Course Code: 20CS0903 **R20**

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:PUTTUR (AUTONOMOUS)

Siddharth Nagar, Narayanavanam Road – 517583

QUESTION BANK (DESCRIPTIVE)

Subject with Code: AT&CD (20CS0903) **Course & Branch**: B.Tech – CSM,CIC,CAI

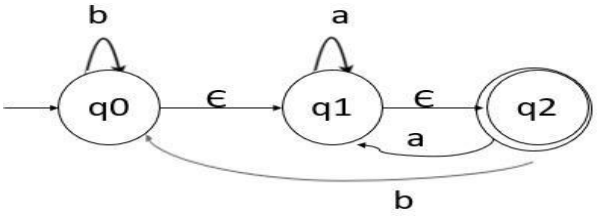
Year &Sem: III-B.Tech & I-Sem **Regulation:** R20

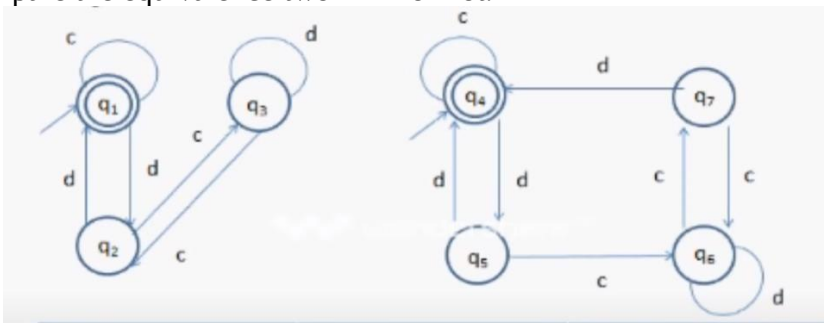
UNIT –I
FINITE AUTOMATA AND REGULAR LANGUAGES

1	a	Consider the below finite automata and check whether the strings are accepted or not (i) 0001 (ii) 1010 (iii) 1001 (iv)0101	[L1][CO1]	[8M]
	b	Define alphabets, strings, Languages?	[L3][CO1]	[4M]
2	a	Compare DFA and NFA	[L2][CO1]	[4M]
	b	Construct DFA for the given NFA	[L6][CO2]	[8M]
3	a	Write the process of conversion from NFA with ε moves to DFA.	[L4][CO3]	[4M]
	b	Convert the following NFA with ε moves to DFA.	[L6][CO2]	[8M]
4	a	Write the process of equivalence two FA's?	[L4][CO3]	[4M]
	b	Compare the equivalence two FA's or not.	[L4][CO3]	[8M]

