a.1)

ST Table:

Δ\Σ	a	b
q_0	q_1	R
q_1	R	q_2
q_2	q_2	q_3
q_3	q_4	q_3
q_4	q_2	q_3
R	R	R

$Q = \{q_0, q_1, q_2, q_3, q_4\}$

$\Sigma = \{a, b\}$

$F = \{q_4\}$

$q_0 = \{q_0\}$

ex. $\delta(q_0, abbba)$

$\delta(q_1, bbba)$

$\delta(q_2, bba)$
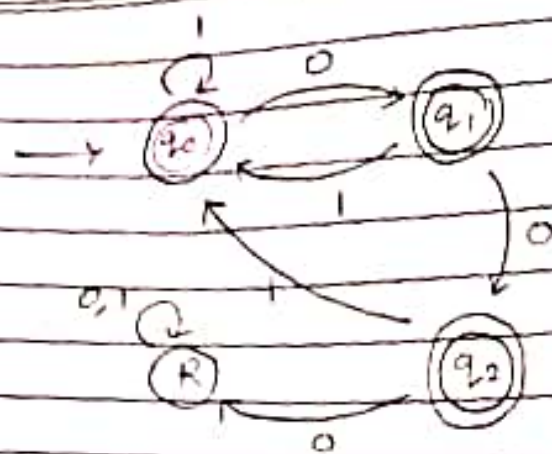
$\delta(q_3, ba)$

$\delta(q_3, a)$

$\delta(q_4)$

A 2)

ST Table:

$Q = \{ q_0, q_1, q_2, R \}$

$\Sigma = \{ 0, 1 \}$

$F = \{ q_0, q_1, q_2 \}$

$q_0 = \{ q_0 \}$

$\delta \backslash \Sigma$	0	1
q_0	q_1	q_0
q_1	q_2	q_0
q_2	R	q_0
R	R	R

ex. $\delta(q_0, 10010)$
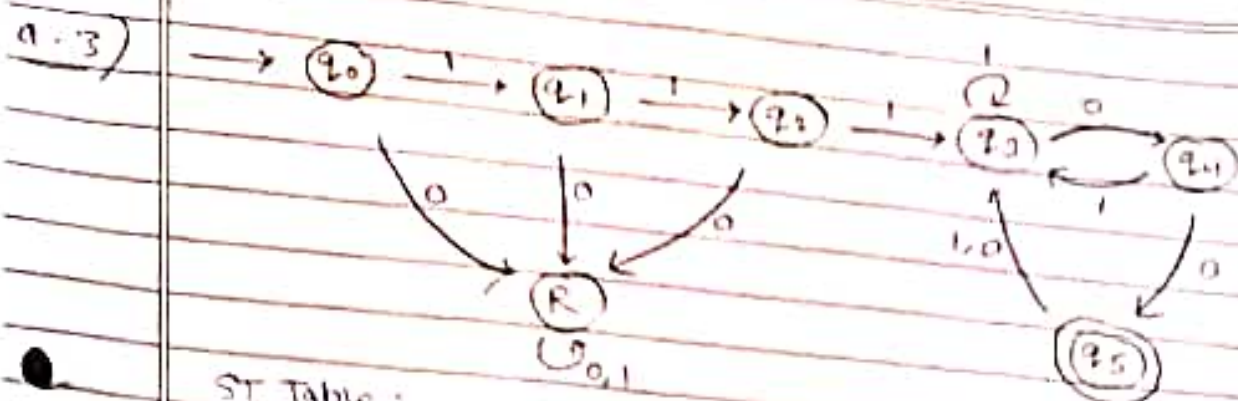
$\delta(q_0, 0010)$

$\delta(q_1, 010)$

$\delta(q_2, 10)$

$\delta(q_0, 0)$

$\delta(q_1,)$

a - 3)

ST Table -

Q \ Σ	0	1
q_0	R	q_1
q_1	R	q_2
q_2	R	q_3
q_3	q_4	q_3
q_4	q_5	q_3
* q_5	q_3	q_3
R	R	R

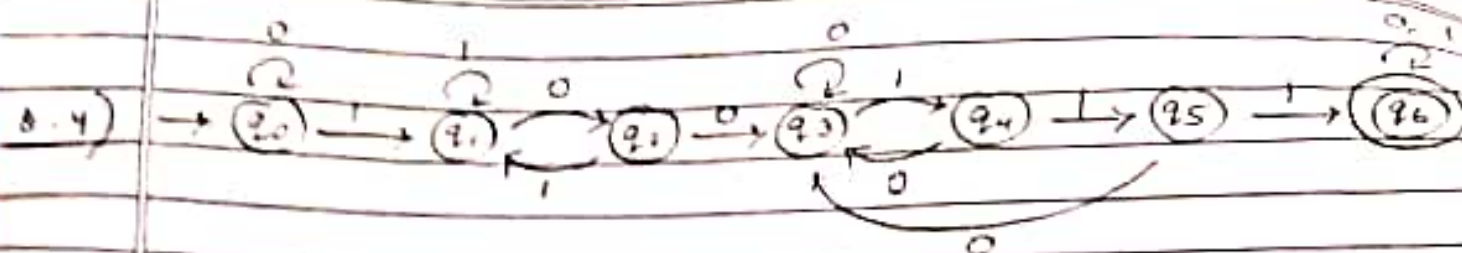$Q = \{q_0, q_1, q_2, q_3, q_4, q_5, R\}$
$\Sigma = \{0, 1\}$
$F = \{q_5\}$
$q_0 = \{q_0\}$

