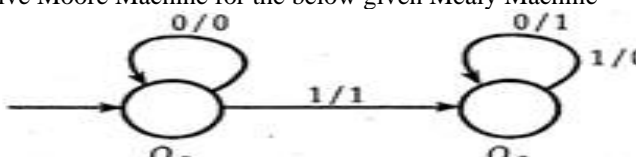
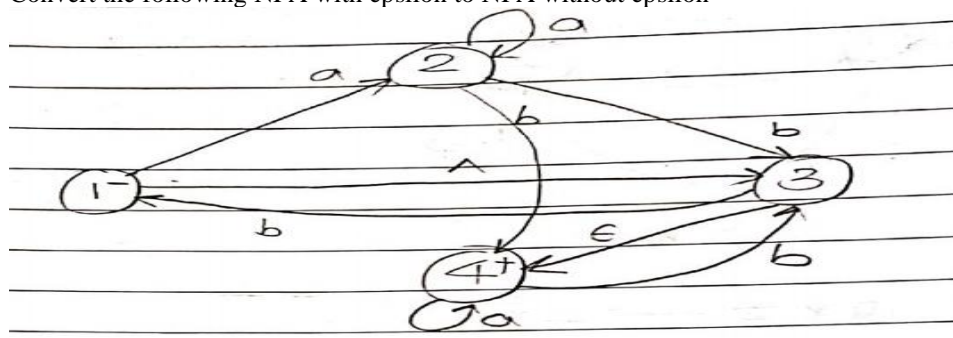
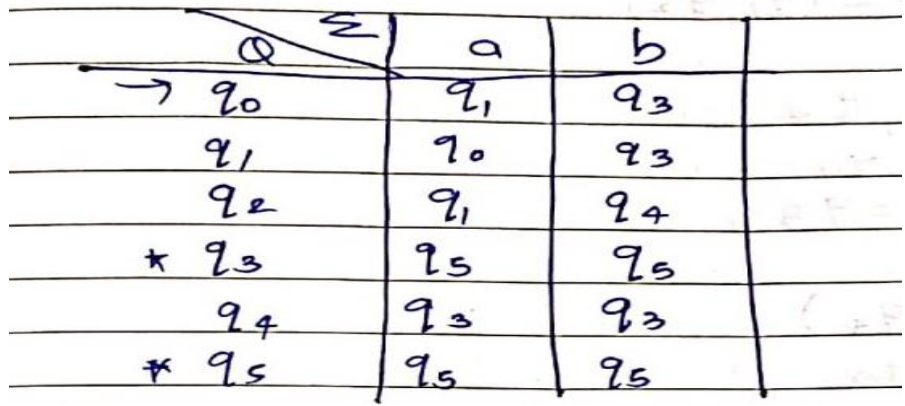
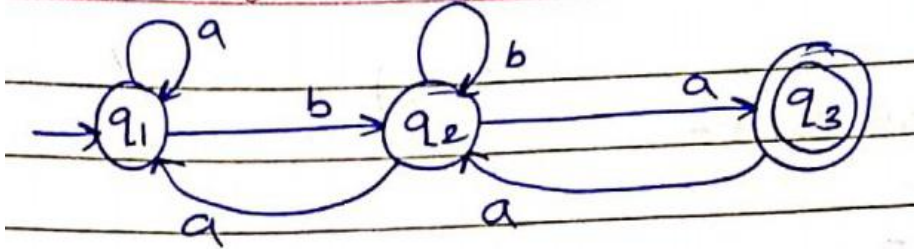


Date:	Time: 1 Hr. & 15 Mints	Branch: CMPN
Semester: V	Subject: TCS	Marks: 40

Q. 1)	Attempt any Five (2 Marks Each)	CO	BL
a)	Give 5 tuple representation of NFA without epsilon moves	CO1	L1
b)	Minimum number of states in a DFA required to recognize a language that contains strings containing "000" or "111" as a substring.	CO1	L3
c)	Give 2 points of difference between Moore and Mealy	CO1	L2
d)	Give Moore Machine for the below given Mealy Machine 	CO1	L3
e)	Give RE for set of strings over $\Sigma = \{a,b\}$ that contain second last symbol an "a".	CO2	L3
f)	Describe the language expressed by the RE $(0+1)^*0(0+1)^*0(0+1)^*$	CO2	L3
g)	Express RE for strings that contains number of "a"s divisible by 3 and any number of "b"s	CO2	L3
h)	Identify whether the following REs are equivalent or not: RE1= $a(ba)^*$ RE2= $(ab)^*a$	CO2	L2
Q. 2)	Attempt any two. (5 Marks Each)		
a)	Design a FSM/ Mealy to decrement a binary number by 1.	CO1	L3
b)	Design a DFA to accept strings over $\Sigma = \{0,1\}$ that start with "00" and end with "110"	CO1	L3
c)	Design a Moore to compute ternary (base 3) number modulo 5.	CO1	L3
Q 3)	Attempt any two. (5 Marks Each)		
a)	Differentiate NFA and DFA	CO1	L2
b)	Convert the following NFA with epsilon to NFA without epsilon 	CO1	L2
c)	Minimize the below DFA 	CO1	L2

Q 4)	Attempt any One (10 Marks Each)		
a)	Construct a NFA with epsilon moves for the RE $(0+1)^*11$ and hence convert the NFA with epsilon into a DFA to recognize the regular language.	CO2	L2
b)	Obtain RE for the below DFA using Arden's Theorem  <pre> graph LR     start(( )) --&gt; q1((q1))     q1 -- a --&gt; q1     q1 -- b --&gt; q2((q2))     q2 -- b --&gt; q2     q2 -- a --&gt; q3(((q3)))     q3 -- a --&gt; q2           </pre>	CO2	L2
CO1	Identify the concepts in theory of computation and differentiate between deterministic and non-deterministic automata, also obtain equivalence of NFA and DFA.		
CO2	Infer the equivalence of languages described by finite automata and regular expressions.		