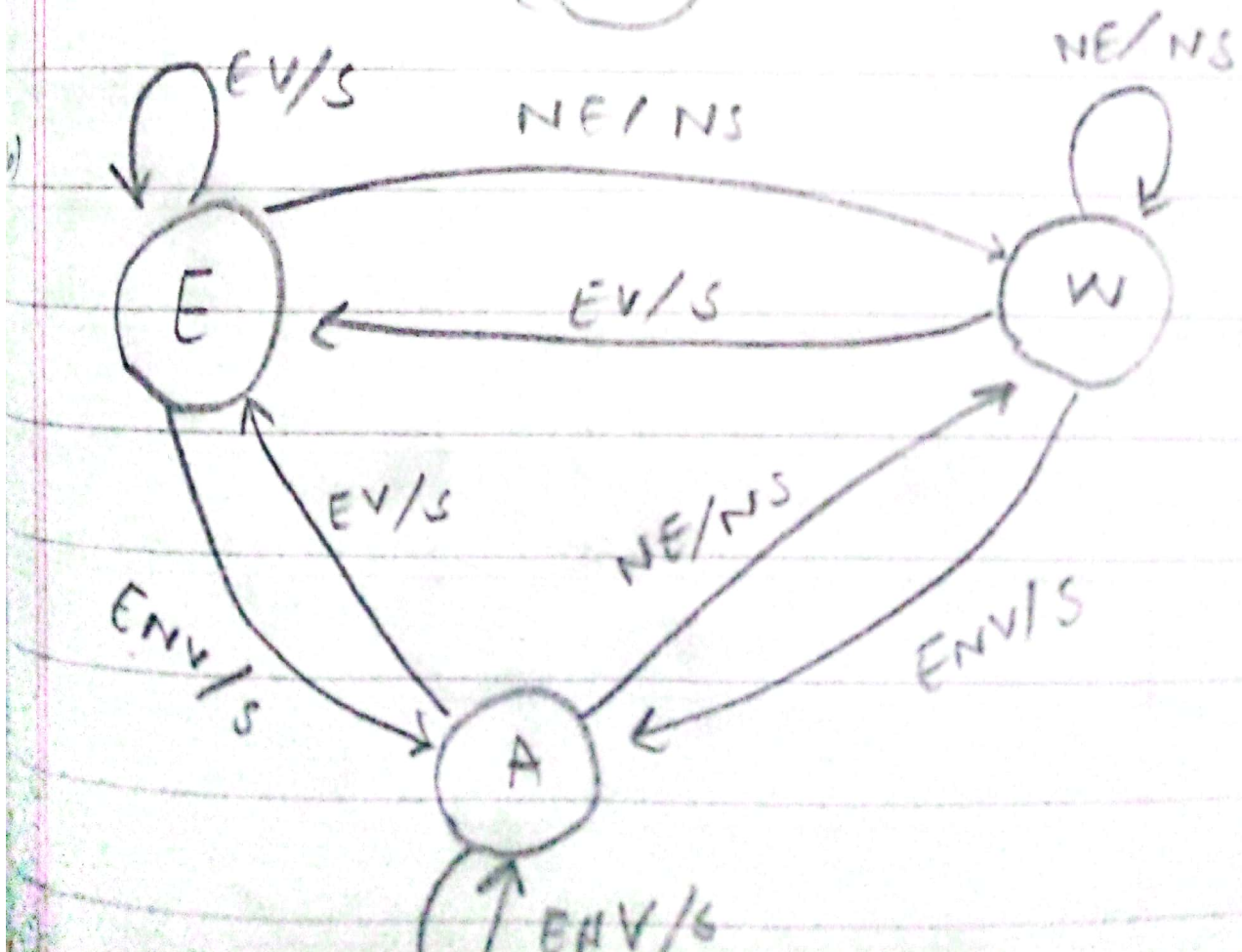
