Indian Institute of Information Technology
Design and Manufacturing, Kancheepuram
Chennai – 600 127, India
An Autonomous Institute under MHRD, Govt of India
An Institute of National Importance
CS 2009 Theory of Computation

Instructor
N.Sadagopan
Quiz 1
17-Feb-2023
15 Marks
9.00-10.00 AM

Roll No: Name:

Answer must be written in the space provided. No Answer booklet / additional sheets.

1. (1.5+1.5=3 marks) Construct a Deterministic Finite Automaton for the language $L = \{x \mid x \in \{a, b\}^*$, x begins with b and ends with a $\}$. Using Arden's Theorem, find the regular expression corresponding to L.

2. (1.5+1.5=3 marks) Let L be a language over $\{0,1\}^*$ with the property that all strings in L are ending with a '1'. Draw TWO different DFAs. Write TWO different regular expressions.

3. (1.5+1.5=3 marks) For the regular expression, $(00 + 01 + 10 + 11)$, draw a NFA with epsilon M having exactly one start and final states. For each state in M, write the ϵ-closure.

4. (1.5+1.5=3 marks) State Pumping Lemma and its contrapositive.

5. (1.5+1.5=3 marks) Prove that $L = \{a^n, n\text{: prime } \}$ is non-regular using (i) pumping lemma (ii) Myhill-Nerode Theorem

Space for Rough work (Do NOT use any additional sheets)