



VIT

Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

School of Computer Science & Engineering

Continuous Assessment Test -I

A2+TA2+TAA2-Slot CAT-I (Aug-2018)

CSE2002-Theory of Computation and Compiler Design

Time: 1:30 Hrs

Max.Marks:50

Answers ALL the questions

1. Prove or disprove the following:

a) Let $L = \{ w \in \{0, 1\}^+ / w \text{ contains at least three 1's} \}$ and let $L' = \{0, 1\}^+ 1 \{0, 1\}^+ 1 \{0, 1\}^+ 1 \{0, 1\}^+$, $L = L'$ [4]

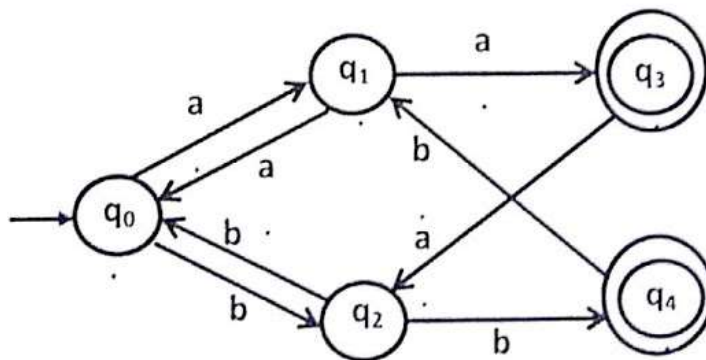
b) Let $L = \{a^n b^n / n \geq 0\}$. Then the complement of L is L^c and $L^c = \{a^n b^m / m, n \geq 1, m \neq n\}$ [4]

c) The regular expressions $P = (1^*0 + 001)^*01$ and $Q = (1^*001 + 00101)^*$ are equivalent [4]

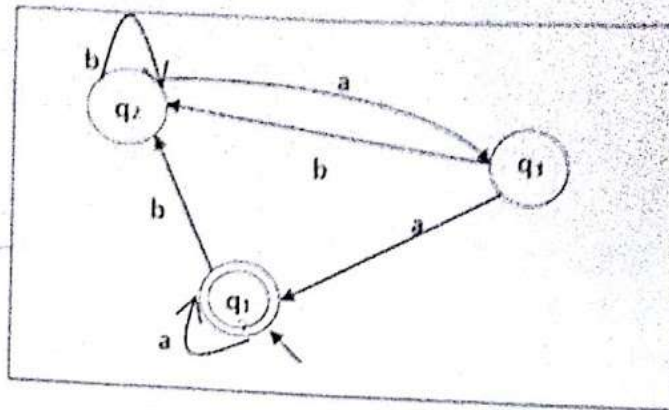
d) Every subset of a regular set is regular. [4]

e) Regular expression corresponding to the complement of the regular expression $(a + ab)^*$ is $(aa^*b)^* b (a+b)^*$ [4]

2. a) Construct DFA for the NFA given below: [5]



b) Using Arden's Theorem, construct a regular expression to the automata given below [5]



3. a) State pumping lemma for regular languages and show that $L = \{a^n / n \geq 1\}$ is not regular. [4]

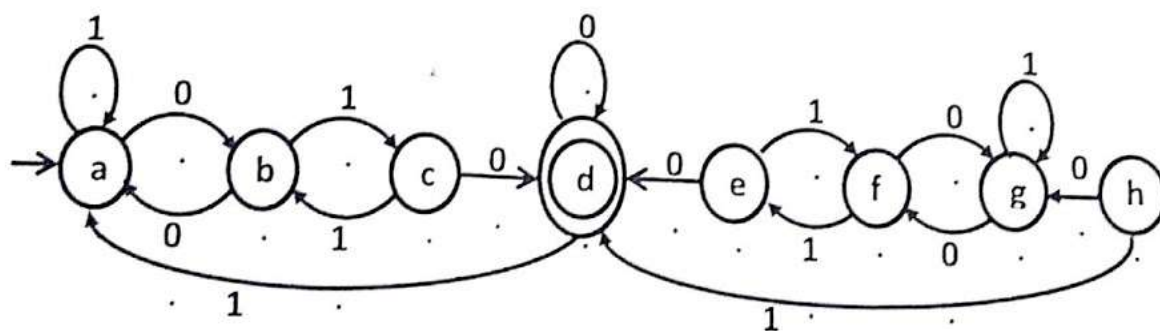
b) Construct a DFA over $\Sigma = \{a, b\}$ for accepting strings which satisfy the following conditions:

If the string begins with a it is of even length (≥ 2). If the string begins with b it is of odd length (≥ 3).

[4]

4. a) Show the translation for an assignment statement: `position := initial + rate * 60`. Clearly indicate the output of each phase of the compiler. [4]

b) When do you say two states are equivalent in DFA? When are they distinguishable? What do you mean by a distinguishable sequence? Consider the DFA in the following figure. a is the initial state and d is the final state. [8]



Which states are equivalent? Which states are distinguishable? Find the minimum state automaton.

xxxxxxxEndxxxxxxx