

Department Of Mathematics
Indian Institute Of Technology Delhi
MINOR – I TEST

Time : 1 Hour

MAL 382 – Theory of Automata
 February 10, 2013, Room V LT I

Full Marks - 20

Q1. Prove or Disprove the following:

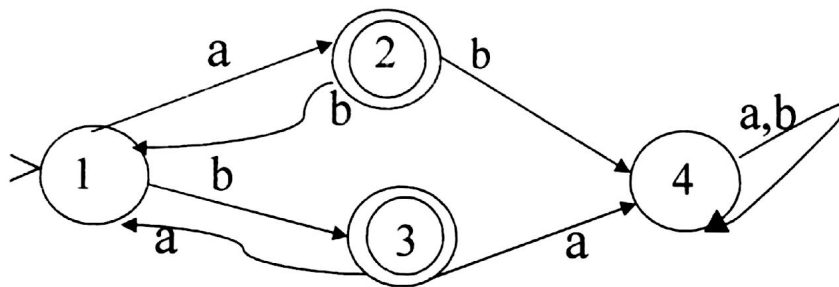
- a) $L = \{a^m \mid m \text{ is a prime}\}$ is a regular language
- b) $L = \{a^m b b a^m \mid 0 < m < 1024\}$ is NOT a regular language

[3 + 2 = 5]

Q2. Suppose $L = (ab \cup bb)^*$. Let $h: \{0,1\} \rightarrow \{a,b\}$ be defined as $h(0) = ab$ & $h(1) = bbb$.
 Compute $h^{-1}(L)$. Justify your answer.

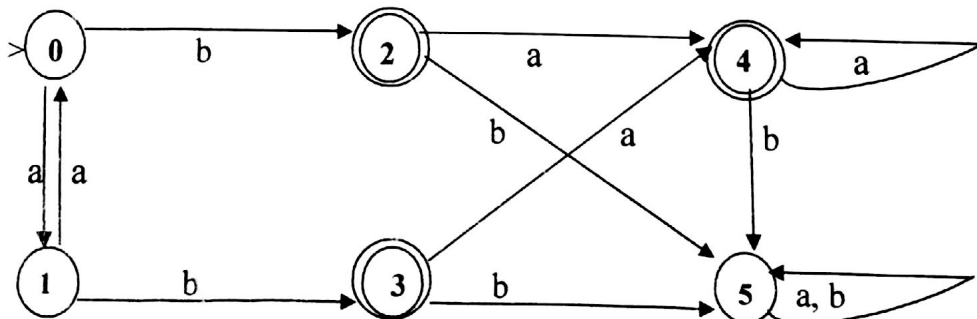
[5]

Q3. Obtain the *regular expression* corresponding to this automaton using Arden's Lemma



[5]

Q4. Characterize the states of the following automata based on the string characteristics. Find the minimal automata equivalent to it.



[5]