States (Q)	Input Alphabtes 0	1
→q0	q1	q3
q1	q0	q2
(q2)	q3	q1
q3	q2	q0

	Next state 0	1
→ q0	q0,q1	q0
q1	q2	q1
q2	q3	q3
(q3)	-	q2





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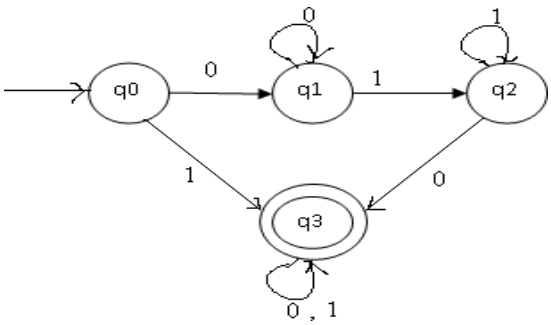
<table>
<tr><td>5</td><td>a</td><td>Contrast Mealy machine and Moore machine.</td><td>[L4][CO1]</td><td>[6M]</td></tr>
<tr><td></td><td>b</td><td>Convert the following Mealy machine into its equivalent Moore machine.
<table>
<tr><th rowspan="2">Present State</th><th colspan="2">I/P=0</th><th colspan="2">I/P=1</th></tr>
<tr><th>Next State</th><th>O/P</th><th>Next State</th><th>O/P</th></tr>
<tr><td>→A</td><td>C</td><td>0</td><td>B</td><td>0</td></tr>
<tr><td>B</td><td>A</td><td>1</td><td>D</td><td>0</td></tr>
<tr><td>C</td><td>B</td><td>1</td><td>A</td><td>1</td></tr>
<tr><td>D</td><td>D</td><td>1</td><td>C</td><td>0</td></tr>
</table></td><td>[L3][CO2]</td><td>[6M]</td></tr>
<tr><td>6</td><td>a</td><td>Define Melay machine and Moore machine.</td><td>[L3][CO1]</td><td>[6M]</td></tr>
<tr><td></td><td>c</td><td>Construct Mealy machine corresponding to Moore machine?
<table>
<tr><th rowspan="2">States (Q)</th><th colspan="2">Next States</th><th rowspan="2">Output</th></tr>
<tr><th>I/P=0</th><th>I/P=1</th></tr>
<tr><td>→q1</td><td>q1</td><td>q2</td><td>0</td></tr>
<tr><td>q2</td><td>q1</td><td>q3</td><td>0</td></tr>
<tr><td>q3</td><td>q1</td><td>q3</td><td>1</td></tr>
</table></td><td>[L3][CO2]</td><td>[6M]</td></tr>
<tr><td>7</td><td>a</td><td>List out the identities of Regular expression.</td><td>[L1][CO3]</td><td>[6M]</td></tr>
<tr><td></td><td>b</td><td>From the identities of RE, prove that
i) 10+(1010)*[^+(1010)*]=10+(1010)*
ii) (1+100*)+(1+100*)(0+10*)(0+10*)*=10*(0+10*)*</td><td>[L3][CO3]</td><td>[6M]</td></tr>
<tr><td>8</td><td>a</td><td>Prove R=Q+RP has unique solution, R=QP*</td><td>[L3][CO3]</td><td>[4M]</td></tr>
<tr><td></td><td>b</td><td>Construct RE from given FA by using Arden’s Theorem.

</td><td>[L6][CO3]</td><td>[8M]</td></tr>
<tr><td>9</td><td>a</td><td>State Pumping lemma for regular languages.</td><td>[L1][CO3]</td><td>[4M]</td></tr>
<tr><td></td><td>b</td><td>Prove that L = $\{a^i b^i \mid i \geq 0\}$ is not regular</td><td>[L3][CO3]</td><td>[8M]</td></tr>
<tr><td>10</td><td>a</td><td>Give the Closure properties of Regular Sets</td><td>[L1][CO2]</td><td>[6M]</td></tr>
<tr><td></td><td>b</td><td>What are the applications of Pumping Lemma?</td><td>[L1][CO3]</td><td>[6M]</td></tr>
</table>

