FACULTY OF ENGINEERING
B.E. 3/4 (CSE) I-Semester (Suppl.) Examination, July 2014

Subject : Automata Languages and Computation

Time : 3 Hours   **Max. Marks: 75**

Note: Answer all questions of Part - A and answer any five questions from Part-B.
PART – A (25 Marks)

1	Define δ in a TM.	(2)
2	State pumping lemma for CFL's.	(2)
3	Define Church's hypothesis.	(2)
4	Define the term LBA and explain.	(2)
5	Prove that $(O+1)^*$ 100 regular or not.	(3)
6	State the closure properties of Regular Languages.	(2)
7	Define PCP and MPCP.	(2)
8	Construct a right linear grammar for $(0+1)^*00(0+1)^*$.	(3)
9	Convert to CNF.	(3)

$S \rightarrow aB \mid bA$
$A \rightarrow a \mid aS \mid bAA$
$B \rightarrow b \mid bS \mid aBB$

10   What are intractable problem ? Explain.   (3)

PART – B (50 Marks)

11 (a) Construct a DFA equivalent to the regular expression $10+(0+11)0^*1$.   (6)
     (b) Differentiate between NFA and DFA.   (4)

12 (a) Given CFG G = ({S, A}, {a, b}, P, S) where
        P consists of $S \rightarrow aAS \mid a$
                  $A \rightarrow SbA \mid SS \mid ba$
    Give the LMD, RMD and parse tree for "aabbaa"   (5)
     (b) What are ambiguous grammars ? Give examples. Is the above grammar ambiguous.   (5)

13   Design a PDA to accept equal no of a's and b's over the alphabet $(a+b)^+$.   (10)

14 (a) Write short notes on Universal TM .   (5)
    (b) Design a TM for L $\{WW^R \mid W \in (0+1)^*$, R stands for Reverse$\}$.   (5)

15   Reduce to GNF
        $S \rightarrow AA \mid O$
        $A \rightarrow SS \mid 1$ (10)

16 (a) Define Chomsky hierarchy.   (3)
     (b) What are recursively enumerable languages? Give example.   (3)
     (c) Explain undecidability.   (4)

17 (a) Explain a restricted satisfiability problem.   (5)
     (b) Explain the classes of P, NP and explain the terms NP - complete and NP-nard.   (5)

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