CS353: Theory of Computation (TOC)

Unit-I,II, III-Question Bank

Que 1].

Find a deterministic acceptor equivalent to

$$M = (\{q_0, q_1, q_2\}, \{a, b\}, \delta, q_0, \{$$

where δ is as given by Table

TABLE State Table

State/Σ	a
$\rightarrow q_0$	q_0, q_1
q_1	q_0
q_2	

Que 2]. Construct a Deterministic finite automaton equivalent to M=({p,q,r,s},{a,b}, d , q0,{q3})

State\ Σ	a	b
p	p, q	p
q	r	r
r	s	~
s	s	s~

Que 3]. Consider the Mealy machine describe by transition table given by following table.

Construct a Moore machine which is equivalent to Mealy machine.

Present State	Next State			
	a=0		a=1	
	State	Output	State	Output
q0	q3	0	q1	1
q1	q1	1	q2	0
q2	q2	1	q3	1
q3	q3	0	q0	0

Que 4]. Construct a deterministic finite automaton equivalent to

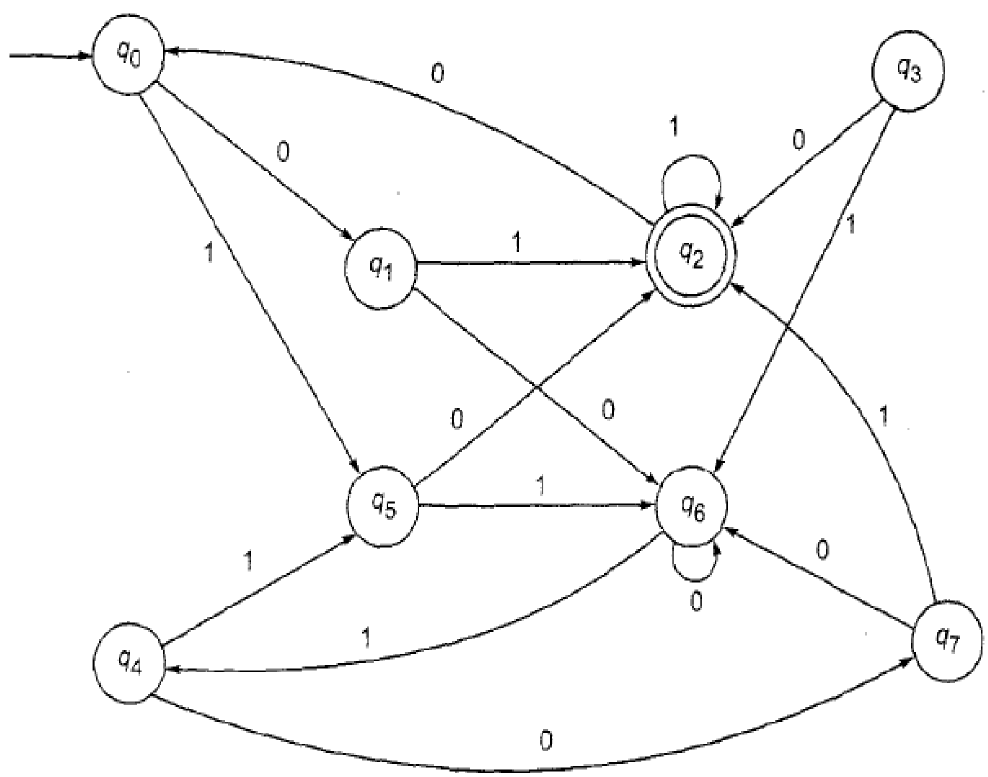
$$M = (\{q_0, q_1, q_2, q_3\}, \{0, 1\}), \delta, q_0, \{q_3\}$$

