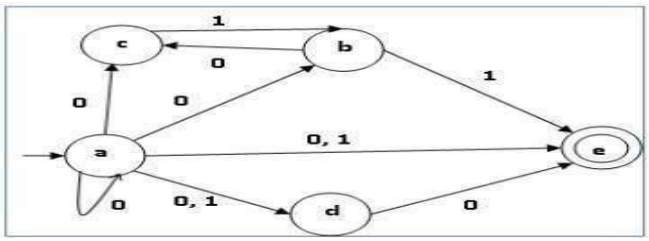
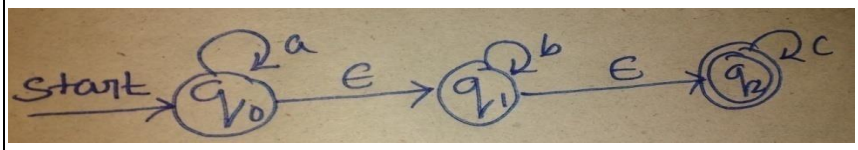
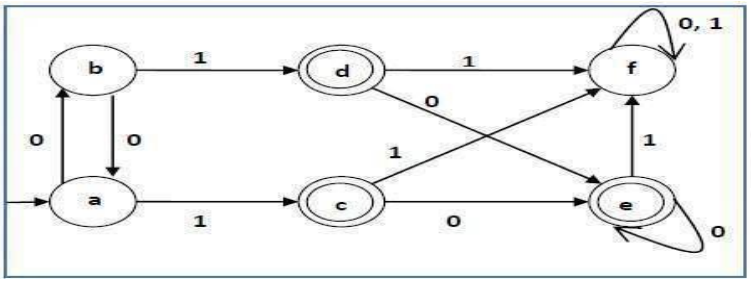
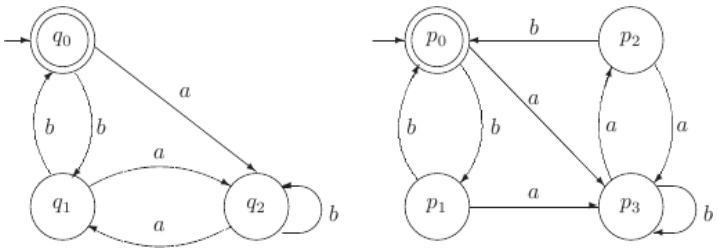
B.Tech III YEAR I SEM

FORMAL LANGUAGE AUTOMATA THEORY(CS3101PC)