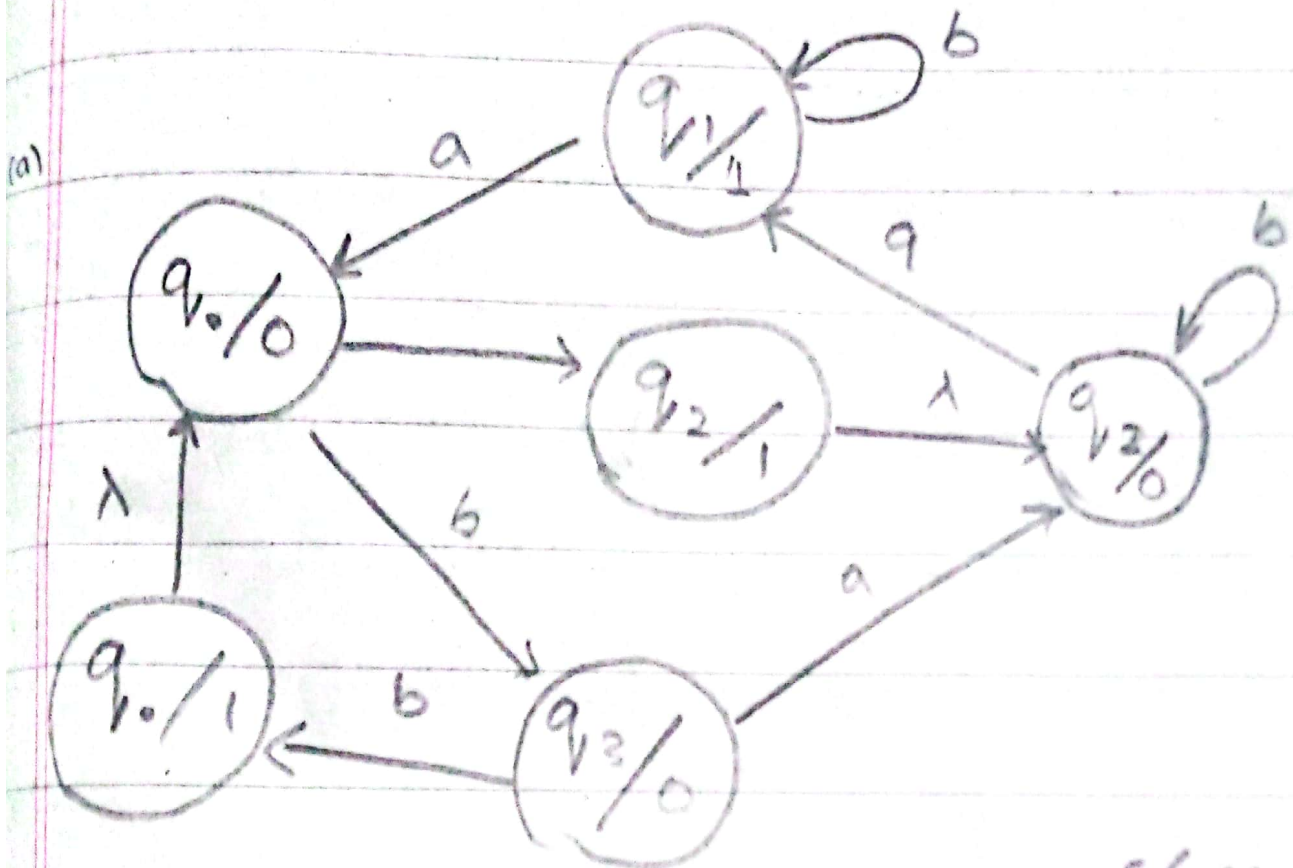


