

EEL702: Minor II

4th October, 2013

Maximum Marks: 30

1. Try to design a grammar for each of the following languages. Which languages are regular?
 - (a) The set of all binary strings such that every 1 is immediately followed by at least one 0.
 - (b) Binary strings with an unequal number of 0s and 1s.
 - (c) Binary strings corresponding to odd numbers.
 - (d) Binary strings which do not contain the substring 1010.
 - (e) Binary strings of the form $x01y$, where $x \neq y$. [10]
2. Consider the grammar

$$S \rightarrow aSbS|bSaS|\epsilon$$

- (a) Is this grammar ambiguous? Justify with reason/example. [3]
 - (b) What language does this grammar generate? [3]
 - (c) Attempt to construct a predictive parser for this grammar, making use of *FIRST* and *FOLLOW* sets. Is it possible? Why or why not? Is this grammar LL(1)? [6]
3.
 - (a) What is back-patching in a compiler/assembler, and when is it needed?
 - (b) What is 'strength reduction'?
 - (c) Give a postfix representation for the following expression: $(a + (b + c) * d) - e$.
 - (d) Given a postfix representation, how would you evaluate it? [8]