Teoria da Computação

Exercício 1

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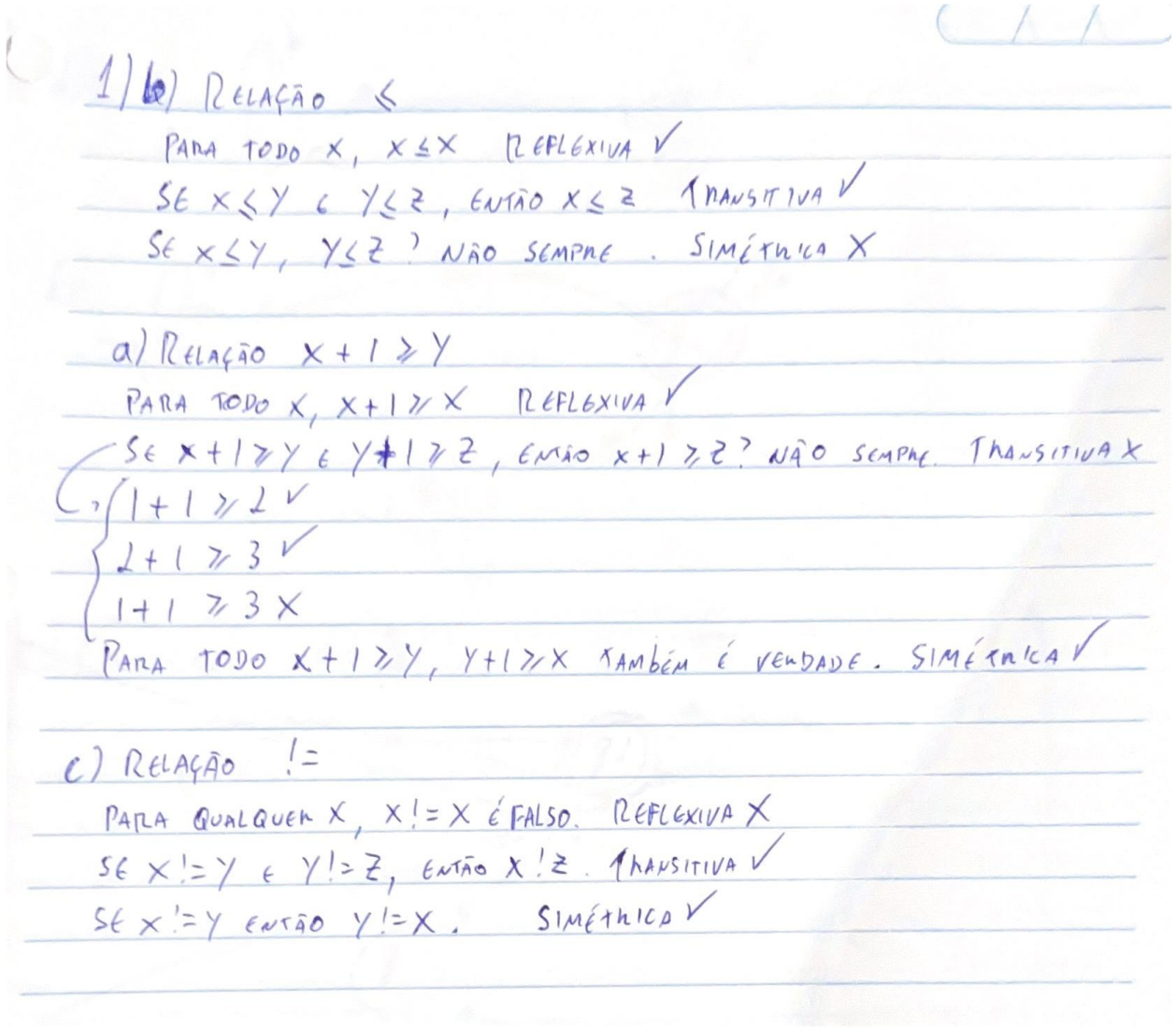
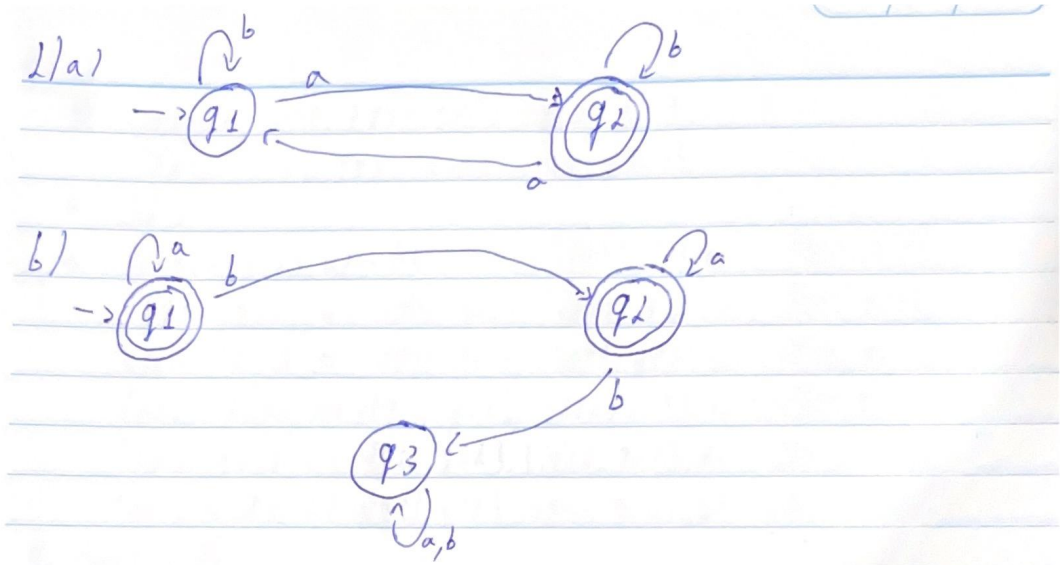
Questão 1



