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Question Paper Code : 71386

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 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)

(Regulation 2008/2010)

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

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Any set A, B, and C if $A \cap B = \phi$ and $C \subset B$ then $A \cap C = \phi$. Prove by contra positive.
2. Prove for every $n \geq 1$ by mathematical induction
$$\sum_{i=1}^n i^2 = n(n+1)(n+2)/6$$
3. Give English description of the following language $(0+10)^*1^*$.
4. Construct NFA $\hat{\quad}$ for $1^*(01)^*$
5. Generate CFG for $(011+1)^*$
6. Construct a parse tree of $(a + b)^*c$ for the grammar $E \rightarrow E+E / E^* E /(E)/id$
7. Differentiate PDA acceptance by empty stack method with acceptance by final state method.
8. Define — pumping lemma for CFL.
9. Define — RE language
10. Differentiate recursive and non-recursive languages.

11. (a) Design a DFA accept the following strings over the alphabets {0,1} The set of all string that contains a pattern 11. Prove this using mathematical induction

Or

- (b) Design a NFA accept the following strings over the alphabets {0,1} The set of all string that begins with 01 and ends with 11. Check for the validity of 01111 and 0110 strings.

12. (a) Find the min-state DFA for $(0+1)^*10$.

Or

- (b) Find the regular expression of a language that consist of set of string starts with 11 as well as ends with 00 using Rij formula

13. (a) Construct a PDA for the given grammar $S \rightarrow aSa|bSb|c$.

Or

- (b) Construct a PDA for the language $L = \{x \in \{a,b\}^* | n_a(x) > n_b(x)\}$

14. (a) Construct a TM to perform copy operation.

Or

- (b) Given the CFG G, find CFG G' in CNF generating the language $L(G) - \{\wedge\}$

$$S \rightarrow AACD$$

$$A \rightarrow aAb| \wedge$$

$$C \rightarrow aC|a$$

$$D \rightarrow aDa|bDb| \wedge$$

15. (a) Explain post-correspondence problems and decidable and undecidable problems with examples.

Or

- (b) Explain the class P and NP problems with suitable example.