R20 Regulation *Subject code: 3P3HC*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech III Semester Supplementary Examinations, July 2024

FORMAL LANGUAGE AND AUTOMATA THEORY

(CSE(DS))

Maximum Marks: 70 Date:23.07.2024 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 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	What is regular language?	1	L1
2	Differentiate NFA from DFA.	1	L1
3	What is pumping lemma?	2	L1
4	Prove that (0 * 1*) * = (0 + 1)*.	2	L1
5	Define – Pushdown Automata	3	L1
6	What are the applications of context free languages?	3	L1
7	Define – Turing Machine	4	L1
8	What is GNF?	4	L1
9	What is decidable problem?	5	L1
10	Define – Universal Language	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)			
11	A. Prove by induction on n $1^2+2^2+3^2+\ldots+n^2= \sum_{i=0}^{n} i = n(n+1)(2n+1)/6$. B.Draw transition diagram for recognition the set of all operation in C language. [5M+5M]	1	L2
	OR		
12	A. Construct a Mealy machine that print **'a'** whenever the sequence **'01'** is encountered in any input binary string. [5M] B. Construct the Finite state machine(FSM) M given in the following table test whether the string 101101,1111 are accept by M. [5M]	1	L2

state	0	1
$\rightarrow q_0$	q_0	q_1
q_1	q3	q_0
q_2	q_0	q3
q3	q_1	q_2

13	Convert the RE **(a|b)*abb** into NFA E and find the equivalent minimum state DFA. [10M]	2	L2
	OR		
14	Explain the DFA Minimization algorithm with an example. [10M]	2	L2
15	A. Show that **E->E+E/E*E/(E)/id** is ambiguous. [5M] B. Give an example for a context free grammar. [5M]	3	L2
	OR		
16	Design Push down Automata for the language **L = {a^n b^n | n≥1}.** [10M]	3	L2
17	A. State the Pumping Lemma for Context Free Languages. [5M] B. Write and explain closure properties of Context Free Languages. [5M]	4	L2
	OR		
18	Construct a TM for the addition function for the unary number system. [10M]	4	L2
19	Explain in brief about Turing machine Reducibility. [10M]	5	L2
	OR		
20	A. Explain in detail about Post Correspondence Problem. [5M] B. Explain in detail about Halting problem of TM. [5M]	5	L2