TOA Assignment



Ques

states

a

b

I

q_0

$\left[\begin{array}{cc|cc} q_1 & I & q_9 & \bar{I} \end{array} \right]$

q_1

$q_8 \quad \bar{I} \quad q_2 \quad I$

q_2

$q_3 \quad \bar{I} \quad q_2 \quad I$

q_3

$q_4 \quad \bar{I} \quad q_5 \quad I$

q_4

$\left[\begin{array}{cc|cc} q_7 & I & q_5 & \bar{I} \end{array} \right]$

q_5

$\left[\begin{array}{cc|cc} q_6 & I & q_5 & \bar{I} \end{array} \right]$

II

q_2

$q_2 \quad I \quad q_4 \quad \bar{I}$

q_4

$q_5 \quad I \quad q_8 \quad \bar{I}$

q_8

$q_1 \quad I \quad q_3 \quad \bar{I}$

q_9

$q_7 \quad I \quad q_8 \quad \bar{I}$

states

a

b

I $\left[\begin{array}{cc} q_1 & q_8 \text{ II} \\ q_2 & q_3 \text{ II} \end{array} \right]$ $\left[\begin{array}{cc} q_2 & q_2 \text{ I} \\ q_5 & q_5 \text{ I} \end{array} \right]$

III $\left[\begin{array}{cc} q_6 & q_7 \text{ III} \\ q_7 & q_6 \text{ III} \end{array} \right]$ $\left[\begin{array}{cc} q_5 & q_5 \text{ I} \\ q_5 & q_5 \text{ I} \end{array} \right]$

IV $\left[\begin{array}{cc} q_0 & q_1 \text{ I} \\ q_1 & q_2 \text{ I} \end{array} \right]$ $\left[\begin{array}{cc} q_9 & q_9 \text{ II} \\ q_9 & q_9 \text{ II} \end{array} \right]$

II $\left[\begin{array}{cc} q_3 & q_4 \text{ II} \\ q_8 & q_8 \text{ II} \end{array} \right]$ $\left[\begin{array}{cc} q_5 & q_5 \text{ I} \\ q_5 & q_5 \text{ I} \end{array} \right]$

$\left[\begin{array}{ccc} q_7 & \text{III} & q_8 \text{ II} \end{array} \right]$

states	a	b
I	q_1	q_2
	q_2	q_2
	q_5	q_5
II	q_6	q_5
	q_7	q_5
IV	q_0	q_9
	q_3	q_4
	q_4	q_8
II	q_8	q_3
	q_9	q_8

