Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 21386

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2015.

Fifth Semester

Computer Science and Engineering

CS 2303/CS 53/10144 CS 504/CS 1303 — THEORY OF COMPUTATION

(Common to Seventh Semester Information Technology)

(Regulations 2008/2010)

(Common to PTCS 2303 – Theory of Computation for B.E. (Part-Time) Fifth Semester – CSE – Regulations 2009)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. Define the term NFA.

2. What is meant by a Epsilon transition?

3. List the operators used in the regular expression and their precedence.

4. Mention any four Closure properties of Regular languages.

5. Define the term Parse tree.

6. What is meant by ambiguity in Grammars?

7. Define the term Chomsky Normal Form?

8. List the components of Turing Machine.

9. What is meant by recursive enumerable language?

10. Define PCP.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Construct DFA to accept the language $L = \{w \mid w$ is of even length and begins with 10$\}$. (10)

(ii) Discuss on Finite automata with epsilon transitions. (6)

Or

(b) (i) Convert the following NFA to a DFA. (10)

	0	1
p	$\{p, q\}$	$\{p\}$
q	$\{r, s\}$	$\{t\}$
r	$\{p, r\}$	$\{t\}$
$^*s$	ϕ	ϕ
$^*t$	ϕ	ϕ

(ii) Discuss on the relation between DFA and Minimal DFA. (6)

12. (a) (i) Explain about Finite automata and Regular expressions. (8)

(ii) Discuss about the closure properties of regular languages. (8)

Or

(b) (i) Prove that the following languages are not regular (8)

$\{0^n 1^m \mid n \leq m\}$

$\{0^n 1^{2n} \mid n \geq 1\}$

(ii) Discuss on equivalence and minimization of Automata. (8)

13. (a) Discuss the following :

(i) CFG and Parse trees (6)

(ii) Ambiguity in Context Free Grammars with example (10)

Or

(b) (i) Construct PDA for the language

$L = \{ww^R \mid w \text{ is in } \{0,1\}^*\}$. (10)

(ii) Discuss on Deterministic PDA. (6)

14. (a) (i) Construct the following grammar in CNF :

S -> ABC | BaB

A -> aA | BaC | aaa

B -> bBb | a | D

C -> CA | AC

D -> ε . (8)

(ii) Discuss on Turing Machines. (8)

Or

(b) (i) List and explain the closure properties of CFL.

(ii) Explain in detail about programming techniques for Turing Machines. (8)

15. (a) (i) Explain about "A language that is not Recursively Enumerable". (8)

(ii) Prove that L_{ne} is not recursive. (8)

Or

(b) (i) Discuss on undecidable problems about Turing Machine. (10)

(ii) Explain about the Universal language. (6)

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