



R18 Regulation

Subject code:2P5EC

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech V Semester Supplementary Examinations, May 2025

THEORY OF COMPUTATION

(CSE)

Maximum Marks: 70

Date: 23.06.2025

Duration: 3 hours

- Note:**
1. This question paper contains two parts A and B.
 2. Part A is compulsory which carries 20 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 (10X2M=20 Marks)		Marks	CO	BTL
1	List out the Finite automaton?	2M	1	L1
2	What is an Automata?	2M	1	L1
3	Define Regular Expression.	2M	2	L1
4	Write regular expression for denoting language containing empty string.	2M	2	L1
5	Define Right Linear Grammar.	2M	3	L1
6	Define the language of PDA accepted by final state.	2M	3	L1
7	Define Greibach normal form.	2M	4	L1
8	Define an ID of a Turing Machine?	2M	4	L1
9	Define Recursively Enumerable languages.	2M	5	L1
10	What are Class P problems?	2M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	A. Describe the finite state machine with a block diagram.	5M	1	L2
	B. Construct DFA to accept the language of all strings of even numbers of a's & numbers of b's divisible by three over $(a+b)^*$.	5M		
OR				
12	A. Explain the procedure to convert NFA to DFA with an example.	5M	1	L2
	B. Construct DFA to accept set of all strings defined over alphabet $\{0,1\}$ ending with substring '010'.	5M		
13	A. Construct the FA for the Regular Expression $(a/b)^*abb$.	5M	2	L2
	B. List out the properties of regular sets?	5M		
OR				
14	A. Apply Pumping Lemma for the language $L = \{a^n / a \text{ is prime}\}$ and prove that it is not regular?	5M	2	L2
	B. Define Finite Automata for the following Languages $L1 = \{0^*1^*\}^*$ $L2 = \{0+1\}^*111^*$	5M		
15	Define PDA for the language $L = \{ a^n b^{2n}, n \geq 1 \}$	10M	3	L2

	OR			
16	Explain various components of context free grammar and derivation tree in detail.	10M	3	L2
17	A. Discuss closure properties of deterministic context free languages. B. When do you say a language L is unambiguous? Show that the language $L = \{a^n b^n n \geq 1\}$ is unambiguous	5M 5M	4	L2
	OR			
18	A. Design TM which will recognize strings containing equal number of 0's and 1's? B. Design TM that accepts the language 00.	5M 5M	4	L2
19	Consider two-end Turing Machine(TM) determine whether the TM always writes a nonblank symbol on its second tape during the computation on any input string 'w'. Formulate this problem as a language and show it is undecidable.	10M	5	L2
	OR			
20	What are P and NP problems? Give at least five problems that can be classified as NP problem. Justify.	10M	5	L2