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UNIT –II
CONTEXT FREE GRAMMAR AND TURING MACHINE

<table>
<tr><td>1</td><td>a</td><td>Analyze and explain with example Chomsky Hierarchy of Languages</td><td>[L4][CO1]</td><td>[6M]</td></tr>
<tr><td></td><td>b</td><td>Define the following terms:
i) Useless symbol
ii) Null production
iii) Unit productions</td><td>[L1][CO4]</td><td>[6M]</td></tr>
<tr><td>2</td><td>a</td><td>Describe what is meant by Simplifying the Grammar.</td><td>[L2][CO4]</td><td>[4M]</td></tr>
<tr><td></td><td>b</td><td>Evaluate simplification of the following context free grammar.
S→ Aa /B
B→ a/bc
C→ a / ϵ</td><td>[L5][CO4]</td><td>[8M]</td></tr>
<tr><td>3</td><td></td><td>Interpret simplification of the given grammar. Simplify the following CFG
S→ aSb S→A A→cAd A→cd</td><td>[L5][CO4]</td><td>[12M]</td></tr>
<tr><td>4</td><td>a</td><td>Remove the unit production from the grammar
S→AB A→E B→C C→D D→b E→a</td><td>[L3][CO4]</td><td>[6M]</td></tr>
<tr><td></td><td>b</td><td>Remove ϵ productons from the grammar
S→ABaC A→BC B→b/ ϵ C→D/ϵ D→d</td><td>[L3][CO4]</td><td>[6M]</td></tr>
<tr><td>5</td><td>a</td><td>Write the process adapted to convert the grammar into CNF?</td><td>[L2][CO4]</td><td>[4M]</td></tr>
<tr><td></td><td>b</td><td>Convert the following grammar into CNF.
S→ bA/aB
A→bAA/aS/a
B→aBB/bS/a.</td><td>[L3][CO4]</td><td>[8M]</td></tr>
<tr><td>6</td><td>a</td><td>State Pumping lemma for Context-free language</td><td>[L1][CO4]</td><td>[4M]</td></tr>
<tr><td></td><td>b</td><td>Show that L = {$a^nb^nc^n$, where n>=1} is not context free.</td><td>[L3][CO4]</td><td>[8M]</td></tr>
<tr><td>7</td><td>a</td><td>State Turing machine.</td><td>[L1][CO6]</td><td>[4M]</td></tr>
<tr><td></td><td>b</td><td>Construct a TM for regular Expression 01(00+11)(0+1)*1.</td><td>[L6][CO6]</td><td>[8M]</td></tr>
<tr><td>8</td><td></td><td>Explain the various types of Turing machine.</td><td>[L2][CO6]</td><td>[12M]</td></tr>
<tr><td>9</td><td>a</td><td>Differentiate PCP and MPCP.</td><td>[L4][CO6]</td><td>[4M]</td></tr>
<tr><td></td><td>b</td><td>Find the PCP solution for the following sets.
<table>
<tr><th>A</th><th>B</th></tr>
<tr><td>10</td><td>101</td></tr>
<tr><td>01</td><td>100</td></tr>
<tr><td>0</td><td>10</td></tr>
<tr><td>100</td><td>0</td></tr>
<tr><td>1</td><td>010</td></tr>
</table></td><td>[L5][CO6]</td><td>[8M]</td></tr>
<tr><td>10</td><td>a</td><td>State the formal of PDA.</td><td>[L1][CO5]</td><td>[4M]</td></tr>
<tr><td></td><td>b</td><td>Construct an equivalent PDA for the following CFG.
S→aAB | bBA
A→bS|a
B→aS | b.</td><td>[L6][CO5]</td><td>[8M]</td></tr>
</table>

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UNIT –III
LEXICAL ANALYSIS AND TOP DOWN PARSING

1		Explain the phases of a compiler with neat diagram.	[L2][CO2]	[12M]
2	a	Explain in detail about the role of lexical analyzer in Compiler Design.	[L2][CO1]	[6M]
	b	Write about input buffering?	[L3][CO1]	[6M]
3	a	Explain LEX Tool with the structure of Lex Program?	[L2][CO3]	[8M]
	b	Illustrate Application of compiler technology	[L3][CO1]	[4M]
4	a	State what is meant by derivation and parse tree with examples.	[L1][CO4]	[4M]
	b	Construct Leftmost and Rightmost derivation and derivation tree for the string 0100110 S→0S/1AA A→0/1A/0B B→1/0BB	[L6][CO4]	[8M]
5	a	Describe the procedure of eliminating Left recursion.	[L1][CO1]	[6M]
	b	Eliminate left recursion for the following grammar E→E+T/T T→T*F/F F→(E)/id	[L5][CO1]	[6M]
6	a	Explain Left recursion and Left factoring.	[L2][CO1]	[6M]
	b	Perform left factor for the grammar A→abB/aB/cdg/cdeB/cdfB	[L3][CO4]	[6M]
7	a	Describe the role of Compiler	[L1][CO1]	[4M]
	b	Design the recursive decent parser for the following grammar? E→E+T/T T→T*F/F F→(E)/id	[L6][CO3]	[8M]
8	a	Illustrate the rules to be followed in finding the FIRST and FOLLOW.	[L3][CO1]	[4M]
	b	Find FIRST and FOLLOW for the following grammar? E→ E+T/T T→T*F/F F→(E)/id	[L3][CO2]	[8M]
9		Consider the grammar E→E+T/T, T→T*F/F, F→(E)|id Design predictive parsing table and check given grammar is LL(1) Grammar or not?	[L6][CO3]	[12M]
10		Consider the grammar E→TE^1 E^1→+TE^1| -TE^1 | ε T→FT^1 T^1→*FT^1 | / FT^1 | ε F→GG^1 G^1→^F/ ε G→(E)/ id Calculate FIRST and FOLLOW for the above grammar	[L4][CO2]	[12M]

