R22 Regulation *Subject code:4E6FC*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech VI Semester Regular Examinations, May 2025

AUTOMATA THEORY AND COMPILER DESIGN

(IT)

Maximum Marks: 60 Date: 18.06.2025 Duration: 3 hours

Note: **1.This question paper contains two parts A and B.**
2. Part A is compulsory which carries 10 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10X1M=10 Marks)		Marks	CO	Bloom Tx
1.a)	Define DFA.	1M	CO	L1
b)	How to check acceptance of string by finite automata?	1M	CO	L1
c)	How do you prove a language is regular?	1M	CO	L1
d)	Write the regular expression for the L={w ε{0,1}* | w has no pair of consecutive zeros.	1M	CO	L2
e)	Define Push Down Automata.	1M	CO	L1
f)	What is the purpose of studying Turing Machine?	1M	CO	L1
g)	Why left recursion has to be eliminated from grammar?	1M	CO	L1
h)	Show that the grammar E E+E|E*E|(E)|id is ambiguous.	1M	CO	L2
i)	Write SDTs for the Boolean expression grammar.	1M	CO	L2
j)	How to evaluate the semantic rules?	1M	CO	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	Bloom Tx
2.	a) Explain the procedure for constructing minimum state DFA with an example.	5M	CO1	L5
	b) Describe the procedure of converting NFA to DFA with a suitable example.	5M	CO1	L4
	OR			
3	a) (0/1)*011 for this regular expression draw the NFA with ϵ-closures and convert it into NFA	5M	CO1	L6
	b) Draw a deterministic and non-deterministic finite automaton for Σ = {A-Z} which accept a string containing "ING" at the end of a string of {A-Z}.	5M	CO1	L6
4	What is a regular language? Convert the given regular expression to regular language. i) (1+ϵ)(00*1)0* ii) (0*1*)000(0+1)* iii) (00+10)*1*(10+00)*	10M	CO2	L3

	OR			
5	Generate left most and right most derivation and parse tree for given grammars **G1**: S→0B|1A, A→0|0S|1AA, B→1|1S|0BB for the string 00110101 **G2:**S→Ab|bA, A→a|aS|bAA, B→b|bS|aBB for the string aaabbabbba	10M	CO2	L6
6	a) Construct a Turing Machine that will accept the Language consists of all palindromes of 0's and 1's.	5M	CO3	L3
	b) Show that for every PDA there exists a CFG such that L(G)=N(P).	5M	CO3	L2
	OR			
7	a) Construct a Turing Machine to recognize the Language { $a^nb^nc^n$/n>=1}	5M	CO3	L3
	b) Design Push down Automata for L = {$a^{2n}b^n$ | n ≥ 1}	5M	CO3	L6
8	Explain the various phases of a compiler in detail and also write about recognition of tokens in lexical analyzer.	10M	CO4	L5
	OR			
9	Design the SLR parsing table for the given grammar: ***E->E+T/T*** ***T->T*F/F*** ***F->(E)/id.*** and construct parse tree for the sentence id*id+id	10M	CO4	L6
10	What do you mean by activation of procedure? How it can be represented with activation tree and record? Explain with quick sort example.	10M	CO5	L4
	OR			
11	a) What is syntax directed translation? Write the semantic rules for D→TL, T→int|real, L→L,id|id	5M	CO5	L3
	b) Differentiate inherited and synthesized attributes with an example.	5M	CO5	L5