States

a

b

I

II

I

II

I

II

III

III

I

IV

I

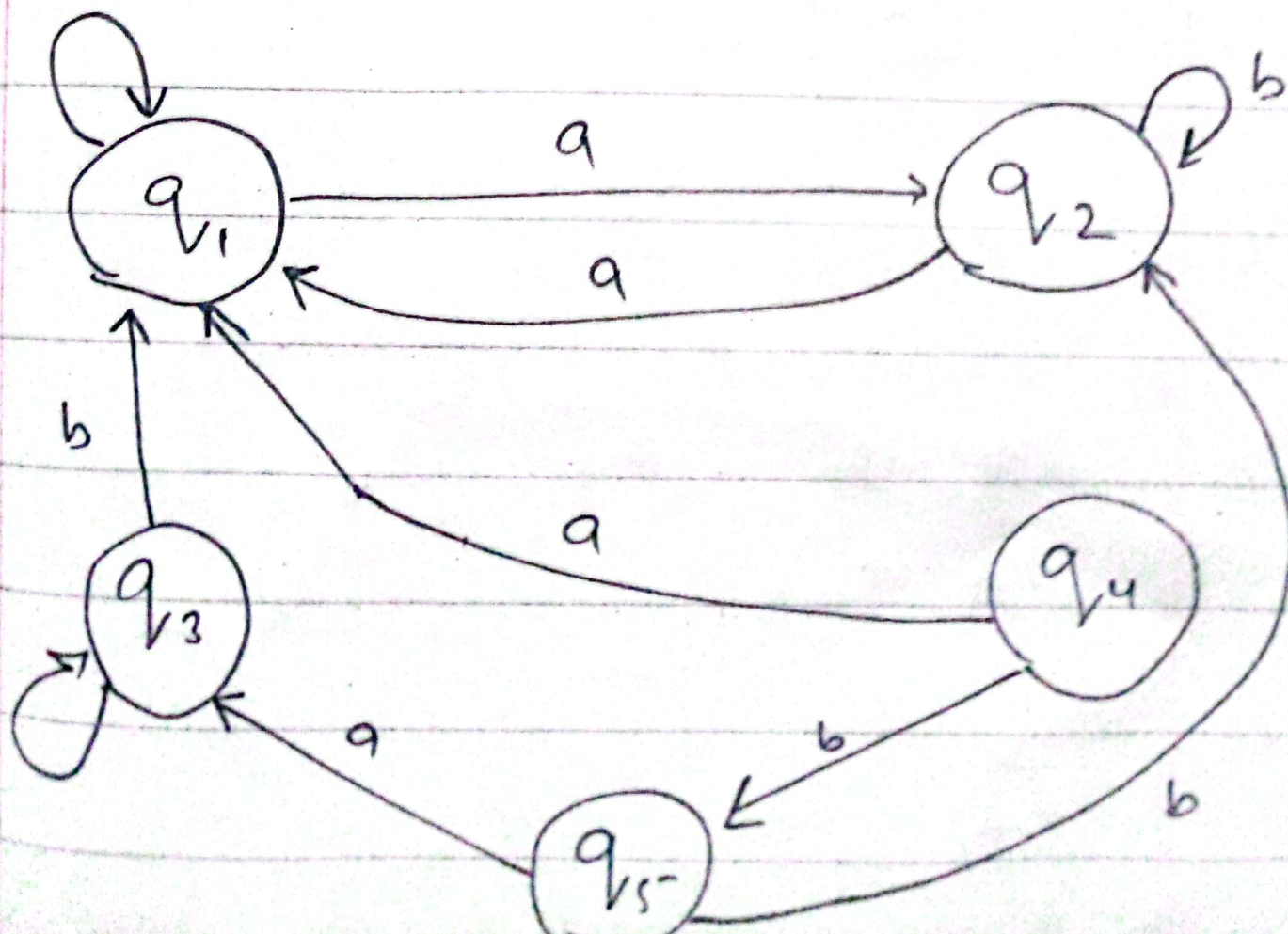
V

b

V

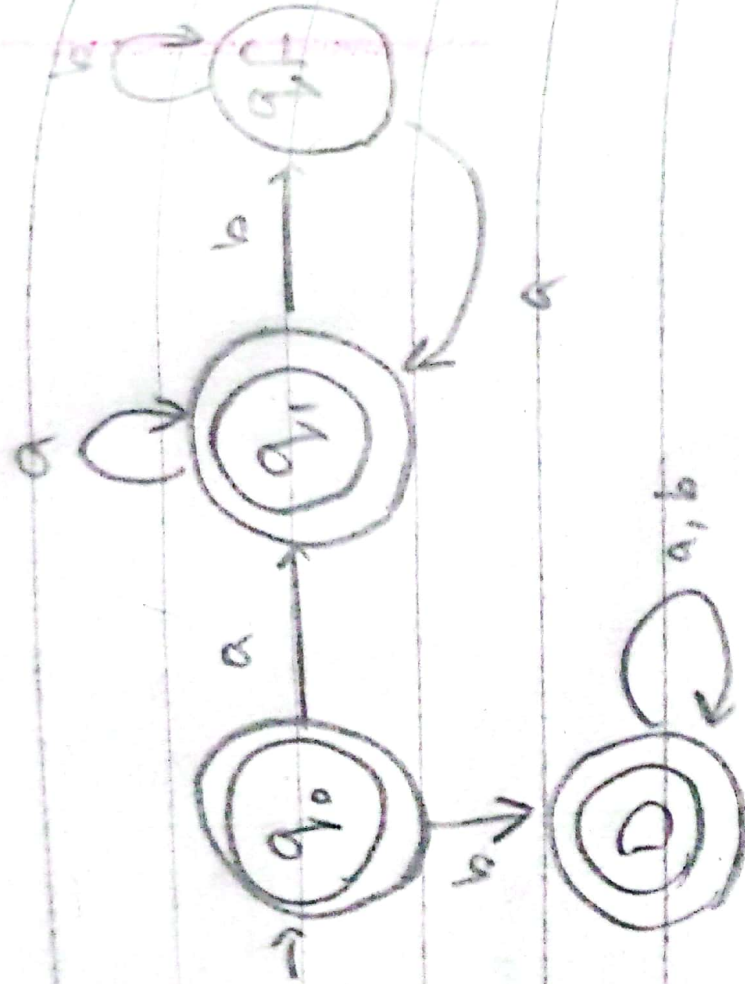
III

II



Q3(a)

(i)



