SE 1T — Sem IV — Automata Theory (CBCS)   Q. P. Code: 40016

Duration: 3 Hours   Marks : 80

Note :

1. Question No.1 is compulsory.
2. Attempt any three question form remaining question.   0 4 JUN 2018
3. Draw suitable diagram whenever necessary.
4. Assume suitable data if, necessary.

Q.1:

a) Design FA for decimal number divisible by 4   (05)
b) Write a regular expression for $a^n b^m c^k$ where n+m is odd and k is even   (05)
c) Design NFA for binary number divisible by 4 or 6   (05)
d) Design Moore machine for binary adder.   (05)

Q.2:

a) Convert the following Regular Expression to NFA with Null moves , then convert it to DFA   (10)
    $(0+1)^* 011 (0+1)^*$
b) Give the Regular expression and corresponding DFA for all the words that begin and end with double letter   (10)

Q.3:

a) Design the Turing machine for $a^n b^n c^n$ where $n \geq 1$.   (10)
b) Write a Right linear grammar and left linear grammar for RE $(0+1)^* 0$ and show derivation tree for 1010110.   (10)

Q.4:

a) Construct CFG for the following
    i.   Alternate sequences of 0 and 1.   (03)
    ii.   Do not contain 3 consecutive b's   (04)
    iii. $a^n b^m c^k$ where k=n+m   (03)

b) Design CFG for $a^n b^n$ where $n \geq 1$ and convert it to Chomsky's Normal form   (10)

Q.5:

a) What is Ambiguous Grammar, find if the following grammar is ambiguous or not?   (10)

S --> S+S

S -->S*S

S -->a

S -->b

b) Design PDA for odd length palindrome, let $\Sigma = \{ 0,1\}$,L= $\{ W X W^R$ where $W \in \Sigma^* \}$ (10)

Q.6:

a) Design Turing machine which adds 2 unary numbers and convert the Turing machine design to a Program (12)

b) Explain the Applications of Automata (FM,PDA,TM) in detail with example (08)

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