Questão 2

Letras A e B



Letra C

c) M:

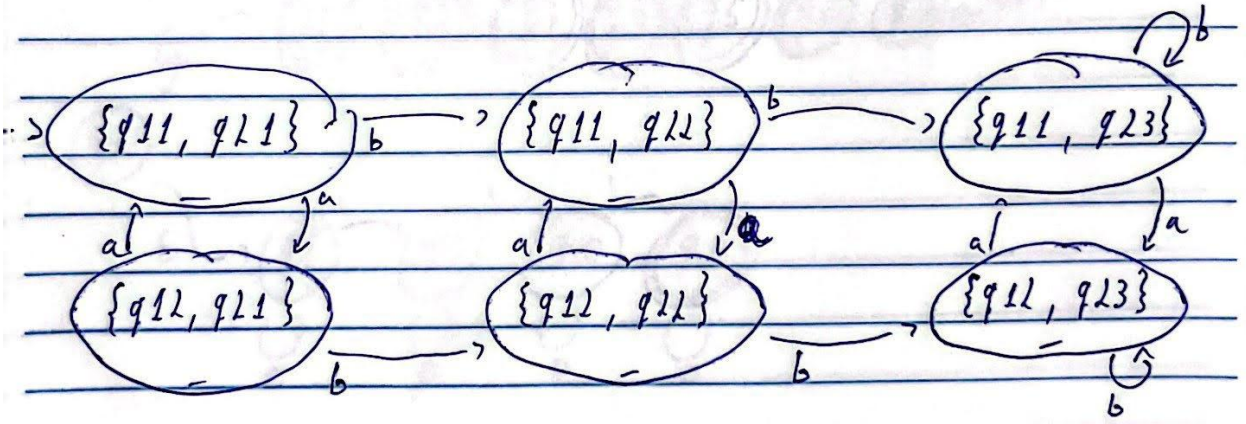
Q = {{q11, q21}, {q11, q12}, {q11, q23},
{q12, q21}, {q12, q22}, {q12, q23}}

Σ = {a, b}

δ = {({q11, q21}, a) → {q12, q21}, ({q11, q21}, b) → {q11, q22},
({q11, q22}, a) → {q12, q22}, ({q11, q22}, b) → {q11, q23},
({q11, q23}, a) → {q12, q23}, ({q11, q23}, b) → {q11, q23},
({q12, q21}, a) → {q11, q21}, ({q12, q21}, b) → {q12, q22},
({q12, q22}, a) → {q11, q22}, ({q12, q22}, b) → {q12, q23},
({q12, q23}, a) → {q11, q23}, ({q12, q23}, b) → {q12, q23}}

