Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Fifth Semester B.Tech Degree Regular and Supplementary Examination December 2020

Course Code: IT303

Course Name: THEORY OF COMPUTATION

Max. Marks: 100 Duration: 3 Hours

PART A

Answer any two full questions, each carries 15 marks.

			Marks
1	a)	Write down the applications of Finite Automata.	(4)
	b)	Construct a DFA over Σ={0,1}that accepts odd number of 0's.	(5)
	c)	What is meant by language acceptability in FSA? Explain with an example.	(4)
	d)	Explain String concatenation with an Example	(2)
2	a)	What is meant by non-determinism? Design an NFA over Σ={a,b}for the language L such that L={Set of all strings ends with 'ab'}.	(5)
	b)	Explain Chomsky classification of grammars with examples.	(6)
	c)	Differentiate between NFA and DFA.	(4)
3	a)	Explain the concept of Kleene closure.	(4)
	b)	Explain Transition Diagram and Table.	(6)
	c)	Design a Mealy machine to print 2's complement of a binary number.	(5)

PART B

Answer any two full questions, each carries 15 marks.

4	a)	State pumping lemma for regular languages.	(2)
	b)	State and prove Arden's theorem.	(8)
	c)	List the major steps followed in State Elimination Method for converting a finite automata to regular expression.	(5)
5	a)	Prove that the language A={yy | y ϵ{0,1}* is NOT REGULAR	(8)
	b)	Define PDA. Explain with an example.	(7)
6	a)	Write regular expression for the language L={Set of all strings whose length is divisible by 3}	(4)
	b)	Simplify the following CFL: S→aB/bX, A→BAd/bSX/a, B→aSB/bBX, X→SBD/aBX/ad	(8)
	c)	Explain GNF with an example.	(3)

PART C

Answer any two full questions, each carries 20 marks.

7	a)	Explain Linear Bounded Automata with an Example.	(4)
	b)	Design a Turing machine that adds two numbers m and n stored as 10^m10^n1 in the input tape.	(8)
	c)	State and prove the equivalence of single tape and multi-tape Turing Machine.	(8)
8	a)	List and explain the variants of Turing Machine, and show that they are equivalent to a single tape Turing Machine.	(12)
	b)	Prove that Universal Language is recursively enumerable.	(8)
9	a)	Explain Halting problem with an example.	(5)
	b)	Write a short note on Recursive and recursively enumerable languages.	(9)
	c)	Distinguish between decidable and undecidable problems.	(6)

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