Roll No: ……

Hi-Tech Institute of Engineering & Technology
DEPARTMENT OF MCA
Course MCA
(SEM- II) MODEL PAPER 2022-23

Subject Code: KCA201 **Subject Name: TAFL**
Faculty Name: PRIYANKA SINGH

Time: 1:30 Hours ***Total Marks: 50***

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

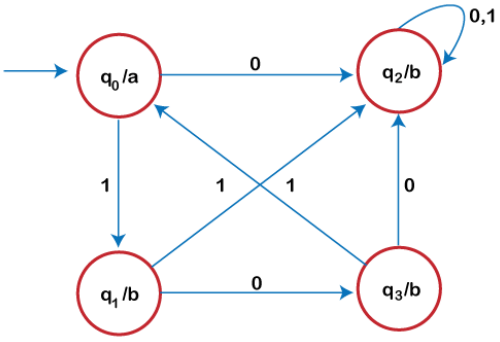
SECTION-A

1. Attempt all question in brief. **2x 5 = 10**

Q.No	Question	Marks	CO
a.	How do you minimize DFA with Myhill-Nerode theorem?	2	1
b.	Differentiate between Mealy and Moore machine.	2	1
c.	Discuss Pigeonhole Principle.	2	2
d.	What do you understand by finite automata and regular languages?	2	2
e.	Define Chomsky Hierarchy.	2	3
f.	Define ambiguous grammar and un-ambiguous grammar with examples.	2	3
g.	What do you understand by NPDA & DPDA?	2	4
h.	Describe Two stack Pushdown Automata with example.	2	4
i.	Define Post correspondence problem with an example.	2	5
j.	Define universal Turing Machine, how it will be designed?	2	5

SECTION-B

2. Attempt any FOUR of the following: **5x4=20**

Q.No	Question	Marks	CO
a.	Convert the following Moore machine to mealy machine using transition diagram. 	5	1

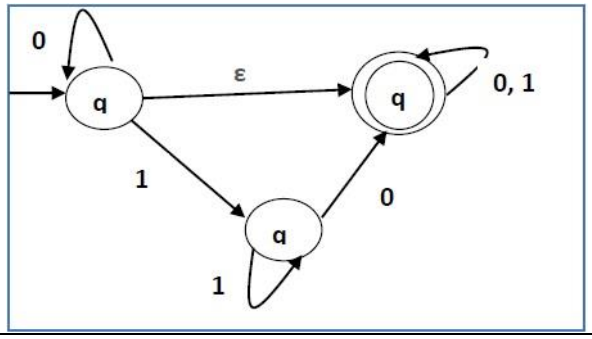
b.	Design FA with ∑ = {0, 1} accepts even number of 0's and even number of 1's.	5	2
c.	Construct the string “aabbabba" from the Leftmost derivation. S → aB | bA S → a | aS | bAA S → b | aS | aBB	5	3
d.	Construct a PDA that accepts L = { ww^R | w = (a+b)* }	5	4
e.	construct a Turing Machine for reversing a string.	5	5

SECTION-C

3. Attempt any ONE part of the following: 2x10 = 20

Q.No	Question	Marks	CO
a.	Construct an NFA equivalent to the regular expression 10 + (0 +11)0*1	10	1
b.	Construct the following Non-Deterministic Finite Automata (NFA) to Deterministic Finite Automata (DFA)- {aa,aab}*{b}.	10	1

4.. Attempt any ONE part of the following: 2x10 = 20

Q.No	Question	Marks	CO
a.	Convert the following NFA-ε to NFA without Null move. 	10	2
b.	Suppose, L (G) = {a^m b^n | m ≥ 0 and n > 0}. We have to find out the grammar **G** which produces **L(G)**.	10	2

5. Attempt any ONE part of the following: 2x10 = 20

Q.No	Question	Marks	CO
a.	Prove that if L is a regular set then L is generated by some left linear grammar and right linear of grammar.	10	3
b.	Tell all the Properties of Regular Sets	10	3

6. Attempt any ONE part of the following: **2x10 = 20**

Q.No	Question	Marks	CO
a.	Construct a PDA that accepts **L = {0^n 1^n | n ≥ 0}**	10	4
b.	What is Push Down Automata? Explain how context free language is accepted by PDA.	10	4

7. Attempt any ONE part of the following: **2x10 = 20**

Q.No	Question	Marks	CO
a.	sign a Turing Machine for the following: $\{0_n 1_m 0_n 1_n / m, n \geq 1 \}$	10	5
b.	Show that that union of two recursive languages is recursive and the union of two recursive enumerable languages is also recursively enumerable.	10	5