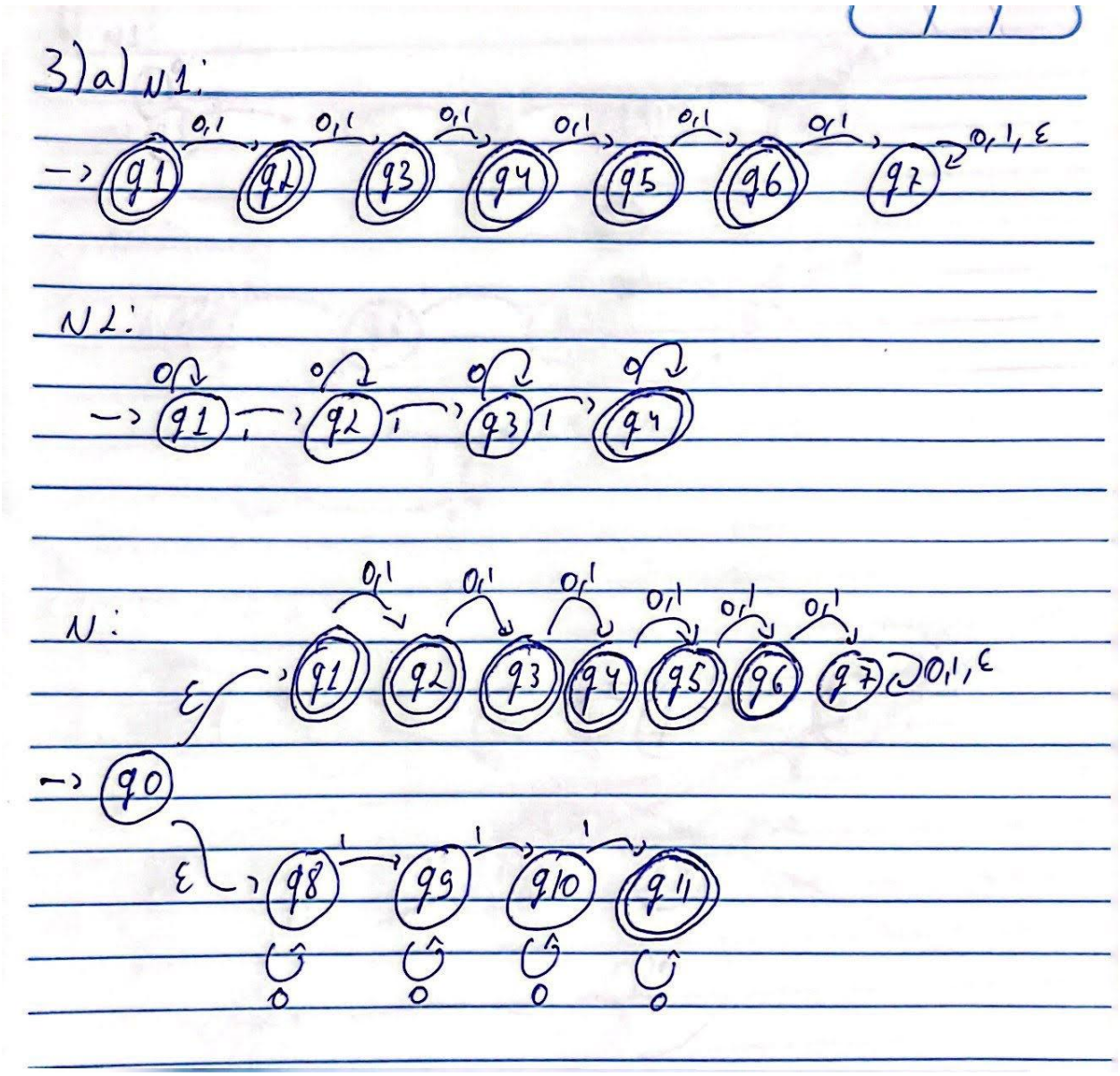
q_0 = {q11, q21}

F = {{q12, q21}, {q12, q22}, {q12, q23}, {q11, q21}, {q11, q21}}



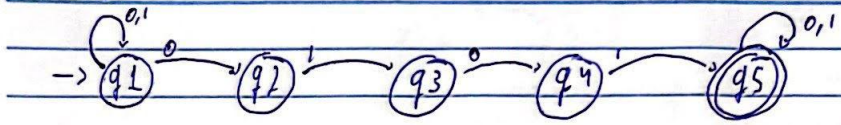
