R18 Regulation *Subject code:2P4FE*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech IV Semester Supplementary Examinations, July 2024

FORMAL LANGUAGES & AUTOMATA THEORY

(INFORMATION TECHNOLOGY)

Maximum Marks: 70 Date:27.07.2024 **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 10 questions. Answer any 5 questions which carries 10M.

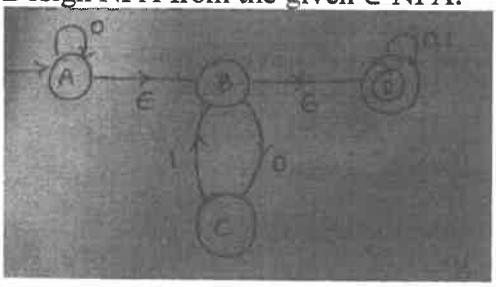
Part-A

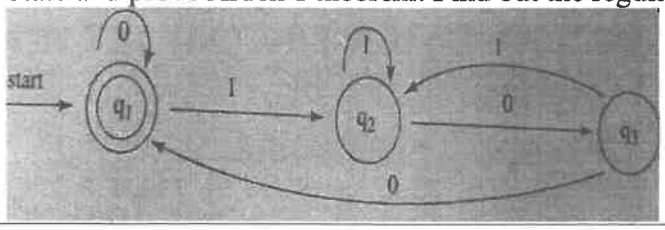
All the following questions carry equal marks (10X2M=20 Marks)

1	Define the terms symbol, string and Language.
2	Construct DFA for a string accepting even number of 0's
3	Define Regular Expression.
4	List the closure properties of regular languages
5	Define Grammar?
6	Compare DPDA and NPDA.
7	What do you mean by Instantaneous Description of Turing Machine?
8	What is Chomsky Normal Form?
9	Define Context Sensitive Language.
10	Define NP-Complete class

Part-B

Answer all the questions (5X10M=50Marks)

11	Distinguish DFA and NFA and Design DFA for the following over {a, b} [10M] i) All strings that has at least length is 2 ii) All strings that has at most length is 2 iii) All strings that has exactly length is 2
	OR
12	Design NFA from the given ∈-NFA. [10M] 

13	State and prove Arden's theorem. Find out the regular expression from the given FA. [10M] 
	OR
14	Explain the pumping lemma for regular expression and applications of pumping lemma. & Prove that the given language L={$0^n 1^n$ | n>=1} is not a regular. [10M]
15	Explain the process of removal of Null productions from the grammar.and Remove null productions from the following grammar. [10M] S→ABAC A→aA /ϵ B→Bb / ϵ C→c
	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]
17	Design a Turing machine for unary multiplication. [10M]
	OR
18	Prove pumping lemma for Context Free Language and Prove L = { $a^i b^i c^i$ | i ≥ 1} is not context free language. [10M]
19	Explain about the Decidability and Undecidability problems. [10M]
	OR
20	Define PCP problem? Does the PCP problem P={(10,101)(011,11)(101,011)} has a solution If so, give the solution. [10M]