USN												21CST501

B. E. Degree (Autonomous) Fourth Semester End Examination (SEE)

AUTOMATA THEORY AND INTRODUCTION TO COMPLIERS

(Model Question Paper - I)

Time: 3 Hours]   [Maximum Marks: 100

Instructions to students: Answer 5 full questions.

			Marks	Course Outcomes	BTL* Cognitive Level
1	a)	What is an automaton? Discuss why study automaton?	[06 M]	CO1	L2
	b)	Design DFA for the following languages over $\sum = \{ a, b\}$ • Set of all string that either begins or ends or both with substring ab. • Set of all strings that end with substring abb. • L= {w: |w| mod 5 $\neq$ 0}	[09 M]	CO1	L5
	c)	Explain the applications of Finite Automata?	[05 M]	CO1	L3
		OR			
2	a)	Convert to a DFA, the following NFA	[10 M]	CO1	L2
	b)	Prove that a language is Regular if and only if it is accepted by a Finite Automata.	[10 M]	CO1	L3
3	a)	State and prove pumping lemma for Regular Languages	[08 M]	CO2	L3
	b)	Minimize the following DFA, given A = Start state. States C, F and I are final states.	[12 M]	CO2	L4
		OR			
4	a)	Write the Table filling algorithm to find the distinguishable pairs in a DFA 'M'.	[08 M]	CO2	L2
	b)	Show that the language L = { 0^n / n is prime } is not regular.	[06 M]	CO2	L3
	c)	Using identities prove that the regular languages are closed under intersection.	[06 M	CO2	L3

Table for Question 2 a):

δ_{NFA}	0	1
→P	{P,Q}	{P}
Q	{R}	{R}
R	{S}	ϕ
*S	{S}	{S}

Table for Question 3 b):

δ	0	1
→A	B	E
B	C	F
* C	D	H
D	E	H
E	F	I
*F	G	B
G	H	B
H	I	C
*I	A	E

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5	a)	Define the following terms with examples 1.Parse tree 2.Ambiguity 3.Rightmost derivation	[08 M]	CO3	L1
	b)	Show that following grammar is ambiguous. Obtain unambiguous grammar for this: E→E+E/E*E/E/E-E/(E)/a/b.	[06 M]	CO3	L3
	c)	Write CFG for the language 1.L = { $0^n 1^n$ | n>=1} 2. L = {w w^R | w ε{a,b}*, w^R is the reversal of w}	[06 M]	CO3	L2
		OR			
6	a)	Write context free grammars for the following i) L(G) = {$a^n b^m c^m d^n$: m, n ≥ 1} ii) L(G) = { $a^n b^{n+1}$: n ≥ 0 } iii) L(G) = {w: $n_a(w) = n_b(w)$} iv) L(G) = {w: $n_a(w) > n_b(w)$}	[12 M]	CO3	L2
	b)	Write a note on chomsky hierarchy.	[08 M]	CO3	L2
7	a)	With neat diagram explain the working of PDA and define the language accepted by PDA by both methods.	[12 M]	CO4	L2
	b)	Design a PDA to accept the language L = {w w^R : w ε {0,1}*} by empty stack method.	[08 M]	CO4	L5
		OR			
8	a)	Give the formal definition of a PDA.	[06 M]	CO4	L2
	b)	Obtain a PDA to accept the language L = { $a^n b^n$ | n≥0} by a final state. Give the graphical representation for PDA obtained. Show the moves made by the PDA for the string aaabbb.	[14 M]	CO4	L3
9	a)	Explain the structure of an compiler with an example.	[10 M]	CO5	L4
	b)	List and Explain the applications of compiler technology.	[06 M]	CO5	L3
	c)	Differentiate between Compiler and Interpreter.	[04 M]	CO5	L3
		OR			
10	a)	Explain the concept of input buffering in lexical analysis with its implementation	[10 M]	CO5	L5
	b)	Write a brief note on Language procesing system.	[06 M]	CO5	L1

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