Questão 3

Letra A

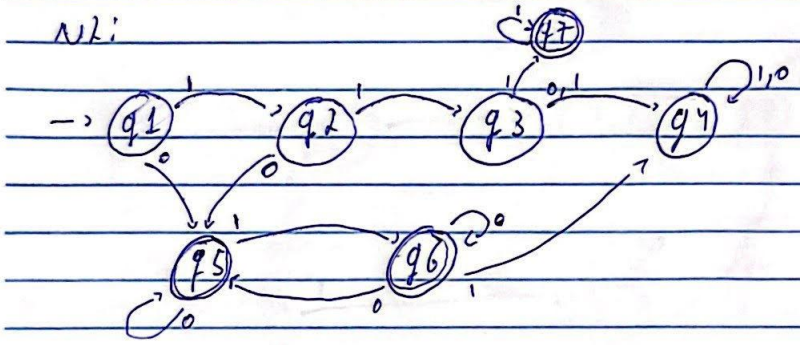


Letra B

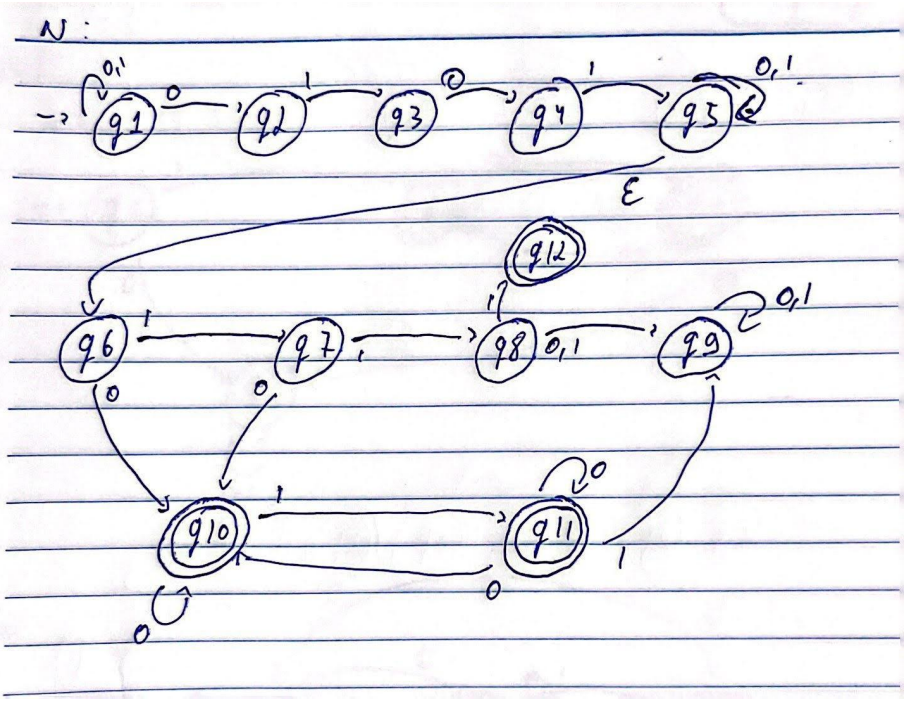
b) N1:



N2:



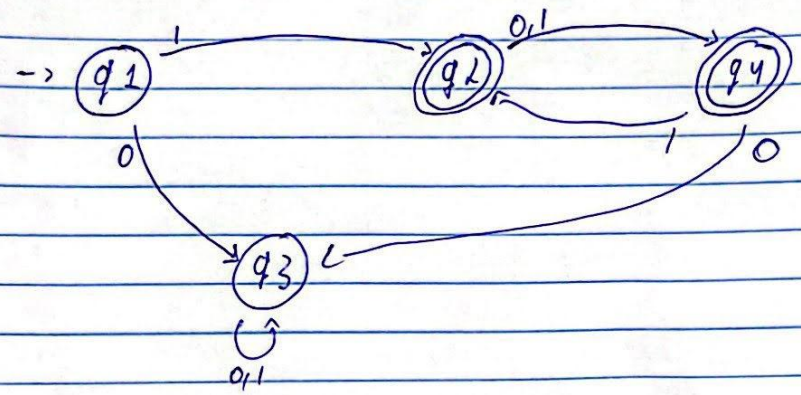
N:



