Roll No .....

CS - 505

B.E. V Semester

Examination, June 2015

Theory of Computation

Time : Three Hours

Maximum Marks : 70

Note: i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.

ii) All parts of each questions are to be attempted at one place.

iii) All questions carry equal marks, out of which part A and B (Max.50 words) carry 2 marks, part C (Max.100 words) carry 3 marks, part D (Max.400 words) carry 7 marks.

iv) Except numericals, Derivation, Design and Drawing etc.

Unit-I

1. a) Differentiate between transition graph and transition matrix.

   b) Explain the term alphabet and string.

   c) What do you understand by DFA (Deterministic Finite Automata) and how is it represented.

   d) What is Moore Machine? How Finite Automates can be converted into Moore Machine? Explain with the help of example.

   OR

   State the Myhill Nerode theorem and its applications.

Unit-II

2. a) Show that the grammar s → a|sa|bss|ssb|sbs| in ambiguous.

   b) How can we construct regular grammar from regular expression.

   c) Describe context free and context sensitive Grammar.

   d) Convert the following CFG to CNF :

   $S \rightarrow ABA$

   $A \rightarrow aA / \varepsilon$

   $B \rightarrow bB / \varepsilon$

   OR

   Convert the grammar S →AB, A→BS/b, B→SA/a into Greibach normal form.

Unit-III

3. a) What is the additional feature PDA has when compared with NFA?

   b) Is it true that deterministic PDA and non-deterministic PDA are equivalent in the sense of language of acceptances? Justify your answer.

   c) Prove that CFLs are not closed under intersection.

   d) Construct a PDA for the following language :

   $L = \{a^m b^n c^{m+n} \mid m,n \geq 1\}$

   OR

   Show that the language $\{_a n^2 \mid n \geq 1\}$ is not context free.

Unit-IV

4. a) Explain the concept of Turing Machine Model?

   b) Construct TM accepting language

   L = {w/w has even no. of 2}

   c) Discuss the properties of recursive and recursive enumerable languages.

   d) Construct a turing machine for checking the palindrome of a string of odd palindrome for $\Sigma = \{0, 1\}$

   OR

   Find the languages obtained from the following operations:

   i) Union of two recursive languages

   ii) Union of two recursively enumerable languages

   ii) L if L and complement of L are recursively enumerable.

Unit-V

5. a) What is tractable and untractable problem?

   b) Explain P- class problems with suitable example.

   c) Explain what is NP- heat problem?

   d) Explain vertex cover problem with suitable example.

   OR

   Write short notes:

   i) Satisfiability problem.

   ii) Hamiltonian path problem.

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