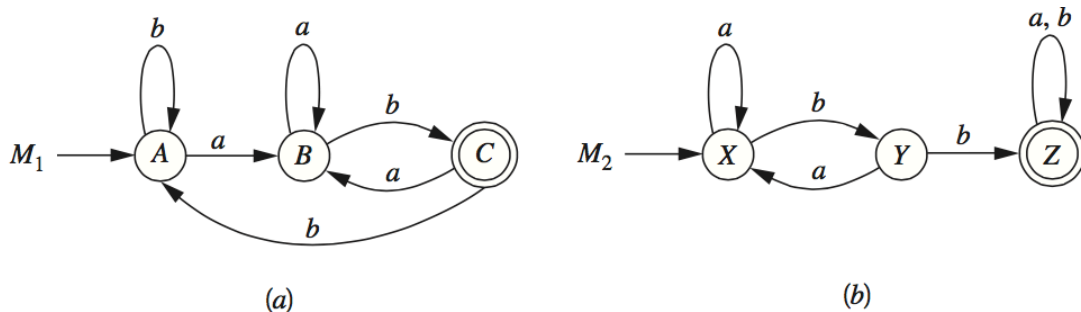
Q2: Suppose $n \geq 2$ and let $L_n = \{x \in (0,1)^* \mid |x| \geq n \text{ and the } n\text{th symbol from the right in } x \text{ is } 1\}$. Then design a deterministic finite automaton for the said language. [5]

Q3: Provide a regular expression for the language with strings ending in 1 and not containing 00. [5]

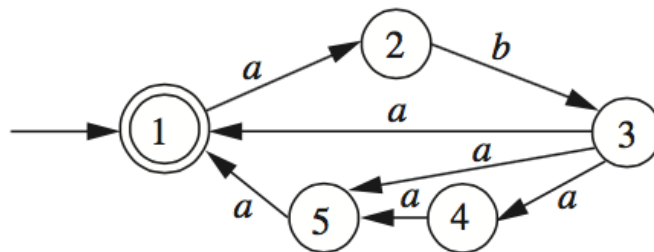
Q4: Prove that If $y \geq 4$, then $2^y \geq y^2$. [Hint: a deductive approach can be used]. [5]

Q5: Let M_1 and M_2 be the FAs pictured in Figures (a & b) below, accepting languages L_1 and L_2 , respectively. Draw respective FAs accepting the following languages. [5]

- a) $L_1 \cup L_2$
- b) $L_1 \cap L_2$
- c) $L_1 - L_2$



Q6: Using the subset construction, draw an FA accepting the same language given in the following NFA. [5]



.....
 Best of luck