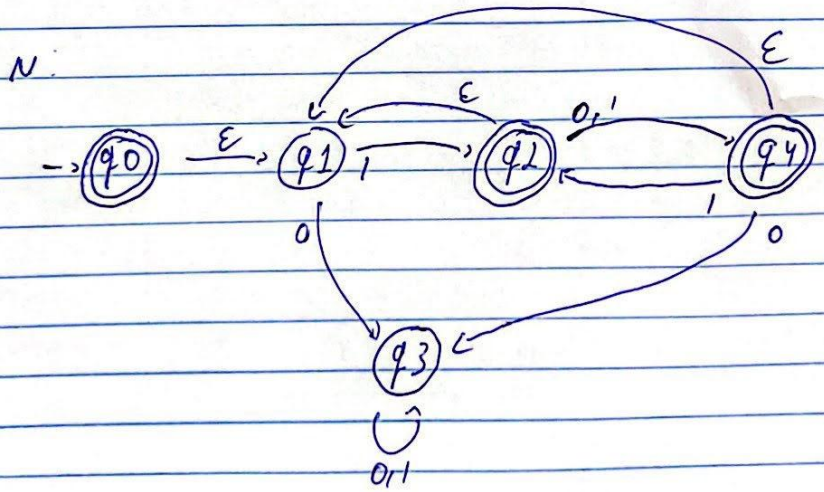
Letra C

3)c)

N1:



N:



Questão 4

4) $N = (\{q_1, q_2, q_3\}, \{a, b\}, \delta, q_1, \{q_2\})$

$\delta = \{(q_1, a) \to \{q_2, q_3\}, (q_1, b) \to \{q_3\}; (q_1, \varepsilon) \to \emptyset$
$(q_2, a) \to \{q_2\}, (q_2, b) \to \emptyset, (q_2, \varepsilon) \to \{q_2\}$
$(q_3, a) \to \emptyset, (q_3, b) \to \{q_2\} (q_3, \varepsilon) \to \emptyset$

$M =$

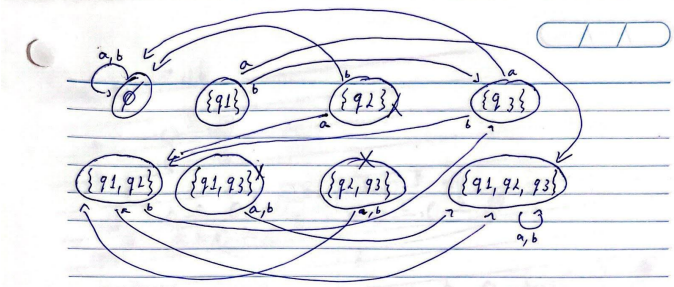
$Q = \{\emptyset, \{q_1\}, \{q_2\}, \{q_3\}, \{q_1, q_2\}, \{q_1, q_3\}, \{q_2, q_3\}, \{q_1, q_2, q_3\}\}$

$E(R):$

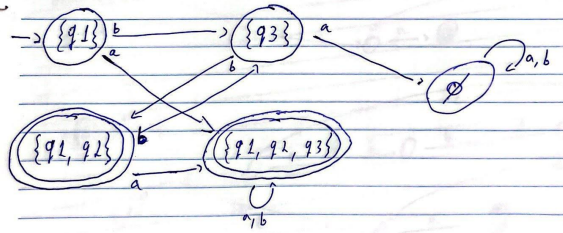
$E(\emptyset) = \emptyset$ $\quad E(\{q_1, q_2\}) = \{q_1, q_2\}$
$E(\{q_1\}) = \{q_1\}$ $\quad E(\{q_1, q_3\}) = \{q_1, q_3\}$
$E(\{q_2\}) = \{q_1, q_2\}$ $\quad E(\{q_2, q_3\}) = \{q_1, q_2, q_3\}$
$E(\{q_3\}) = \{q_3\}$ $\quad E(\{q_1, q_2, q_3\}) = \{q_1, q_2, q_3\}$

$\delta = \{(\emptyset, a) \to \emptyset, (\emptyset, b) \to \emptyset$
$(\{q_1\}, a) \to \{q_1, q_2, q_3\}, (\{q_1\}, b) \to \{q_3\},$
$(\{q_2\}, a) \to \{q_1, q_2\}, (\{q_2\}, b) \to \emptyset,$
$(\{q_3\}, a) \to \emptyset, (\{q_3\}, b) \to \{q_1, q_2\},$
$(\{q_1, q_2\}, a) \to \{q_1, q_2, q_3\}, (\{q_1, q_2\}, b) \to \{q_3\}$
$(\{q_1, q_3\}, a) \to \{q_1, q_2, q_3\}, (\{q_1, q_3\}, b) \to \{q_1, q_2, q_3\},$
$(\{q_2, q_3\}, a) \to \{q_1, q_2\}, (\{q_2, q_3\}, b) \to \{q_1, q_2\}$
$(\{q_1, q_2, q_3\}, a) \to \{q_1, q_2, q_3\}, (\{q_1, q_2, q_3\}, b) \to \{q_1, q_2, q_3\}\}$