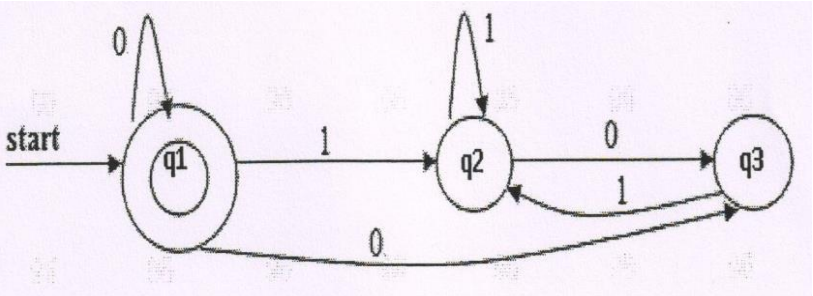
Unit wise Question Bank

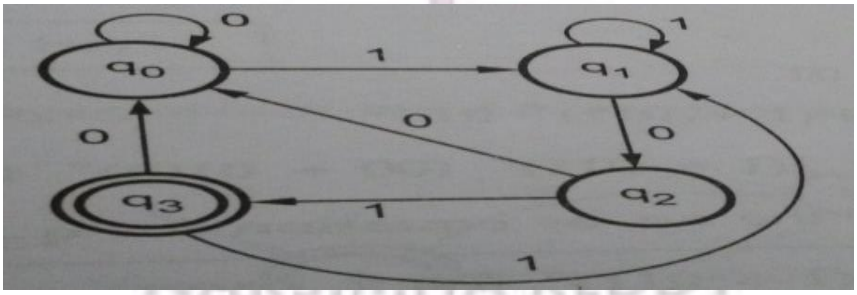
UNIT-I

S.No	Questions	BT	CO	PO
	Part-A: Short Answer Questions			
1	Define DFA	L1	CO1	PO1
2	Mention the differences between DFA, NFA.	L4	CO1	PO1
3	Construct the DFA that accepts all strings of a's and b's , no a's are even or no.of b's are even .	L1	CO1	PO1
4	Construct the FA that accepts all strings of a's and b's, that every string starts with a and length of the string not divisible by 3	L1	CO1	PO1
5	Write down the decision properties of FA.	L1	CO1	PO1
6	List the differences between Moore and Melay machines.	L1	CO1	PO1
7	Obtain a DFA to accept strings of a's and b's starting with the string ab	L1	CO1	PO1
8	List limitations of Finite Automata.	L1	CO1	PO1
9	Define Moore machine.	L1	CO1	PO2
10	Obtain a DFA to accept strings of a's and b's having even number of a's and b's	L3	CO1	PO1
	Part – B Long Answer Questions			
	Convert the following NFA to DFA 	L1	CO1	PO1

12		Convert the following NFA with ε to NFA without ε 	L1	CO1	PO1
13	A)	Define the following i). power of an String ii).Transition Table	L1	CO1	PO2
		iii) Language iv) power set			PO2
	B)	With the help of diagram explain the function of DFA, Why it is called as deterministic?	L1	CO1	PO2
14	A)	Draw a DFA to accept string of 0's and 1's ending with the string 011	L1	CO1	PO1
	B)	Obtain a DFA to accept strings of a's and b's having even number of a's and b's.	L2	CO1	PO1
15	A)	Minimize following DFA. 	L3	CO1	PO1
	B)	Check whether following two finite automata are equivalent or not. 	L1	CO1	PO1

UNIT–II

S.No		Questions	BT	CO	PO
		Part-A: Short Answer Questions			
1		What is regular set and Regular Expression?	L4	CO2	PO1
2		Simplify the RE (ab*+(ab)*)*a*	L3	CO2	PO1
3		Construct the RE that generates all the strings of a's and b's i) including ε ii) excluding ε	L3	CO2	PO1
4		Define CFG, LMD, RMD.	L1	CO2	PO1
5		Find a RE for the set of all strings containing no three consecutive 0'	L1	CO2	PO1
6		What is the difference between Regular and context free grammar?	L1	CO2	PO1
7		Construct a regular grammar for the regular expression a*b(a+b)*	L1	CO2	PO1
8		List closure properties of regular languages.	L1	CO2	PO1
9		Prove for the RE a and b i. (ab+a)*a=a(ba+a)* ii (a*b*)*=(a+b)*	L1	CO2	PO1
10		Find the left most derivation for the word abba in the grammar S→AA, A→aB, B→bB/ε	L1	CO2	PO1
		Part-B: Long Answer Questions			
11	a)	Show that L= { $a^n b^n$ | n>=1} is not a regular language using pumping lemma	L1	CO2	PO1
	b)	Derive the RE for the following finite automata 	L1	CO2	PO1

12	a)	Construct the RE , where the length of the string is at least 2 and exactly2	L1	CO2	PO1
	b)	Convert the RE (02+1)* to an NFA-ε	L2	CO2	PO1
13	a)	State and prove pumping lemma for regular languages.	L1	CO2	PO1
	b)	Explain the procedure of converting FA to RE with example	L1	CO2	PO1
14	a)	consider the FA and construct RE that accept by the following diagram. 	L1	CO2	PO1
	b)	Find the RE accepted by the following DFA 	L1	CO2	PO2
15	a)	Construct a regular grammar for (ab+a)* (aa+b)	L1	CO2	PO2
	b)	Convert the given right linear grammar to equivalent left linear grammar S→ bB, B→ bC, B→ aB, C→a, B→b	L1	CO2	PO2

UNIT–III

S.No	Questions	BT	CO	
	Part-A: Short Answer Questions			
1	Prove the grammar is ambiguous. S→a|Sa|bSS|SSb|SbS	L1	CO3	PO3
2	Convert the following grammar to Greibach normal form S→ ABA|AB|BA|AA|B, A→aA|a , B→bB|b	L1	CO3	PO3
3	Construct the PDA for the following grammar S→AA|a A→SA|b	L1	CO3	PO3