ex. $\delta(q_0, 11101000)$
$\delta(q_1, 11010100)$
$\delta(q_2, 1010100)$
$\delta(q_3, 010100)$
$\delta(q_4, 0100)$
$\delta(q_3, 0100)$
$\delta(q_4, 100)$
$\delta(q_3, 00)$
$\delta(q_4, 0)$
$\delta(q_5)$

or. $\delta(q_0, 11100)$
$\delta(q_1, 1100)$
$\delta(q_2, 100)$
$\delta(q_3, 00)$
$\delta(q_4, 0)$
$\delta(q_5)$

8.4)

ST Table:

Q\Σ	0	1
q_0	q_0	q_1
q_1	q_2	q_1
q_2	q_7	q_1
q_3	q_3	q_4
q_4	q_3	q_5
q_5	q_3	q_6
q_6	q_6	q_6

$Q = \{q_0, q_1, q_2, q_3, q_4, q_5, q_6\}$

$\Sigma = \{0, 1\}$

$F = \{q_6\}$

$q_0 = \{q_0\}$

b) $\delta(q_0, 00100110111)$
$\delta(q_0, 0100110111)$
$\delta(q_0, 100110111)$
$\delta(q_1, 00110111)$
$\delta(q_2, 0110111)$
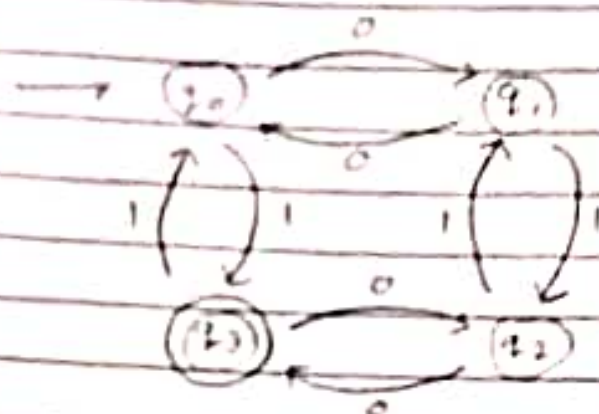$\delta(q_3, 110111)$
$\delta(q_4, 10111)$
$\delta(q_5, 0111)$
$\delta(q_3, 111)$
$\delta(q_4, 11)$
$\delta(q_5, 1)$
$\delta(q_6,)$

5.

ST Table:

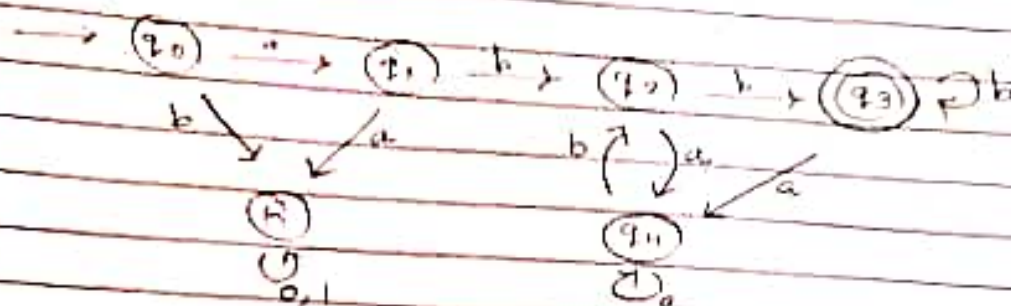| σ\Σ	0	1
q_0	q_1	q_3
q_1	q_0	q_2
q_2	q_3	q_1
q_3	q_2	q_0

$Q = \{q_0, q_1, q_2, q_3\}$

$\Sigma = \{0, 1\}$

$F = \{q_3\}$

$q_0 = \{q_0\}$

ex. $\delta(01000)$

   $\delta(q_0, 01000)$

   $\delta(q_1, 1000)$

   $\delta(q_2, 000)$

   $\delta(q_3, 00)$

   $\delta(q_3, 0)$

   $\delta(q_3)$

Q6)

ST Table :

