

III B.Tech I Semester Regular Examinations, Nov/Dec 2009
Formal Languages and Automata Theory
Computer Science And Engineering

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
 All Questions carry equal marks

1. Design Turing Machine to find out GCD of two given numbers. [16]
2. Construct LR(0) items for the following grammar
 $E \rightarrow E + T \mid T$
 $T \rightarrow T * F \mid F$
 $F \rightarrow (E) \mid id$ [16]
3. What is Chomsky Normal Form? Convert the following Context Free Grammar to Chomsky Normal Form.
 $S \rightarrow AaB \mid aaB$
 $A \rightarrow \varepsilon$
 $B \rightarrow bbA \mid \varepsilon$ [16]
4. (a) Write the steps in minimization of FA.
 (b) Construct a Moore machine to determine the residue mod 3 for each binary string treated as a binary integer. [8+8]
5. (a) Convert the following Context Free Grammar to Push Down Automata
 $S \rightarrow aA \mid bB$
 $A \rightarrow aB \mid a$
 $B \rightarrow b$
 (b) Verify the string aab is accepted by equivalent Push Down Automata [10+6]
6. (a) Define String, Alphabet and Language.
 (b) Prove that if $\delta(q, x) = \delta(q, y)$, then $\delta(q, xz) = \delta(q, yz)$ for all strings z in Σ^+ .
 (c) Construct DFA and NFA accepting the set of all strings with three consecutive 0's. [6+4+6]
7. Describe, in the English language, the sets represented by the following regular expressions:
 (a) $a(a+b)^*ab$
 (b) $a^*b + b^*a$ [16]
8. (a) If $G = (\{S\}, \{0, 1\}, \{S \rightarrow 0S1, S \rightarrow \varepsilon\}, S)$, find $L(G)$.
 (b) If $G = (\{S\}, \{a\}, \{S \rightarrow SS\}, S)$ find the language generated by G . [8+8]
