



R18 Regulation

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

Subject code: 2P5EC

B.Tech V Semester Supplementary Examinations, December 2024

THEORY OF COMPUTATION (CSE)

Maximum Marks: 70

Date: 31.12.2024

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 which carries 10M.
 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

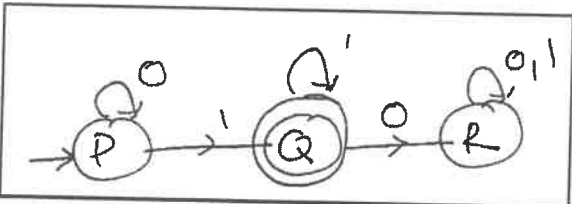
(10X2M=20) Marks)

	CO	Bloom Tx
1 List out the Finite automats.	1	L1
2 What is an Automata?	1	L1
3 Define Regular Expression.	2	L1
4 Write regular expression for denoting language containing empty string.	2	L1
5 Define Right Linear Grammar.	3	L1
6 Define the language of PDA accepted by final state.	3	L1
7 List any two closure properties of CFL's.	4	L1
8 Define Turing Machine.	4	L1
9 Give any two examples of Decidable Problems.	5	L1
10 Define Undecidability.	5	L1

Part-B

Answer All the following questions.

(5X10M=50Marks)

	CO	Bloom Tx
11 A) Describe the finite state machine with a block diagram. [5M] B) Construct DFA to accept the language of all strings of even numbers of a's & numbers of b's $\Sigma = (a+b)^*$. [5M]	1	L2
OR		
12 A) Explain the procedure to convert NFA to DFA with an example. [5M] B) Construct DFA to accept set of all strings defined over alphabet {0,1} ending with substring '010'. [5M]	1	L2
13 A) Discuss closure properties of regular sets. [5M] B) Convert the following Finite Automata to its equivalent Regular Expression. [5M]	2	L2
		
OR		

14	A) Apply Pumping Lemma for the language $L = \{a^n / a \text{ is prime}\}$ and prove that it is not regular? [5M] B) Construct Finite Automata for the following Languages. $L1 = \{0^*1^*\}^*$ $L2 = \{0+1\}^*111^*$ [5M]	2	L2
15	Consider the grammar $E \rightarrow E + E \mid E * E \mid id$. Write the right-most derivation and left most derivation for the sentence $id*id+id$. Discuss whether the given grammar is ambiguous or not. Justify your assertion. [10M]	3	L3
OR			
16	A) Explain deterministic and nondeterministic PDA's with examples and give the differences. [5M] B) Give the steps to convert a CFG to Chomsky Normal Form? Explain in detail with an example. [5M]	3	L3
17	A) Discuss closure properties of deterministic context free languages. 5M 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]	4	L2
OR			
18	A) Design TM which will recognize strings containing equal number of 0's and 1's? [5M] B) Design TM that accepts the language 00^*? [5M]	4	L2
19	Explain about post correspondence problem with an example. [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