



R22 Regulation

Subject code: 4E5GA & 4E5HA

**TKR COLLEGE OF ENGINEERING AND TECHNOLOGY**  
(Autonomous, Accredited by NAAC with 'A+' Grade)

**B.Tech V Semester Supplementary Examinations, May 2025**

**AUTOMATA THEORY AND COMPILER DESIGN**

(Common to CSE(AI&ML) & CSE(DS))

Maximum Marks: 60

Date: 17.06.2025

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 Transition Diagram.		1M	1	BTL1
b)	List out the closure properties of Regular sets.		1M	1	BTL1
c)	Write a shot note on derivation tree.		1M	2	BTL1
d)	Outline CFG.		1M	2	BTL2
e)	What do you mean by instantaneous description of Turing Machine.		1M	3	BTL1
f)	Demonstrate Push down automata.		1M	3	BTL2
g)	Build the model of LR parser.		1M	4	BTL3
h)	Explain left factoring.		1M	4	BTL2
i)	Identify Syntax directed translation schemes.		1M	5	BTL3
j)	Analyze L-attributed SDD.		1M	5	BTL4

Part-B

Answer All the following questions.		(5X10M=50Marks)	Marks	CO	Bloom Tx
2	a) Compare and contrast between DFA and NFA.		5M	1	BTL2
	b) Develop a DFA to accepts strings with 0's and 1's such that number of 1's should be even.		5M	1	BTL3
OR					
3	a) Convert the following regular expressions to NFA with epsilon transitions a) $0^*+1101$ b) $(0+1)^*$		5M	1	BTL2
	b) Justify a Moore Machine to determine the residue mod 5 for each binary string treated as integer.		5M	1	BTL5
4	a) When do you say a language L is unambiguous? Show that the language $L=\{a^n b^n \mid n \geq 1\}$ is unambiguous.		5M	2	BTL1
	b) For the following grammar give the leftmost and rightmost derivation for the string '00101'. $S \rightarrow A1B$ $A \rightarrow 0A / \epsilon$ $B \rightarrow 0B / 1B / \epsilon$		5M	2	BTL1
OR					
5	a) Solve that the following language $\{a^n b^n \mid n \geq 1\}$ is not a regular.		5M	2	BTL3
	b) Illustrate the closure properties of deterministic context free languages.		5M	2	BTL2

6	a) Explain pumping lemma for regular languages with the applications of pumping lemma.	5M	3	BTL1
	b) Model a Turing machine to accept the set of all palindrome over $\{0,1\}^*$ . Draw a transition diagram for the Turing machine of the above.	5M	3	BTL3
	OR			
7	a) Construct the PDA to the following grammar: $S \rightarrow AB$ $A \rightarrow BS/b$ $B \rightarrow SA/a$	5M	3	BTL5
	b) List out the properties of PDA.	5M	3	BTL4
8	a) Write the steps to remove left recursion and design LL (1) predictive parser for the grammar $E \rightarrow E+E E-E E*E E/E (id)$ .	5M	4	BTL1
	b) Define ambiguous grammar. Explain it with an example.	5M	4	BTL1
	OR			
9	a) Demonstrate CLR parsing table for the grammar $S \rightarrow L=R/R$ , $L \rightarrow *R/id$ , $R \rightarrow L$ .	5M	4	BTL2
	b) Summarize the classification of parsing techniques and briefly explain each.	5M	4	BTL2
10	a) Organize syntax directed translation scheme for the below Grammar: $L \rightarrow E/num$ , $E \rightarrow E+T/T$ , $T \rightarrow (T/F)/F$ , $F \rightarrow (E)/num$ .	5M	5	BTL3
	b) Explain about Heap management.	5M	5	BTL3
	OR			
11	a) Explain in brief about Synthesized and Inherited Attributes.	4M	5	BTL4
	b) What is an intermediate code? Explain different types of intermediate codes forms and represent the following statement in different forms: $W = (A + B) - (C + D) + (A + B + C)$ .	6M	5	BTL1