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UNIT –IV
BOTTOM-UP PARSING AND SEMANTIC ANANLYSIS

1	a	Explain about handle pruning	[L2][CO1]	[6M]
	b	Summarize about SLR parsing	[L2][CO1]	[6M]
2	a	Describe bottom up parsing	[L1][CO2]	[4M]
	b	Differences between SLR,CLR, LALR parsers	[L4][CO2]	[8M]
3		Prepare Shift Reduce Parsing for the input string using the grammar S→(L)|a L→L,S|S a)(a,(a,a)) b)(a,a)	[L6][CO3]	[12M]
4	a	Define augmented grammar.	[L1][CO2]	[2M]
	b	Construct the LR(0) items for the following Grammar S→L=R S→R L→*R L→id R→L	[L6][CO3]	[10M]
5		Construct CLR Parsing table for the given grammar S→CC C→aC/d	[L6][CO3]	[12M]
6		Design the LALR parser for the following Grammar S → AA A → aA A →b	[L6][CO3]	[12M]
7	a	Define YACC parser in Syntax Analysis.	[L1][CO3]	[2M]
	b	Explain in detail about YACC Parser generator tool.	[L2][CO3]	[10M]
8	a	Explain syntax directed definition with simple examples	[L2][CO2]	[6M]
	b	Describe in detail the Translation scheme of SDD.	[L2][CO2]	[6M]
9	a	Define a syntax-directed translation and explain with example.	[L2][CO2]	[6M]
	b	Give the evaluation order of SDT with an example.	[L5][CO2]	[6M]
10		Discuss Type Checking with suitable examples.	[L2][CO4]	[12M]

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UNIT –V
CODE OPTIMIZATION AND CODE GENERATION

1		Analyse different types of Intermediate Code with an example.	[L4][CO5]	[12M]
2		Explain Representation of Three Address Codes with suitable Examples	[L2][CO5]	[12M]
3		Produce quadruple, triples and indirect triples for following expression: (x + y) * (y + z) + (x + y + z)	[L6][CO5]	[12M]
4	a	Discuss function preserving transformations.	[L2][CO6]	[6M]
	b	Describe about loop optimization technique .	[L2][CO5]	[6M]
5		Explain the peephole optimization Technique with examples.	[L2][CO5]	[12M]
6	a	Define and Show Dead-code elimination with example.	[L1][CO4]	[6M]
	b	List and explain the Issues in the design of a code generator	[L2][CO6]	[6M]
7	a	Analyse the different forms in target program.	[L4][CO6]	[6M]
	b	Explain the target machine in code generator.	[L2][CO6]	[6M]
8	a	Define flow Graph	[L1][CO4]	[2M]
	b	Interpret optimization techniques on Basic Blocks with simple examples?	[L3][CO5]	[10M]
9	a	Analyze Simple code generator	[L4][CO6]	[6M]
	b	Evaluate Register allocation and register assignment techniques.	[L5][CO6]	[6M]
10	a	Create the DAG for following statement. a+b*c+d+b*c	[L6][CO6]	[4M]
	b	Construct the DAG for the following basic blocks 1. t1:=4*i 2. t2:=a[t1] 3. t3:=4*i 4. t4:=b[t3] 5. t5:=t2*t4 6. t6:=prod+t5 7. prod:=t6 8. t7:=i+1 9. i:=t7 if i<=20 goto 1	[L6][CO6]	[8M]

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