states

a b
Trap

$Z_1 = q_0$ $Z_2(q_1)$

$Z_2 \neq q_1$ $Z_3 =$

$Z_3 = q_1$

$Z_4 \neq (q_1, A)$

$Z_5 = (q_1, B)$

$Z_6 = (q_1, B)$

$Z_7 = (q_1, C)$

$Z_8 = (q_1, C)$

$Z_9 = (q_1, A)$

new states

old states

a

b

Q3. $z_1(q_0)$

$(q_1)z_2$

$(D)z_3$

(ii) $z_2(q_1)$

$(q_1)z_2$

$(qf, A)z_4$

$z_3(D)$

$(D)z_3$

$(D)z_3$

$z_4(qf, A)$

$(q_1, B)z_5$

$(qf, A, B)z_6$

$z_5(q_1, B)$

$(q_1, C)z_7$

$(qf, A, C)z_8$

$z_6(qf, A, B)$

$(q_1, B, C)z_9$

$(qf, A, B, C)z_{10}$

$z_7(q_1, C)$

~~$(qf, A)z_4$~~

$(qf, A)z_4$

$z_8(qf, A, C)$

$(q_1, B, A)z_{12}$

$(qf, A, B)z_6$

$z_9(q_1, B, C)$

$q_{11}A$

$(q_1, C, B)z_{13}$

$(qf, A, C)z_8$

$z_{10}(qf, A, B, C)$

$(q_1, B, C, A)z_{14}$

$(qf, A, B, C)z_{10}$

$z_{11}(q_1, A)$

$(q_1, B)z_5$

$(qf, A, B)z_6$

$z_{12}(q_1, A, B)$

$(q_1, B, C)z_3$

$(qf, A, B, C)z_{10}$

