BICS-018

B. TECH.-VIEP-COMPUTER SCIENCE AND ENGINEERING (BTCSVI)

Term-End Examination

June, 2019

BICS-018 : THEORY OF COMPUTATION

Time : 3 Hours   *Maximum Marks : 70*

Note : Attempt any seven questions. All questions carry equal marks.

1. (a) Find the language generated by the following grammar :   5

    $S \to 0S1 | 0A1, A \to 1A | 1$

   (b) Construct the grammar accepting the following set :

    The set of all strings over $\{0, 1\}$ consisting of equal number of 0's and 1's.   5

2. (a) Find a regular expression for the following language :   4

    $(\Lambda, b, baa, baaa, baaaa)$

(b) Describe the difference between a deterministic finite automata and a non-deterministic finite automata ? Which is expected to have a less number of states ? 6

3. What is a Turing Machine (TM) ? Design a TM that recognizes the language of all strings of even length over the alphabet (c, d). 10

4. (a) Write an algorithm to convert context free grammar into Chomsky normal form. 5

(b) Find regular expression representing the following set :

The set of all strings over (0, 1) having at most one pair of 0's or at most one pair of 1's. 5

5. (a) What is ambiguity in context free grammar ? Show that the grammar G with the following production rules :

$$G = X \rightarrow X + X \mid X*X \mid X \mid a$$

is ambiguous. 5

(b) What is a reduced grammar ? Explain through an example when a grammar is said to be in reduced form. 5

6. (a) Define pumping lemma for context free language. Where is it useful ? 5

(b) Differentiate between Mealy machine and Moore machine. 5

7. Write any *five* properties of a regular set and explain through an example for each. 10

8. Write an algorithm for DFA (Deterministic Finite Automata) minimization using Myphill-Nerode theorem and explain. 10