

Mid Semester Examination

Name of the Program: MCA

Semester : 3 Course Code: TMC302

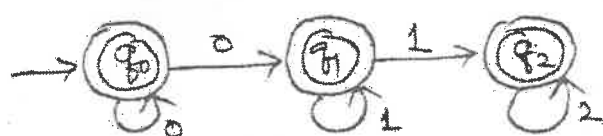
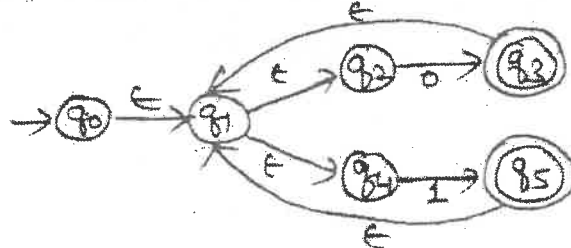
Name of the Course: Automata Theory and Compiler Construction

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) $L = (ab \cup aba)^*$ (ii) $L = \{a^n b^m \mid m, n > 1\}$ (iii) $L = \{a^n b^m \mid m, n \text{ is an even number}\}$																									
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: <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th>I/P a</th> <th>O/P</th> <th>I/P b</th> <th>O/P</th> </tr> </thead> <tbody> <tr> <td>q0</td> <td>q3</td> <td>0</td> <td>q1</td> <td>1</td> </tr> <tr> <td>q1</td> <td>q0</td> <td>1</td> <td>q3</td> <td>0</td> </tr> <tr> <td>q2</td> <td>q2</td> <td>1</td> <td>q2</td> <td>0</td> </tr> <tr> <td>q3</td> <td>q1</td> <td>0</td> <td>q0</td> <td>1</td> </tr> </tbody> </table>			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
	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:	
	<pre> graph LR start(()) --> q0((q0)) q0 -- 0 --> q1(((q1))) q1 -- 0 --> q0 q1 -- 1 --> q1 q1 -- 1 --> q2(((q2))) q2 -- "0,1" --> q1 style start fill:none,stroke:none </pre>	
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) $L = \{b^m a b^n \mid m, n \geq 0\}$
- (ii) $L = \{a^m b^m \mid m \geq 0\}$
- (iii) $L = \{a^{2n} b^{2m+1} \mid m, n \geq 0\}$

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

~~Question paper should have questions from both the units covering the related COs~~

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