

Roll No.

Total Pages : 3

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BT-5/D-25

FORMAL LANGUAGE AND AUTOMATA THEORY

Paper : PC-CS-303A

Time : Three Hours]

[Maximum Marks : 75

Note : All questions carry equal marks and attempt any *five* questions out of eight questions by selecting atleast *one* question from each Unit.

UNIT-I

1. What are algebraic laws of regular expression and Design a DFA that accepts binary strings divisible by 3. 15
2. What is difference between non-deterministic finite automata (NFA) and Deterministic finite automata with epsilon transition and without Epsilon transition (DFA) and also write application of DFA automata. 15

UNIT-II

3. What do you mean by context sensitive grammar and show that the language $L = \{a^n b^n \mid n \geq 0\}$ is context-free but not regular. 15

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4. What are sequential steps to convert context free grammar to chomsky normal form. This is given CFG

$S \rightarrow ASB$

$A \rightarrow aAS \mid a \mid \epsilon$

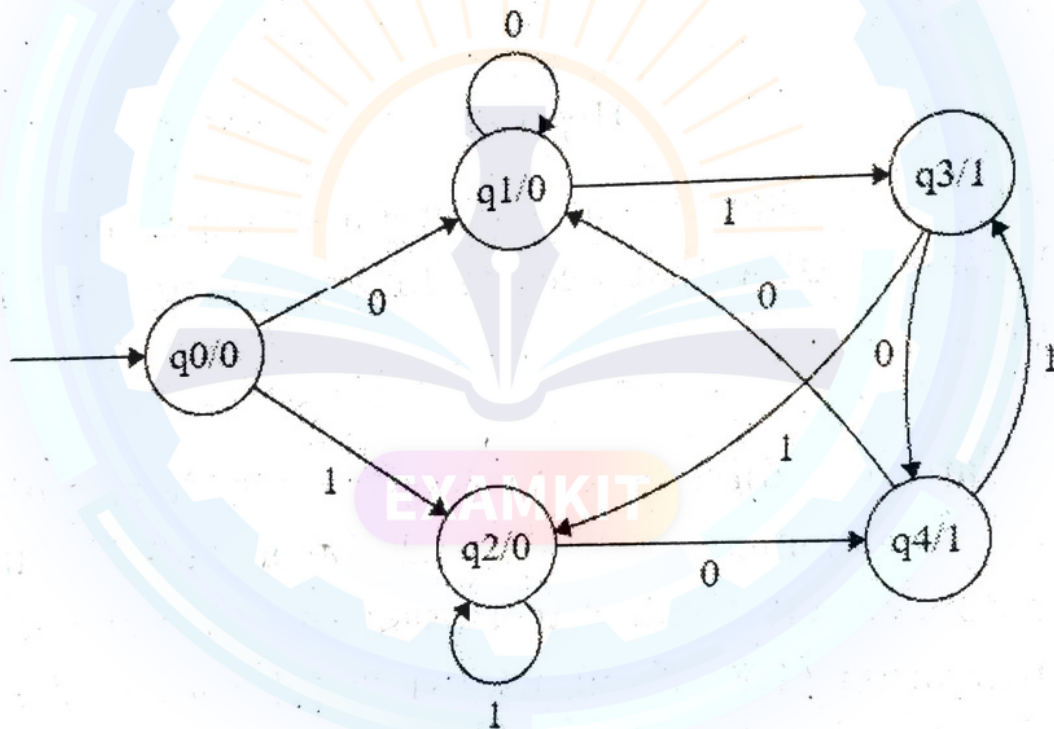
$B \rightarrow SbS \mid A \mid bb.$

15

UNIT-III

5. Define Moore Machines and write its states. Write steps to Convert From following Moore to Mealy Machine.

15



6. What is deterministic push down automata. And also Construct a PDA for palindromes over $\{a, b\}$ with center marker.

15

UNIT-IV

7. What is Turing machine and Construct a Turing Machine that adds 1 to a binary number. 15
8. What is P-NP class and also explain Rice's problem with the help of an example. 15