4		What is DPDA?	L2	CO3	PO3
5		What are the difference between PDA and DPDA?	L1	CO3	PO3
6		For the CFG remove the ε production S→aSa/ bSb/ε	L1	CO3	PO3
7		Explain Chomsky's normal form with example.	L1	CO3	PO1
8		Explain Greibach normal form with example.	L1	CO3	PO1
9		When a CFG is said to be GNF?	L1	CO3	PO1
10		List out the properties of CFG?	L1	CO3	PO1
Part-B: Long Answer Questions					
11	a)	What is Chomsky's normal form explain.?	L1	CO3	PO1
	b)	Define CNF . convert the following CFG to CNF S→ASB| ε , A→aAS|a , B→SbS|A|bb	L1	CO3	PO1

UNIT–IV

S.No	Questions	BT	CO	PO
Part-A: Short Answer Questions				
1	Define Turing Machine?	L1	CO4	PO1
2	What is Type 1 grammar?	L1	CO4	PO1
3	Design TM for L={$0^n1^n0^n$|n>=1}	L1	CO4	PO1
4	Define Recursively enumerable language?	L1	CO4	PO1
5	Construct TM to add two given integer?	L1	CO4	PO1
6	What are the types of TM?	L1	CO4	PO1
7	What are the properties of Recursive and recursively Enumerable language?	L3	CO4	PO1
8	Define Churchs' s Hypothesis?	L1	CO4	PO1
9	What are the limitations of TM?	L3	CO4	PO1

10		Make a comparison between FM,PDA and TM?	L1	CO4	PO1
Part-B Long Answer Questions					
11	a)	Explain TM in Brief?	L1	CO4	PO1
	b)	Explain importance and limitations of TM?	L1	CO4	PO1
12	a)	Given ∑ = { 0,1 }, design a TM that accepts the language denotedby regular expression 00*	L3	CO4	PO1
	b)	Design A TM that accepts L={$a^n b^n$ |n>=0}	L1	CO4	PO1
13	a)	Explain counter machine in details?	L2	CO4	PO1
	b)	make a compare between PDA and TM?	L3	CO4	PO1
14	a)	Explain with diagram for the the working of a TM model?	L1	CO4	PO1
	b)	Design a TM that accept L={$0^{2n}1^n$|n>=0}	L1	CO4	PO1
15	a)	Construct a Multitrack TM for checking a given number is primeor not?	L1	CO4	PO1
	b)	Construct a TM for ∑={a,b} which will covert lower case to uppercase letters.	L3	CO4	PO1

UNIT–V

S.No	Questions	BT	CO	PO
1	What is P class?	L2	CO5	PO1
2	State and explain rice theorem?	L2	CO5	PO1
3	What are the difference between NP-Hard and NP- complete?	L5	CO5	PO1
4	What is Hierarchy Theorem?	L2	CO5	PO1
5	Is the language $a^n b^n c^n$ is context sensitive?	L5	CO5	PO1
6	What is halting problem is it solvable?	L2	CO5	PO1
7	Explain halting problem of TM?	L3	CO5	PO1

8		What is Decidability? Explain with example?	L2	CO5	PO1
9		Explain Universal TM?	L4	CO5	PO1
10		What is COUNTER Machine?	L5	CO5	PO2
11	a)	What is P,NP, NP-complete and NP-hard?	L1	CO5	PO2
	b)	Explain Chomsky Hierarchy in details?	L1	CO5	PO2
12	a)	What is PCP ? Or Universal TM	L1	CO5	PO2
	b)	explain Homomorphism ii) Recursive language	L2	CO5	PO2
13	a)	What is Turing Machine and Multi tape Turing Machine? Show that the languages accepted by these machines are same.	L2	CO5	PO2
	b)	What is decidability of a problem explain in details?	L1	CO5	PO2
14	a)	Design Turing Machine for the language to accept the set of strings with equal number of 0's and 1's and also give the instantaneous description for the input '110100'.	L1	CO5	PO2
	b)	What is halting problem and Turing reducibility ?	L3	CO5	PO2
15	a)	Define LR(0) grammars.	L2	CO5	PO2
	b)	Give examples for Undecidable Problems	L1	CO5	PO2