Roll No.

B.E / B.Tech (Full Time) DEGREE END SEMESTER EXAMINATIONS, APRIL / MAY 2013

INFORMATION TECHNOLOGY

Fourth Semester

IT 9251 Formal Languages and Automata

(Regulations 2008)

Time: 3 Hours

Answer ALL Questions

Max. Marks 100

PART- A (10 x 2 = 20 Marks)

- 1. Prove that $\sqrt{2}$ is not rational
- 2. Design the DFA accepting the language over the alphabet 0, 1 that has the set of all strings that begin with 0 and end with 1.
- 3. Design NFA for the regular expression 01*.
- 4. Suppose H is the homomorphism from the alphabets $\{0,1,2\}$ to the alphabets $\{a,b\}$ defined by h(0)=a h(1)=ab h(2)=ba. What is h(0120) and h(21120)?
- 5. Consider G whose productions are S→ aAS | a, A→ SbA | SS| ba. For the string w = aabbaa, find the leftmost and rightmost derivation.
- 6. Define the languages generated by a PDA using final state of the PDA and empty stack of that PDA.
- 7. State Griebach Normal form.
- 8. Define Turing Machine and state the formal definition of it.
- 9. What is Recursive descent parsing? What are the drawbacks of it?
- 10. Define LL(1) grammar. Check the following grammar is LL(1). S \rightarrow AB, A \rightarrow ab | ϵ , B \rightarrow a.

$Part - B (5 \times 16 = 80 marks)$

11 a) i) Consider the following ϵ -NFA. Compute the ϵ -closure of each state and find it's equivalent DFA.

q	δ (q, ε)	δ(q, 0)	_ δ(q, 1)
Α	{B}	{A}	Ø
В	{D}	{C}	Ø
С	Ø	Ø	{B}
D	Ø	{D}	Ø

- 11 a) ii) Prove that "A language L is accepted by some DFA if and only if L is accepted by some NFA".
- 12 a) i) Find the equivalent DFA that has the minimum number of states.



12 a) ii) Convert the DFA to Regular Expression by eliminating states.

 $\begin{array}{c} 0 \\ \hline \\ 3 \\ \hline \\ 0 \\ \end{array} \begin{array}{c} 0 \\ 1 \\ \hline \\ 0 \\ \end{array} \begin{array}{c} 0 \\ 1 \\ \hline \\ \end{array} \begin{array}{c} 0 \\ 1 \\ \end{array} \end{array}$

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