(Please write your Exam Roll No.) Exam Roll No. .....

END TERM EXAMINATION

FIFTH SEMESTER [B.TECH./M.TECH.] DECEMBER 2013

Paper Code: IT301 **Subject: Theory of Computation**

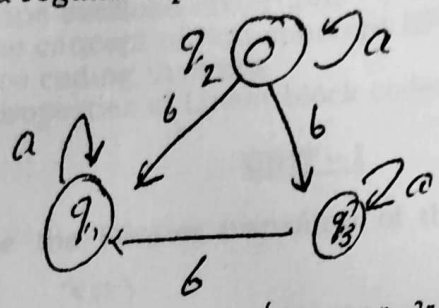
Time : 3 Hours **Maximum Marks :60**

Note: Attempt any five questions including Q.no.1 which is compulsory.

Q1 Explain briefly the following:- (3x4=12)

(a) Differentiate between NFA and DFA.
(b) Differentiate between context free grammar and regular grammar.
(c) Differentiate between P and NP problem.
(d) Explain the structure of a Turing machine.

Q2 (a) Construct a regular expression for the language accepted by DFA- (6)



(b) Show that the language $L = \{\omega \in a^n b^n c^{2n}\}$ is not context free. (6)

Q3 (a) Discuss the closure properties of CFLs. (6)
(b) State Pumping Lemma. Illustrate the pumping Lemma using an example. (6)

Q4 Consider the following grammar $E \rightarrow E+T/T$, $T \rightarrow a/b$. Determine- (12)

(a) SLR parsing table.
(b) LL(I) grammar/parsing table.

Q5 (a) Design a Turing machine, that accepts all the language of all palindrome over the alphabet {a,b}. (8)
(b) Justify the 5(a) turing machine on the string (i) babb (ii) bab. (4)

Q6 Construct a PDA to accept all strings generated by the language $\{a^n b^m a^n | m,n \geq 1\}$. (12)

Q7 (a) Differentiate NP complete and NP Hard problems. Explain NP complete and NP hard problems with some example. (6)
(b) Discuss and explain Hierarchy Theorem. (6)

Q8 Write short notes on **any two** of the following:- (6x2=12)

(a) Halting problem
(b) Decidability
(c) Chomsky Classification

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