SE SEM IV IT CBGS MAY 2017 25/05/2017

T1624 / T1079 AUTOMATA THEORY

Q.P.Code:09966

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

Q 1. (a) Write regular expression to denote a language L which accepts all the strings which begin or end with either 00 or 11. (05)

(b) Convert the given CFG to CNF (05)

S→aSa|bSb|a|b

(c) Difference between FA and PDA (05)

(d) Design moore machine to convert each occurrence of 111 to 101 (05)

Q 2. (a) Construct NFA with epsilon which accept a language consisting the string of any number of a's followed by any number of b's followed by any number of c's. Also convert it into NFA without epsilon. (10)

(b) Design a DFA corresponding to regular expression (a+b)* aba (a+b)* . (10)

Q 3 (a) Use pumping lemma prove that whether following language is regular or not ($a^n b^n c^n \mid n>=1$) (10)

(b) Explain Chomsky's Hierarchy (10)

Q 4 (a) Define context free grammar. Obtain the CFG for the following regular expression: (10)

(110 + 11)* (10)*

Turn Over

(b) Convert given CFG to CNF (10)

S→ASB | ε

B →SbS | A | bb

A→aAS | a

Q 5 (a) Design a PDA to accept the language $\{L = a^m b^m c^n \mid m, n>=1\}$ (10)

(b) Construct TM for $L= \{a^n b^n c^n \mid n>=1\}$ (10)

Q 6 Write short notes on (Any two) (20)

(a) Post Correspondence Problem

(b) Recursive and Recursively enumerable languages

(c) Halting Problem