Q\Σ	a	b
q_0	q_1	R
q_1	R	q_2
q_2	q_4	q_3
q_3	q_4	q_3
q_4	q_4	q_2
R	R	R

$Q = \{ q_0, q_1, q_2, q_3, q_4, R \}$

$\Sigma = \{ a, b \}$
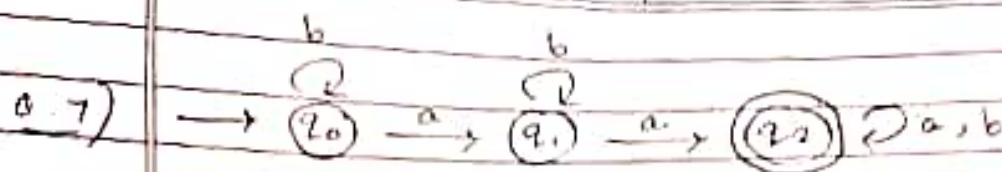
$F = \{ q_3 \}$

$q_0 = \{ q_0 \}$

en. $\delta (abbabb)$

$\longrightarrow$ $\delta (q_0, abbabb)$

$\delta (q_1, bbabb)$

$\delta (q_2, babb)$

$\delta (q_3, abb)$

$\delta (q_4, bb)$

$\delta (q_2, b)$

$\delta (q_3)$

Q 7)

$$\rightarrow \textcircled{q_0} \xrightarrow{a} \textcircled{q_1} \xrightarrow{a} \textcircled{\textcircled{q_2}} \circlearrowright a, b$$

(b loops at q_0 and q_1)

δ - Table

δ \ Σ	a	b
q_0	q_1	q_0
q_1	q_2	q_1
* q_2	q_2	q_2

$Q = \{ q_0, q_1, q_2 \}$

$\Sigma = \{ a, b \}$

$F = \{ q_2 \}$

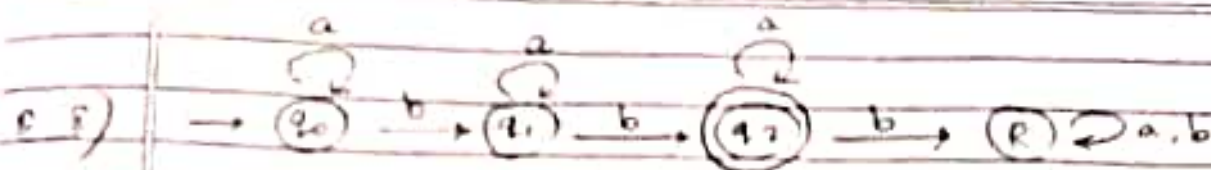$q_0 = \{ q_0 \}$

ex. $\delta(q_0, aaaba)$

$\delta(q_1, aaba)$

$\delta(q_2, aba)$

$\delta(q_2, ba)$

$\delta(q_2, a)$

$\delta(q_2)$

Q 8)

ST   Table

δ \ Σ	a	b
q_0	q_0	q_1
q_1	q_1	q_2
q_2	q_2	R
R	R	R

$$A = \{ q_0, q_1, q_2, R \}$$
$$\Sigma = \{ a, b \}$$
$$F = \{ q_2 \}$$
$$q_0 = \{ q_0 \}$$

$$\vdash \{ q_0, \quad abbab \}$$
$$\delta (q_0, \ bba)$$
$$\delta (q_1, \ ba)$$
$$\delta (q_2, \ a)$$
$$\delta (q_2)$$

B-9)

ST Table:

S\Σ	a	b
q_0	q_1	q_2
q_1	q_3	q_2
q_2	q_1	q_3
q_3	q_1	q_2

$A = \{q_0, q_1, q_2, q_3\}$
$\Sigma = \{a, b\}$
$F = \{q_1\}$
$q_0 = \{q_0\}$

ii) $\hat{\delta}(q_0, aabaa)$
$\hat{\delta}(q_2, abaa)$
$\hat{\delta}(q_1, baa)$
$\hat{\delta}(q_2, aa)$
$\hat{\delta}(q_1, a)$
$\hat{\delta}(q_3)$

State Table

Ω \ Σ	0	1
q_0	q_1	q_2
q_1	q_3	q_2
q_2	q_1	q_3
q_3	q_1	q_2

$$\delta = \{q_0, q_1, q_2, q_3\}$$
$$\Sigma = \{0, 1\}$$
$$f = \{q_3\}$$
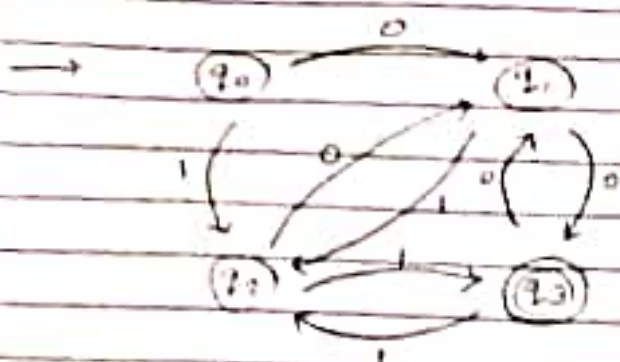$$q_0 = \{q_0\}$$

ex. $\delta(q_0, 01011)$
$\delta(q_1, 1011)$
$\delta(q_2, 011)$
$\delta(q_1, 11)$
$\delta(q_2, 1)$
$\delta(q_3)$