where δ is given by Table

TABLE State Table

State/Σ	a	b
$\rightarrow q_0$	q_0, q_1	q_0
q_1	q_2	q_1
q_2	q_3	q_3
q_3		q_2

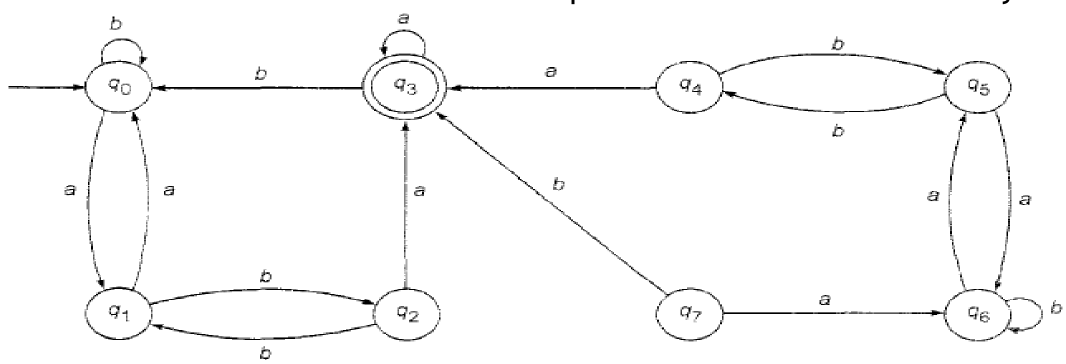
Que 5]. Construct a minimum state automaton equivalent to the DFA describe by following fig.



Que 6]. Construct a Mealy machine which is equivalent to the Moore machine defined by following table.

Present State	Next State		Output
	a=0	a=1	
	State	State	
q0	q3	q1	0
q1	q1	q2	1
Q2	q2	q3	0
q3	q3	q0	0

Que 7]. Construct a minimum state automaton equivalent to the DFA describe by following fig.



Que 8]. Construct a DFA equivalent to NDFA whose transition table is defined by following table.

State\ Σ	a	b
q0	q0, q1	q0
q1	q2	q1
q2	q3	q3
q3	--	q2

Que 9]. Construct a minimum state automaton equivalent to a given automaton M whose transition table is :

State\ Σ	Input	
	a	b
q0	q0	q3
q1	q2	q5
q2	q3	q4
q3	q0	q5
q4	q0	q6
q5	q1	q4
q6	q1	q3

Que 10]. M=({q1,q2,q3},{0,1}, d,q1,{q3}) is a NFA where d is :

(q1,0)={q2,q3}

(q1, 1)={q1}

(q2,0)={q1,q2}

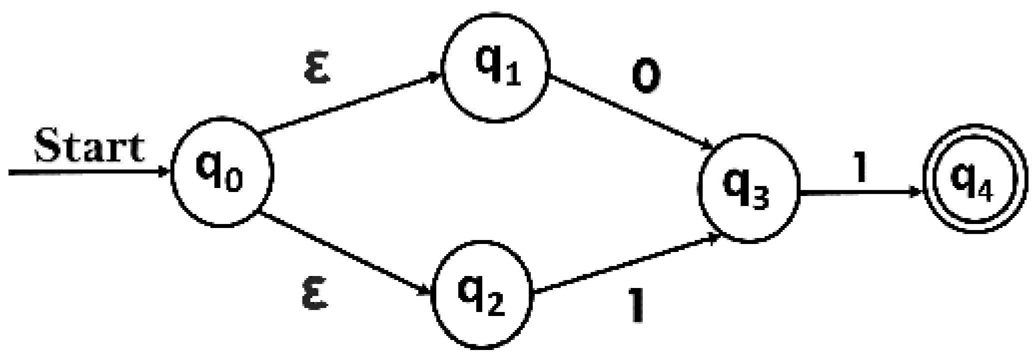
(q2,1)= Ø

(q3,0)={q2}

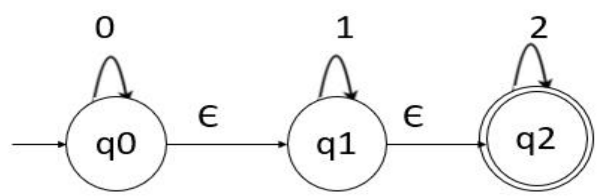
(q3,1)={q1,q2)

Convert it to DFA.

