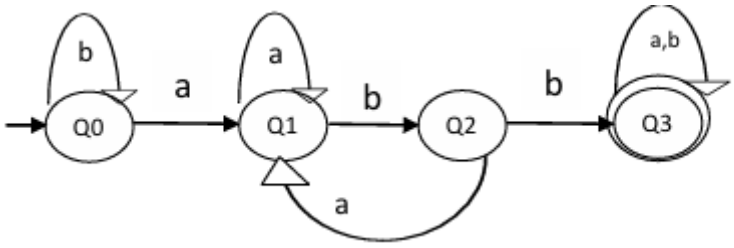
THEORY OF COMPUTATION (BCS503)

MODULE – 2

ASSIGNMENT QUESTIONS

1. Define Regular Expression. Write the RE for the following Languages.
   a) Strings of a's and b's having substring aa.
   b) Strings of a's and b's whose tenth symbol from right end is 'a'
   c) The set of strings 0's and 1's whose number of 0's is divisible by 5.
   d) The set of strings a's and b's ending with 'b' and has no substring aa.
   e) To accept the words with two or more letters but beginning and ending with the same letter where $\sum = \{a,b\}$.
   f) Strings of 0's and 1's having no two consecutive zeros.
   g) Strings of a's and b's starting with 'a' and ending with 'b'.

2. Construct a RE from the following DFA using State Elimination Method



3. Construct a RE from the following DFA using State Elimination Method.

	0	1
→ *p	s	p
q	p	s
r	r	q
s	q	r

4. Convert the following regular expressions to NFA's with Є - Transitions.
   a) (0+1)01
   b) 00(0+1)*
   c) 01*
   d) 0+01*
   e) a* + b* + c*
   f) (a+b)*aa(a+b)*

5. State and prove the pumping Lemma theorem for regular language.
   a) Show that $L=\{0^n10^n \mid n>=1\}$ is not regular.
   b) Show that $L=\{a^nb^n \mid n>=0\}$ is not regular.
   c) Show that $L = \{0^n1^m \mid n \leq m\}$ is not regular.
   d) Show that $L = \{0^n1^{2n} \mid n \geq 1\}$ is not regular.

6. List out closure properties of regular sets.
7. Show that regular languages are closed under complement and intersection
8. Define distinguishable and indistinguishable states. Minimize the following DFA

□	0	1
→A	B	A
B	A	C
C	D	B
*D	D	A
E	D	F
F	G	E
G	F	G
H	G	D

9. Consider the transition table of DFA.

a) Draw the table of distinguishabilities for this automaton.

b) Construct the minimum-state equivalent DFA.

	0	1
→ A	B	E
B	C	F
*C	D	H
D	E	H
E	F	I
*F	G	B
G	H	B
H	I	C
*I	A	E

10.

Minimize the following DFA.