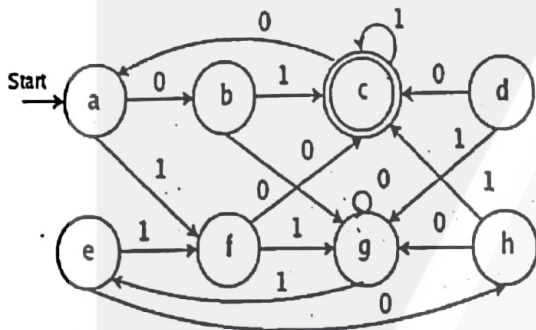BTC-401　　　　4

SECTION – C　　　(20 Marks)
(Compulsory)

10. (a) Construct a minimum state Automaton for the following FA using MyHill Nerode Theorem.

(5)

(b) Prove that "The set of Pairs <M, W> such that Turning Machine, M, started with input W, does not half" is not recursively enumerable.　(5)

(c) Describe the TM that accepts the language

$$L = \{a^n b^n c^n \mid n >= 0\}.$$

Also derive the computation sequence for the input sequence aabbcc.　(6)

(d) What do you mean by PCP and MPCP ? Show that the post correspondence problem with two lists A = {1, 10111, 10} and B = (111, 10, 0} has a solution and give the solution.　(4)

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B. TECH (COMPUTER SCIENCE & ENGINEERING)

FOURTH SEMESTER END TERM EXAMINATION: APRIL, 2011

THEORY OF AUTOMATA & COMPUTATION

Time : 3 Hrs.　　　　　Maximum Marks : 70.

SECTION – A　　　(30 Marks)
Attempt any 5 questions.
Each question carries 6 marks.

1. (a) Explain various applications in which automata have proved its strength.　(3)

   (b) Explain Chomsky hierarchy of grammars.　(3)

2. (a) Design a DFA with exactly 5 states accepting (01 + 011 + 0111).　(3)

   (b) Convert the resultant DFA from (a) in to its corresponding Mealy machine.　(3)

3. (a) Construct the PDA for the following grammar.

   $$S \rightarrow AA/a$$
   $$A \rightarrow SA/b$$

   (3)

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(b) Design a DFA that accept the string of binary
    number which is divisibly by 5.   (3)

4. Reduce the Grammar G given by

   $S \rightarrow aAa$

   $A \rightarrow Sb/bcc/DaA$

   $C \rightarrow abb/DD$

   $E \rightarrow ac/D$

   $D \rightarrow aDA /\epsilon$

   **Eliminate useless symbols, unit productions and null
   productions.**

5. Explain CYK Algorithm. Compute the matrix for
   following grammer and check the acceptance of input
   Amp baaba for

   $S \rightarrow AB/BC$

   $A \rightarrow BA/a$

   $B \rightarrow Cc/b$

   $C \rightarrow AB/a$

6. (a) Explain My-Hill Nerode theorem in detail.   (3)

   (b) Explain Linear bounded Automata and Context
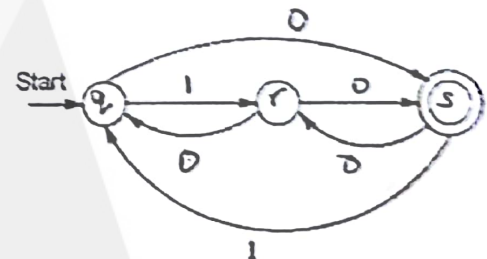   sensitive languages.   (3)

   (158)

SECTION – B   (20 Marks)

Attempt any 2 questions.
Each question carries 10 marks.

7. Convert the following NFA to DFA and then Construct
   Regular Expression for the resulting finite automaton:

8. (a) Construct a Pushdown automata for language
       $L = \{a^n b\ a^n | n \geq 0\}$.   (6)

   (b) Explain ambiguity and inherent ambiguity. Show
       that the grammar G with production

       $S \rightarrow a/aAb/abSb$

       $A \rightarrow aAAb/bS$ is ambiguous.   (4)

9. (a) Design a D.F.A. that accept Language L

       s.t. $L = \{ab^5\ w\ b^4 : w \in (a,b)^*\}$ (5)

   (b) Convert the following grammar in to GNF :

       $S \rightarrow AB,\ A \rightarrow aA/bB/b,\ B \rightarrow b$ (5)

                                              P.T.O.

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