Que 11]. Convert the given NFA with epsilon to NFA without epsilon



Que 12]. Convert the given NFA with epsilon to NFA without epsilon



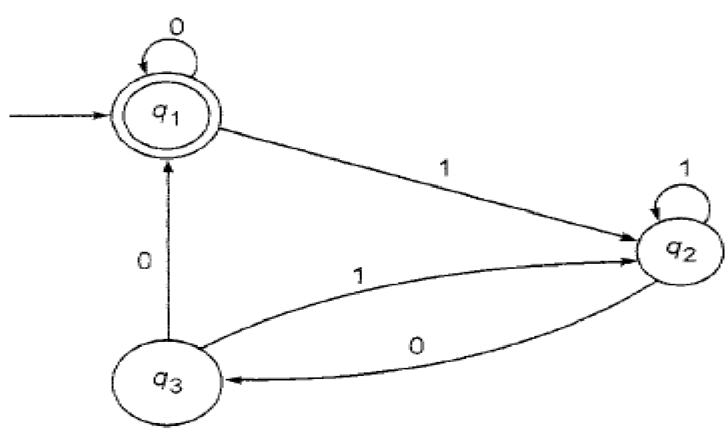
Que 13]. Describe the following sets by regular expressions:

(a) L 1 =the set of all strings of O's and l's ending in 00.

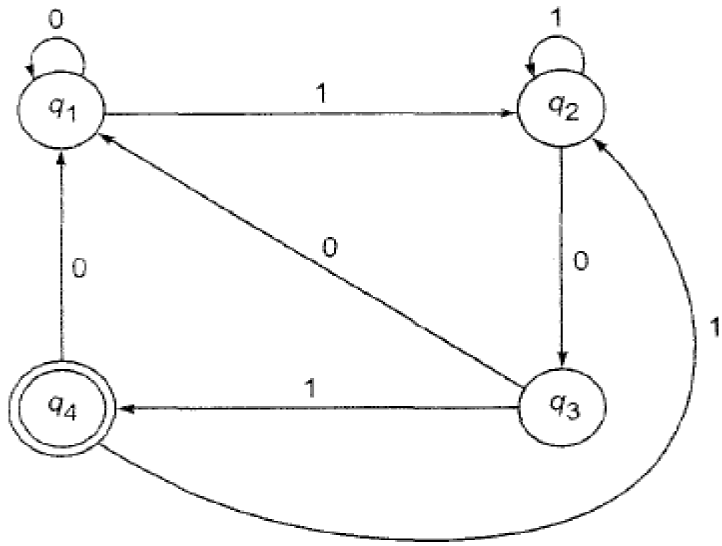
(b) L2 = the set of all strings of O's and l's beginning with 0 and ending with 1.

(c) L3 ={A, 11, 1111, 111111, ... }.

Que 14]. Construct a regular expression corresponding to the state diagram described by following Fig.



Que 15]. Find the regular expression corresponding to following Fig.



Que 16]. Construct the finite automaton equivalent to the regular expression
$(0 + 1)^*(00 + 11)(0 + 1)^*$

Que 17]. Construct a DFA with reduced states equivalent to the R.E.
10 + (0 + 11»)0*1.

Que 18]. Let G be the grammar **S-> OB |1A, A -> 0 | 0S | 1AA, B -> 1|1S |OBB**. For the string **00110101**, find
(a) the leftmost derivation,
(b) the rightmost derivation, and
(c) the derivation tree.

Que 19].If G is the grammar S -> SbS |a, show that G is ambiguous.

Que 20].Let G be S -> AB, A -> a, B -> C I b, C -> D, D -> E and E -> a. Eliminate unit productions and get an equivalent grammar.