Sri Siddhartha Institute of Technology, Tumkur

(A constituent college of Sri Siddhartha Academy of Higher Education, Tumkur)

CS4TH5: Automata Theory and Computation

Date:11-05-2022 **TEST I** Time: 9.15 o 10.15AM

Max. Marks: 30

Answer all the questions.

Q.No		M	C	B
1. a.	Give recursive definition of Regular Expression with example	3	1	1
b.	Describe the 3 operators and their precedence that can be applied to regular expressions.	3	1	1, 2
2.	Give regular expressions for i. Language of all strings of 0's and 1's such that the number of 0's is Odd. ii. Language of all strings not containing 00 as substring on $\sum=\{0,1\}$ iii. Language of all strings with alternative a's and b's on $\sum=\{a,b\}$	6	2	3
3.	What are the applications of Regular Expressions. Explain. .	6	1	3
4.	Obtain the regular expression from following NFA	6	3	3

δ	a	b
→q0	q1	q0
q1	q0	q1,q2
*q2	q2	q2

5.	Construct €-NFA for the following regular expressions 1. (0+11)*1*(0*+10) 2.(0*10*10*)*10*	6	2	3

Note: M:Marks, C:CO, B:Blooms Level

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Date:08-06-2022 **TEST II** Time: 9.15 o 10.15AM

Max. Marks: 30

Answer all the questions.

Q.No		M	C	B
1. a.	Explain the formal definition of Context Free Grammar with an example.	3	1	2
b.	Design CFG for i) $L= \{ wa^nb^nw^r \mid w \varepsilon (a,b)^* \}$ ii) $L=\{ a^{2n}b^n \mid n\geq 1\}$	3	1	2
2.	Define Left Most and Right Most Derivation with an example for each.	6	1	2
3.	Give LMD and RMD for the given grammar for the string. aaabbabbba S→aB | bA A→aS | bAA | a B→ bS| aBB | b	6	1	3
4.	Differentiate between Ambiguous grammar and Unambiguous grammar. Check whether the given grammar is ambiguous. S→iCtS | iCtSeS | a C→b.	6	3	3
5.	Explain the applications of CFG.	6	1	2

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Date:29-06-2022 **TEST III** Time: 9.15 to 10.15AM

Max. Marks: 20

Answer all the questions.

Q.No		M	C	B
1.	Define Push Down Automata. Obtain a PDA to accept the following language $L(M) = \{ a^n b^{2n} \mid w \in (a,b)^*, n>=1 \}$ by Empty stack . Give the graphical representation for PDA obtained.	5	1	3
2.	Obtain a PDA to accept the language $L(M) = \{ w \mid n_a(w)=n_b(w) \ \& \ w \in (a,b)^* \}$ by final state. Show the Instantaneous description of the PDA on the input string aaabbb	5	1	3
3.	Convert the following grammar to an equivalent PDA $S \rightarrow aABB \mid aAA$ $A \rightarrow aBB \mid a$ $B \rightarrow bBB \mid A$ $C \rightarrow a$	5	3	3
4.	Define Non Deterministic PDA (NPDA). Illustrate Non-determinism giving an example NPDA	5	4	1,2

Note: M: Marks, C: CO, B:Blooms Level