$z_{13}(q_1, C, B)$

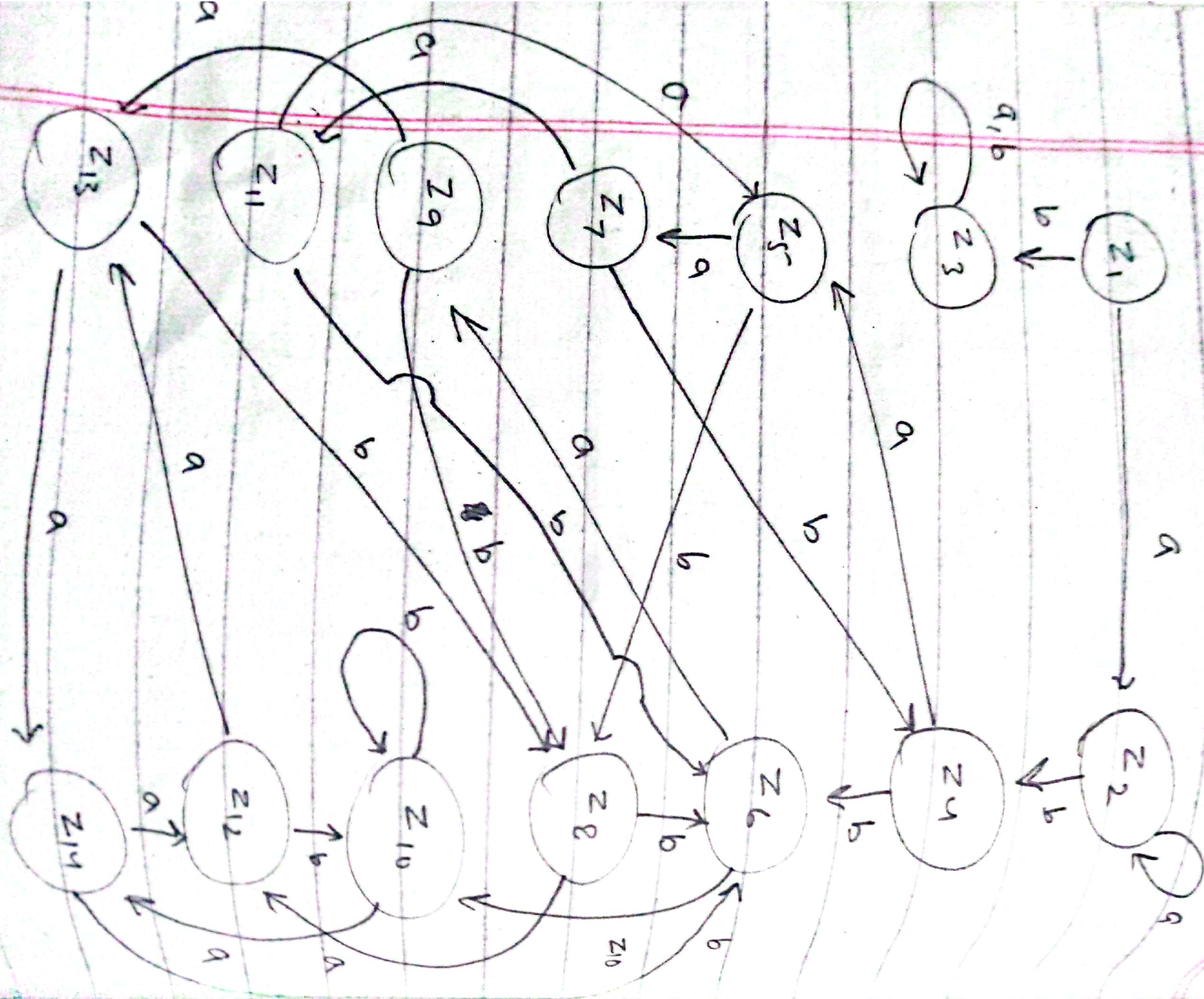
$(q_1, A, C)z_{14}$

$(qf, A, C)z_8$

$z_{14}(q_1, A, C)$

$(q_1, B, B)z_{12}$

$(qf, A, B)z_6$



4.

i) $L_1 = \{ 0^n L^m : mn \leq m+3 \}$

$$0^2 L^2 \Rightarrow 00LL \quad mn < 5$$

$\begin{array}{c} / \quad \backslash \quad / \quad \backslash \\ x \quad y \quad z \end{array}$

$\begin{array}{c} 0 \quad 0L \quad 0LL \\ / \quad \backslash \quad / \quad \backslash \\ x \quad y \quad z \end{array}$
, Contradiction,
 $y \rightarrow$ pumped not regular

$00L0LL$ is not part of $0^n L^m$.

ii) $|y| > 0, |xy| \leq n$

$$S = 01(1100)^n 110(10)^n$$

$|S| \geq n$, is not regular.

$$(iii) L3 = \{a^i b^j c^k : i \geq j \geq k \geq 1\}$$

$$\Rightarrow S = \underbrace{aa}_{x} \underbrace{bb}_{y} \underbrace{cc}_{z}, \text{ ~~for~~$$

pump \rightarrow $aa\ bb\ cc$,
not regular.