R18 Regulation *Subject code:2P4FE*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech IV Semester Supplementary Examinations, December 2024

FORMAL LANGUAGES & AUTOMATA THEORY

(IT)

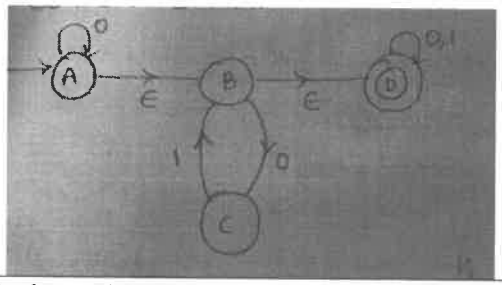
Maximum Marks: 70 Date:12.12.2024 Duration: 3 hours

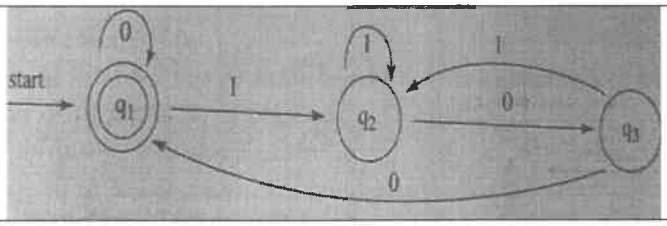
Note: 1.This question paper contains two parts A and B.
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit which carries 10M.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10X2M=20) Marks)		CO	Bloom Tx
1	Define the terms symbol, string and Language.	1	L1
2	Define ε - closure.	1	L1
3	Define Regular Expression	2	L1
4	Define the pumping lemma for regular expressions	2	L1
5	Define Grammar?	3	L1
6	What is an ambiguity.	3	L1
7	Define Pumping lemma for the CFG.	4	L1
8	What is Chomsky Normal Form?	4	L1
9	Define Recursively enumerable languages.	5	L1
10	Define Undecidability?	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		CO	Bloom Tx
11	Define DFA. Construct a minimal DFA over {a,b} where language $L=\{a^n b^m \mid n,m>=1\}$ [10M]	1	L2
	OR		
12	Design NFA from the given ∈-NFA [10M] 	1	L2
13	State and prove Arden's theorem. Find out the regular expression from the given FA [10M]	2	L2

			
	OR		
14	A) Explain the pumping lemma for regular expression and applications of pumping lemma. [5M] B) Prove that the given language $L=\{0^n 1^n \mid n>=1\}$ is not a regular. [5M]	2	L2
15	A) Explain the process of simplification of the grammar. [5M] B) Explain left most and right most derivations with examples. [5M]	3	L2
	OR		
16	Construct a PDA for the given language $L=\{a^n b^n/n>=1\}$ and write the instantaneous description for the string "aaabbb". [10M]	3	L2
17	Define closure properties of context free grammar with proofs? [10M]	4	L2
	OR		
18	Design a Turing machine for unary multiplication. [10M]	4	L2
19	a) Discuss in brief about NP-Hard problems. [5M] b) Explain about the Decidability and Undecidability problems. [5M]	5	L2
	OR		
20	a) Explain about recursively enumerable language. [5M] b) Compare P and NP problems. [5M]	5	L2