

Roll No

CS-505

B.E. V Semester

Examination, December 2016

Theory of Computation

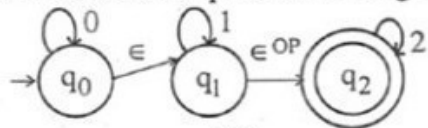
Time : Three Hours

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

- a) Define two way finite automata.
 b) Define Regular expressions.
 c) Design DFA accepting the language over the alphabet 0,1 that have the set of all strings ending in 00.
 d) Determine the DFA equivalent to the given NFA



OR

Explain Myhill Nerode theorem with example.

Unit - II

- a) Define Ambiguity.
 b) Define CFG
 c) Find L(G) for the grammar $S \rightarrow aCa, C \rightarrow aCa/b$.
 d) Prove that the given grammar is ambiguous.
 i) $S \rightarrow aSb/SS/\epsilon$
 ii) $S \rightarrow aB/aaB, A \rightarrow a/Aa, B \rightarrow b$

[2]

OR

Eliminate unit, useless and E-productions from the grammar

$S \rightarrow aA/aBB, A \rightarrow aaA/\epsilon, B \rightarrow bB/bbC, C \rightarrow B$.

Unit - III

- a) Give the formal definition of PDA.
 b) Define deterministic PDA.
 c) Explain the pumping Lemma of content free languages.
 d) Design PDA to accept the language $L(G) = \{a^n b^m a^n / m, n \geq 1\}$.

OR

Design PDA to accept the language $L(G) = \{ww^R / w \in (0,1)^* \text{ and } w^R \text{ is the reverse of word } w\}$

Unit - IV

- a) What is decidable and undecidable problems?
 b) Give two properties of recursively enumerable set.
 c) Explain the types of Turing machine.
 d) Design Turing machine for the language $L(G) = \{a^n b^n / n \geq 1\}$

OR

Design Turing machine for the language $L(G) = \{a^n b^m a^{n+m} / n \geq 1, m \geq 1\}$.

Unit - V

- a) What is NP hard problems?
 b) How P class problems different from NP class problem?
 c) What Hamiltonian path problem? Explain.
 d) Differentiate between tractable and untractable problems.

OR

Explain Vertex cover problem briefly.
