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.	Define regular set with example.	2	1
b.	Define Alphabet, String, Language.	2	1
c.	Define undecidable problem with an example.	2	2
d.	Explain Arden`s theorem.	2	2
e.	Define context free grammar.	2	3
f.	What do you understand by Derivation Trees and Ambiguity?	2	3
g.	Discuss about Deterministic Context Free Languages.	2	4
h.	Tell closure properties of CFL.	2	4
i.	What is Recursive and Recursively Enumerable language?	2	5
j.	Discuss halting problem in detail.	2	5

SECTION-B

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

Q.No	Question	Marks	CO
a.	Convert the given Moore machine into its equivalent Mealy machine.	5	1
b.	Find the language generated by a grammar G=({S},{a,b},{S->aSb, S->ab},S)	5	2

Q	**a**	**b**	**Output(λ)**
q0	q0	q1	0
q1	q2	q0	1
q2	q1	q2	2

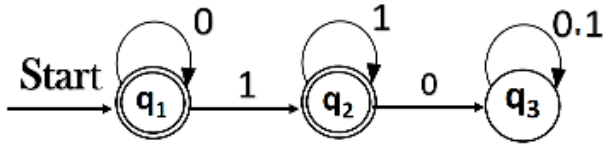
c.	Show that the language $\{0_n1_n2_n / n>=1\}$ is not a Context free language.	5	3
d.	Convert the following grammar to a PDA that accepts the same language. 1. S → 0S1 | A 2. A → 1A0 | S | ε	5	4
e.	construct a Turing Machine for checking the palindrome of the string of even llenght over (a,b).	5	5

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 ((0+1)(00+11)(0+1))*	10	1
b.	Show that the Context free languages are closed under union, concatenation and Kleene closure	10	1

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

Q.No	Question	Marks	CO
a.	Discuss the Pumping Lemma for the regular expression.	10	2
b.	Construct the regular expression for the given DFA 	10	2

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

Q.No	Question	Marks	CO
a.	Construct an equivalent grammar G in CNF for the grammar G1=({S,A,B},{a,b },{S bA / aB, A bAA / aS / a , B aBB / bS / b } , S)	10	3
b.	Find grammar in GNF equivalent to the grammar E->E+T/T T->T*F/F F->(E)/a	10	3

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

Q.No	Question	Marks	CO
a.	Differentiate between deterministic and non-deterministic PDA.	10	4
b.	How PDA and CFG are equivalent? Explain the procedure to conversion of PDA to its equivalent CFG.	10	4

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

Q.No	Question	Marks	CO
a.		10	5
b.	Explain the linear bounded automata with an example. Also discuss about context sensitive's languages with an example.	10	5