$q_0 = E(q_1) = \{q_1\}$
$F = \{\{q_2\}, \{q_1, q_2\}, \{q_2, q_3\}, \{q_1, q_2, q_3\}\}$

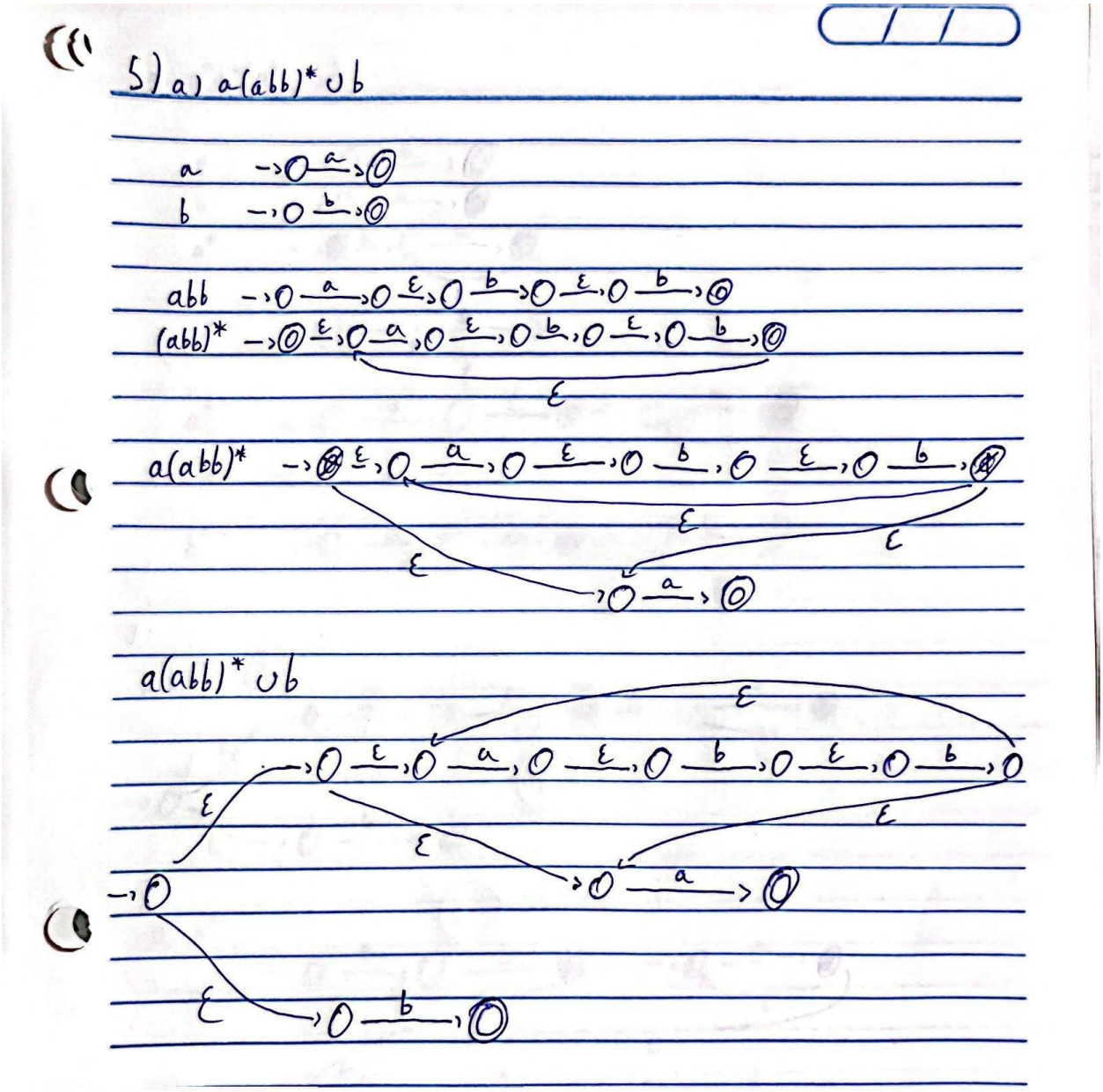


M:

