

Code No: R22055

**R10****SET - 1**

**II B. Tech II Semester, Regular Examinations, April/May – 2013**  
**FORMAL LANGUAGES AND AUTOMATA THEORY**  
 (Computer Science and Engineering)

Time: 3 hours

Max. Marks: 75

Answer any **FIVE** Questions  
 All Questions carry **Equal** Marks  
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1. a) Define Relation? Explain about different types of Relations?  
 b) Construct a DFA that accepts an identifier of a 'C' programming language. (8M+7M)

2. Construct Minimum state Automata for the following DFA?  
 \* denotes final state

| $\delta$          | 0  | 1  |
|-------------------|----|----|
| $\rightarrow$ q 1 | q2 | q3 |
| q 2               | q3 | q5 |
| *q 3              | q4 | q3 |
| q 4               | q3 | q5 |
| *q5               | q2 | q5 |

(15M)

3. a) Show that  $L=\{a^{2n}/n<0\}$  is regular?  
 b) Show that  $L=\{a^p /p \text{ is prime}\}$  is context free? (8M+7M)
4. a) Define Grammar? Explain about Chomsky classification of Grammars?  
 b) Explain about Right linear and Left Linear Grammars? (8M+7M)
5. a) Explain about the decision properties of context free languages?  
 b) Explain about Left Factoring and Left Recursion? (8M+7M)
6. a) Explain about PDA?  
 b) Convert the grammar  $S \rightarrow 0AA, A \rightarrow 0S/1S/0$  to a PDA that accepts the same language by empty Stack? (4M+11M)
7. a) Define Turing Machine? Explain about the Model of Turing Machine?  
 b) Explain about types of Turing Machine? (8M+7M)
8. a) Explain about the Decidability and Undecidability Problems?  
 b) Explain about Turing Reducibility? (8M+7M)

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**R10****SET - 2**

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 (Computer Science and Engineering)

Time: 3 hours

Max. Marks: 75

Answer any **FIVE** Questions  
 All Questions carry **Equal** Marks  
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1. a) Define Finite Automaton? Explain about the model of Finite Automaton?  
 b) Define Set? Explain about the Operations on Set? (8M+7M)
2. Explain in detail about Melay and Moore Machines? (15M)
3. Construct Finite Automata for the regular Expression  $1(01+10)^*00$ ? (15M)
4. a) Define Derivation tree? Explain about LMD and RMD?  
 b) Construct a derivation tree for the string abcd from the grammar  
 $S \rightarrow aAB, A \rightarrow bC, B \rightarrow d, C \rightarrow cd$ ? (8M+7M)
5. a) List out the Applications of CFL?  
 b) Construct CNF for the Grammar  $S \rightarrow ABC, A \rightarrow 0B, B \rightarrow CD/0, C \rightarrow 1$  (8M+7M)
6. a) Show that for every PDA then there exists a CFG such that  $L(G)=N(P)$ ?  
 b) Construct a PDA for  $L=\{a^n b^n c^n / n > 0\}$  (8M+7M)
7. Construct a Turing Machine that will accept the Language consists of all palindromes of 0's and 1's? (15M)
8. Explain in detail about NP Complete and NP hard problems? (15M)

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**SET - 3**

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**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. a) Define Relation? Explain about different types of Relations?  
b) Construct a DFA for the Regular Language consisting of any number of a's and b's?  
(8M+7M)
2. Explain in detail about the Procedure for converting a given Melay to Moore Machine and vice versa?  
(15M)
3. a) Explain about the identity rules of Regular Expressions?  
b) Explain about the Closure Properties of Regular sets?  
(8M+7M)
4. a) Explain about LBA?  
b) Explain about Context free and Context Sensitive Grammars?  
(8M+7M)
5. Explain in detail about Chomsky and Greibach Normal forms?  
(15M)
6. Construct a PDA for  $L=\{wcw^R / w \in (0+1)^*\}$   
(15M)
7. a) Design a Turing Machine for  $L=\{0^n1^m0^n / m,n \geq 1\}$ ?  
b) Explain about Recursively Enumerable Languages?  
(8M+7M)
8. a) Explain in detail about Halting Problem of Turing machine?  
b) Explain about Universal Turing Machine?  
(8M+7M)

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**R10****SET - 4****II B. Tech II Semester, Regular Examinations, April/May – 2013****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. Define the Following:
  - i) String
  - ii) Alphabet
  - iii) Languages
  - iv) Grammar
  - v) NP problem
 (15M)
2. Construct Minimum state Automata for the following DFA? (15M)  
\* denotes final state
 

$\delta$	0	1
$\rightarrow$ q 1	q2	q6
q 2	q1	q3
*q 3	q2	q4
q 4	q4	q2
q5	q4	q5
*q6	q5	q4
3. Define Regular Expression? Explain about the Properties of Regular Expressions? (15M)
4. Explain about the Procedure for Converting a Regular Expression in to Automata. (15M)
5. Define Ambiguous Grammar? Check whether the grammar  $S \rightarrow aAB, A \rightarrow bC/cd, C \rightarrow cd, B \rightarrow c/d$  is Ambiguous or not? (15M)
6. a) Explain about DPDA?  
b) Construct PDA for  $L = \{a^n b^n / n > 0\}$ ? (8M+7M)
7. a) Construct Turing machine for the languages containing the set of all strings of balanced parenthesis?  
b) Explain about the Design of Turing Machines? (8M+7M)
8. Define LR(0) Grammar? Explain in detail about PCP? (15M)