

## JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- September 2016

B. Tech V Semester

COURSE CODE: 10B11CI513

MAX. MARKS: 15

COURSE NAME: Theory of Computation

COURSE CREDITS: 04

MAX. TIME: 1Hr

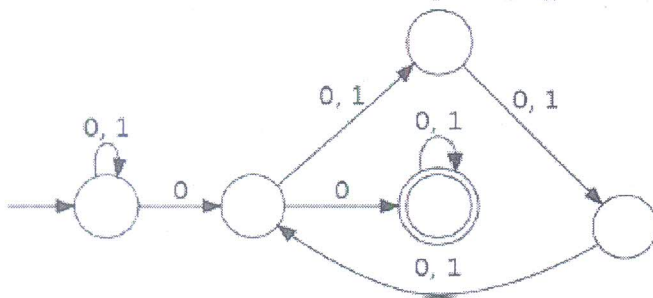
*Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.*

1. Write regular expressions for the following languages over the alphabet  $\Sigma = \{a, b\}$ : [0.5x3 = 1.5 Marks]

- All strings that do not end with aa.
- All strings that contain an even number of b's.
- All strings which do not contain the substring ba.

2. Draw DFAs for each of the languages from question 1. None of your DFAs may contain more than 4 states. [1.5x3 = 4.5 Marks]

3. Consider the following Automata: [1+2+2 = 5 Marks]



- Write a regular expression for the language accepted by this Finite Automata.
- Construct a DFA from the given NFA.
- Construct a DFA with minimum number of states that you obtain from part (b).

4. Prove that the language  $L = \{www \mid w \in \{a, b\}^*\}$  is not regular. [4 Marks]