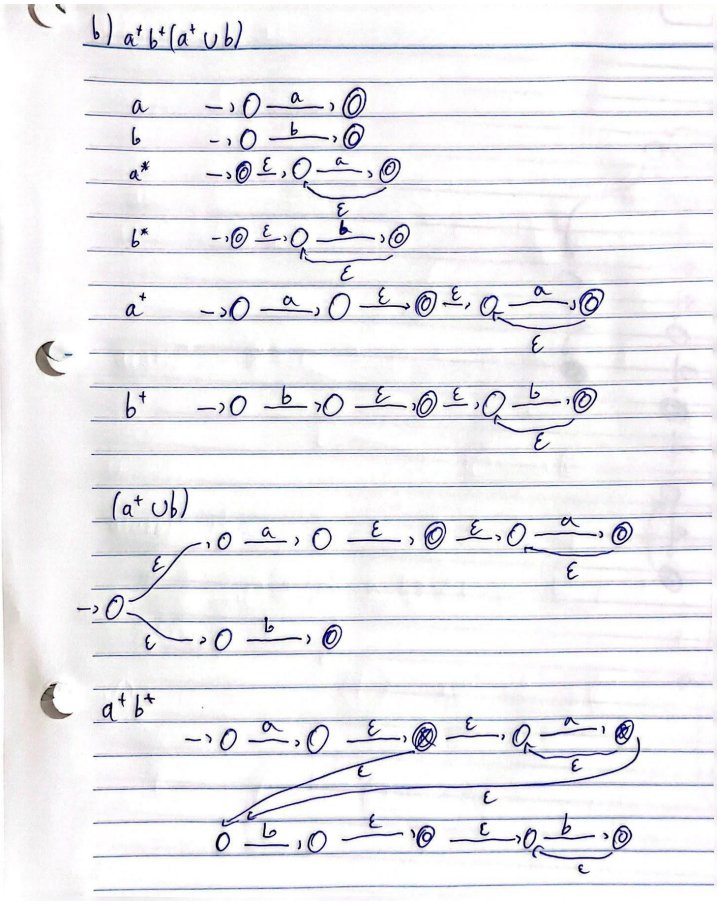


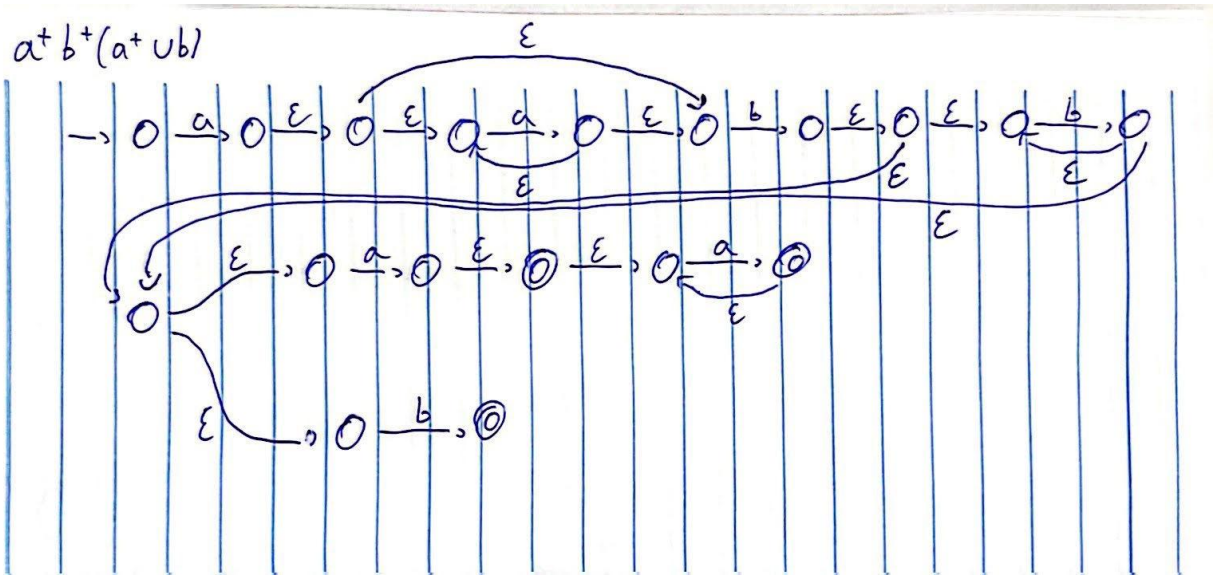
Questão 5

Letra A



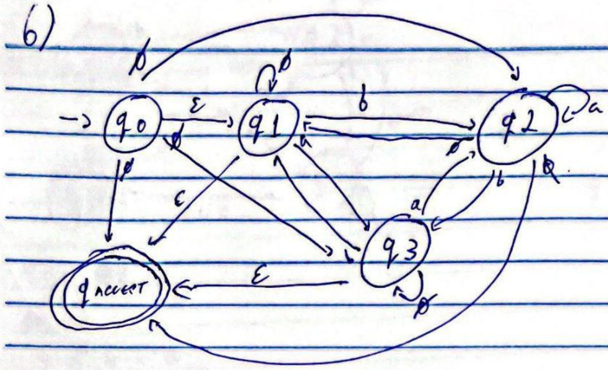
Letra B





Questão 6

6)



KILL Q1

q_0, q_2

$\varepsilon \cdot \emptyset^* \cdot b \cup \emptyset =$

b

q_0, q_3

$\varepsilon \cdot \emptyset^* \cdot a \cup \emptyset = a$

q_0, q_4

$\varepsilon \cdot \emptyset^* \cdot \varepsilon \cup \emptyset = \varepsilon$

q_2, q_2

$\emptyset \cdot \emptyset^* \cdot b \cup a$

a

q_2, q_3

$\emptyset \cdot \emptyset^* \cdot a \cup b$

b

q_2, q_4

$\emptyset \cdot \emptyset^* \cdot \varepsilon \cup \emptyset$

$\emptyset$

q_3, q_3

$b \cdot \emptyset^* \cdot a \cup \emptyset$

ba

q_3, q_2

