

**R07**

Code: R7310501

III B. Tech I Semester (R07) Supplementary Examinations, May 2012

**FORMAL LANGUAGES & AUTOMATA THEORY**

(Computer Science &amp; Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE questions  
All questions carry equal marks

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- 1 (a) Define string and alphabet and discuss the operations on string.  
(b) Define language. Discuss its operations.
- 2 Prove the theorem "Let L is a set accepted by non - deterministic finite automata and then there exists a DFA that accepts L".
- 3 (a) Prove "if L is accepted by DFA, then there exists an equivalent regular expression which develops L".  
(b) Discuss the method for conversion of regular expression to finite automata.
- 4 (a) Explain in detail about right and left linear grammars with example.  
(b) Explain the equivalence and differences between regular grammar and finite automata.
- 5 (a) Write procedure for converting a given CFG into GNF. Find GNF for the grammar with the following productions.  
 $A \rightarrow BC$                        $B \rightarrow CA / b$                        $C \rightarrow AB / a$ .  
(b) Give an example of a CFG whose complement is not a CFG. And also prove the same (i.e. the complement of the grammar provided by you is not a CFG.)
- 6 (a) When do we say that a PDA is non deterministic? Design a PDA for recognizing the language of palindromes over the input alphabet {a, b}.  
(b) Distinguish between a DPDA and NPDA.
- 7 (a) Write short notes on Church's hypothesis.  
(b) Discuss in detail about various modifications that can be done to the basic model of a Turing machine.
- 8 Prove that PCP is undecidable.

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