Mid Semester Examination

Name of the Program: **MCA** *Semester : 3* *Course Code: TMC302*

Name of the Course: Automata Theory and Compiler Construction

Time: 1-1/2 Hour Maximum Marks: 50

Note:

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

(ii) Each question carries 10 marks

Q1 (10 marks)

(a) Explain the term finite automata? How many types of finite automata? Explain with Suitable example. **CO1**

OR

(b) Design a DFA for the following language:

(i) L= (ab U aba)*

(ii) L= $\{a^n b^m \mid m,n > 1\}$

(iii) L= $\{a^n b^m \mid m,n$ is an even number$\}$

Q2 (10 marks)

(a) Discuss and differentiate between moore and mealy machine. Design a moore machine which calculates a 1's compliments of binary number. **CO1**

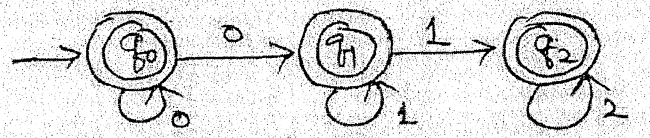
OR

(b) Convert the following mealy machine into equivalent moore machine:

	I/P a	O/P	I/P b	O/P
q0	q3	0	q1	1
q1	q0	1	q3	0
q2	q2	1	q2	0
q3	q1	0	q0	1

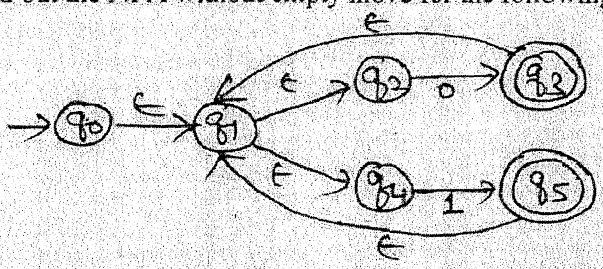
Q3 (10 marks)

(a) Construct the minimized DFA for the following NFA: **CO2**



OR

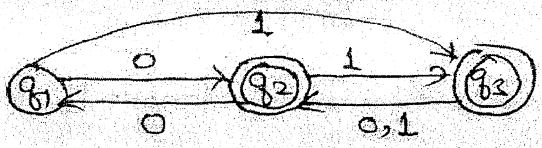
(b) Find out the NFA without empty move for the following NFA with empty move:



Q4 (10 marks)

(a) Explain the Chomsky hierarchy of languages with example. **CO2**

OR

(b)	Find the regular expression corresponding to the DFA:  	
Q5	(10 marks)	
(a)	What do you mean by Pumping Lemma? Show that the language $L=\{ww^R \mid w \in (0,1)^*\}$ is not a regular language.	**CO5**
	OR	
(b)	Find the regular expression over $\Sigma = \{a, b\}$ for the following languages: (i) $L=\{b^m ab^n \mid m,n>0\}$ (ii) $L=\{a^m b^m \mid m>0\}$ (iii) $L=\{a^{2n} b^{2m+1} \mid m,n>=0\}$	

Note for the question paper setters: (Assuming two units are covered)

a. **Question paper should have questions from both the units covering the related COs**

b. **Sub questions (a) and (b) can be further divided if required**