
AC32008 Theory of Computation
Class Test 1 - Friday 12 March 2020 - 14.00-15.00
Answer ALL 5 Questions

Total marks: 30

1. If Σ is a finite set of symbols, say what is meant by the following, i.e., give the definition:

(a) The set Σ^* ; **[3 marks]**

(b) A language over Σ . **[3 marks]**

2. Write a regular expression for the language that contains strings of 0's and 1's with at most one pair of consecutive 1's.

[4 marks]

3. Let L be the set of all strings over $\{0, 1\}$ which do not contain 001 as a substring. Give a DFA M which accepts L , i.e., such that $L = L(M)$ (you need only give a transition diagram). **[7 marks]**

4. Let L be the binary language given by

$$L = \{0^n 1^m, n \leq m\},$$

Show that L is not regular. **[8 marks]**

5. Describe informally a procedure to convert a NFA into a DFA that accepts the same language. How many states does the resulting DFA has? How can we eliminate some of these states? **[5 marks]**