Code No: R22055 **R10** SET - 1

II B. Tech II Semester Supplementary Examinations, April-2018
FORMAL LANGUAGES AND AUTOMATA THEORY
(Computer Science and Engineering)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
~~~~~~~~~~~~~~~~~~~~~~~~~

1. What is NFA? Design the NFA for the following (15M)
   i) L= { $(ab + aab + aba)^*$ }
   ii) L1={ $10^n : n \geq 0$ } $\vee$ { $10^n10^m : n, m \geq 0$ }
   iii) L2= { x ϵ { a, b, c} * : X contains a substring acaba}
   iv) L3={ x ϵ { a, b} * : x contains the substring bb or a substring bab }
   v) L4= { a^i, b^i} : $i \geq 1, j \geq 1$ } $\vee$ { λ , 0 }.

2. a) Discuss about Myhill- Nerode theorem. (3M)
   b) Construct the NFA for the language that accepts only the strings of 0's and 1's that end in 01. Convert this NFA to the equivalent DFA. (12M)

3. a) Explain about the equivalence of finite automata and regular expressions. (8M)
   b) Given the regular expression (11+0)*. Convert into NFA. (7M)

4. a) Define context sensitive grammar with an example. (6M)
   b) Differentiate between leftmost and rightmost derivations (5M)
   c) Write short note on Chomsky classification of languages. (4M)

5. Define GNF? Find the GNF equivalent to the following CFG (15M)
   S → AA / 0
   A → SS / 1

6. Design a PDA to accept the language (15M)
   L= { $a^n b^m c^n$ / n,m ≥1}.

7. Design Turing machines for the language L= {WW^R / w is any string of 0's and 1's}. (15M)

8. a) Explain about NP complete and NP hard problems (5M)
   b) Write a short note on LR(0) grammar. (5M)
   c) Discuss about modified PCP. (5M)
~~~~~~~~~~~~~~~~~~~~~~~~~