S.E.I.T Sem IV (CBGS).

9/12/14

QP Code : 12527

Duration : 3 hours

Total marks : 80

Note.(1) Question No. 1 is compulsory

(2) Attempt any three questions from remaining questions

(3) Draw suitable diagrams wherever necessary

(4) Assume suitable data, if necessary.

Q1.(a)Explain Chomsky hierarchy (10)

(b) Let G be the grammar . Find the leftmost derivation, rightmost derivation and parse tree for the string 001222 (10)

G: $S \rightarrow 0S \mid 1A \mid 2B \mid \epsilon$

$A \rightarrow 1A \mid 2B \mid \epsilon$

$B \rightarrow 2B \mid \epsilon$

Q2. (a)Design a DFA that rejects any string over { 1, 2, 3 } where 2 is immediately preceded by a 0. It should accept all other strings. (10)

(b) Design a DFA for the regular expression (a+b)*abb (10)

Q3. (a Design a Mealy machine to accept all strings ending with 00 or 11 (10)

(b) Convert the following NFA to a reduced DFA (Final state is marked with *). (10)

δ	0	1
p	p , q	p
q	r	r
r	s	--
*s	s	s

Q4. (a) Using pumping lemma prove that the following language is not regular (10)

$L = \{ ww \mid w \in \{0, 1\}^* \}$

(b) Design a Turing machine to generate the language given by a regular expression (10)

00*

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Q5 (a) (i) Convert the following CFG to CNF (05)

S →aAbB

A →aA | a

B →bB|b

(ii) Construct a CFG over { a ,b } to accept a set of all palindromes. (05)

(b) Design a PDA corresponding to the grammar S →aSa |bSb |ϵ (10)

Q6. Write short notes on (any two) (20)

(a) Turing Machines
(b) Post Correspondence Problem
(c) Halting Problem
(d) Pumping Lemma for Regular languages
