OR

(b) Explain Push down automata. How many types of representation of PDA ? In how many ways does PDA accept a string ? Explain with a suitable example. (CO2)

H Roll No. .....

TMC–303

M. C. A. (THIRD SEMESTER)
MID SEMESTER EXAMINATION, 2022

AUTOMATA THEORY AND COMPILER CONSTRUCTION

Time : 1½ Hours

Maximum Marks : 50

Note : (i) Answer all the questions by choosing any ***one*** of the sub-questions.

(ii) Each question carries 10 marks.

1. (a) Define the term Automaton with an example. Distinguish between DFA and NFA with suitable example. (CO1)

OR

(b) Design a DFA machine for the following languages : (CO1)

(i) The language L = {w $\varepsilon \Sigma^*$ | w ends with 00}

P. T. O.

(ii) The language L = {w $\varepsilon\Sigma^*$ | w contains the substring 1010}

(iii) The language L = {w $\varepsilon\Sigma^*$ | w is a string of 0 and 1 ending with 00}

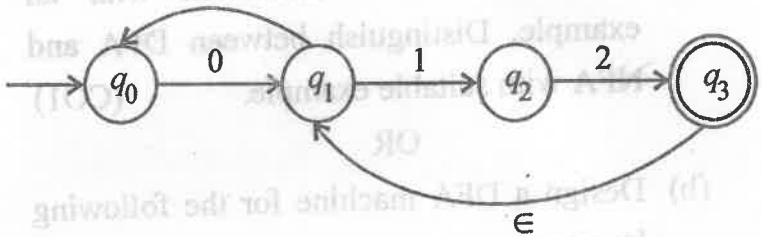
2. (a) Design an NFA machine for the following languages : (CO1)

(i) L = $\{a^n : n >= 0\}$ U $\{b^n a : n >= 1\}$ with only four states.

(ii) L = (ab U aba)*

OR

(b) Construct a DFA equivalent to the following NFA : (CO1)



3. (a) Explain Moore machine. Construct a Moore machine to determine the residue mod 3 for a binary number. (CO1)

OR

(b) Construct a Mealy machine which is equivalent to the following Moore machine : (CO2)

Current State	Next State		Output
	Input 0	Input 1	
q0 (start state)	q1	q2	1
q1	q3	q2	0
q2	q2	q1	1
q3	q0	q3	1

4. (a) Explain Chomsky classification of language with a suitable example. (CO2)

OR

(b) Obtain the regular expression for the following languages : (CO2)

(i) L = $\{a^{2n} b^{2m+1} | n >= 0, m >= 0\}$

(ii) $\{a^{2n+1} | n > 0\}$

(iii) L = $\{a^n b^n \geq n > 0\}$

5. (a) Explain the use of pumping lemma. Show that the language L = $\{a^n b^n c^n : n >= 0\}$ is not a context free language. (CO2)