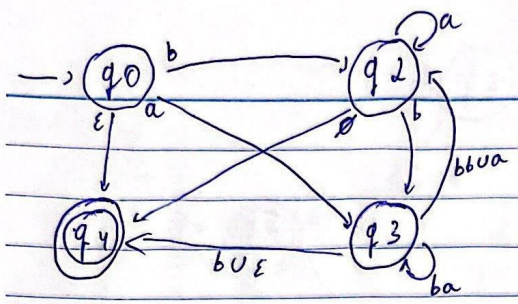
$b \cdot \emptyset^* \cdot b \cup a$

$bb \cup a$

q_3, q_4

$b \cdot \emptyset^* \cdot \varepsilon \cup \varepsilon$

$b \cup \varepsilon$



KILL q2

q0, q3

$b \cdot a^* \cdot b \cup a$

q0, q4

$\varepsilon \cup b \cdot a^* \cdot \emptyset$

ε

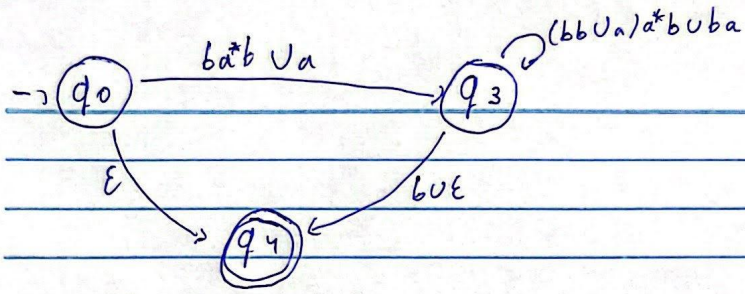
q3, q3

$(bb \cup a) \cdot a^* \cdot b \cup ba$

q3, q4

$(bb \cup a) \cdot a^* \cdot \emptyset \cup (\varepsilon \cup q)$

$\varepsilon \cup q$



KILL Q3:

q0, q4

$(ba^*b \cup a)((bb \cup a)a^*b \cup ba)^*(b \cup \varepsilon) \cup \varepsilon \cup (\varepsilon \cup q)$

q0 → q4 : $(ba^*b \cup a)((bb \cup a)a^*b \cup ba)^*(b \cup \varepsilon) \cup \varepsilon \cup (\varepsilon \cup q)$