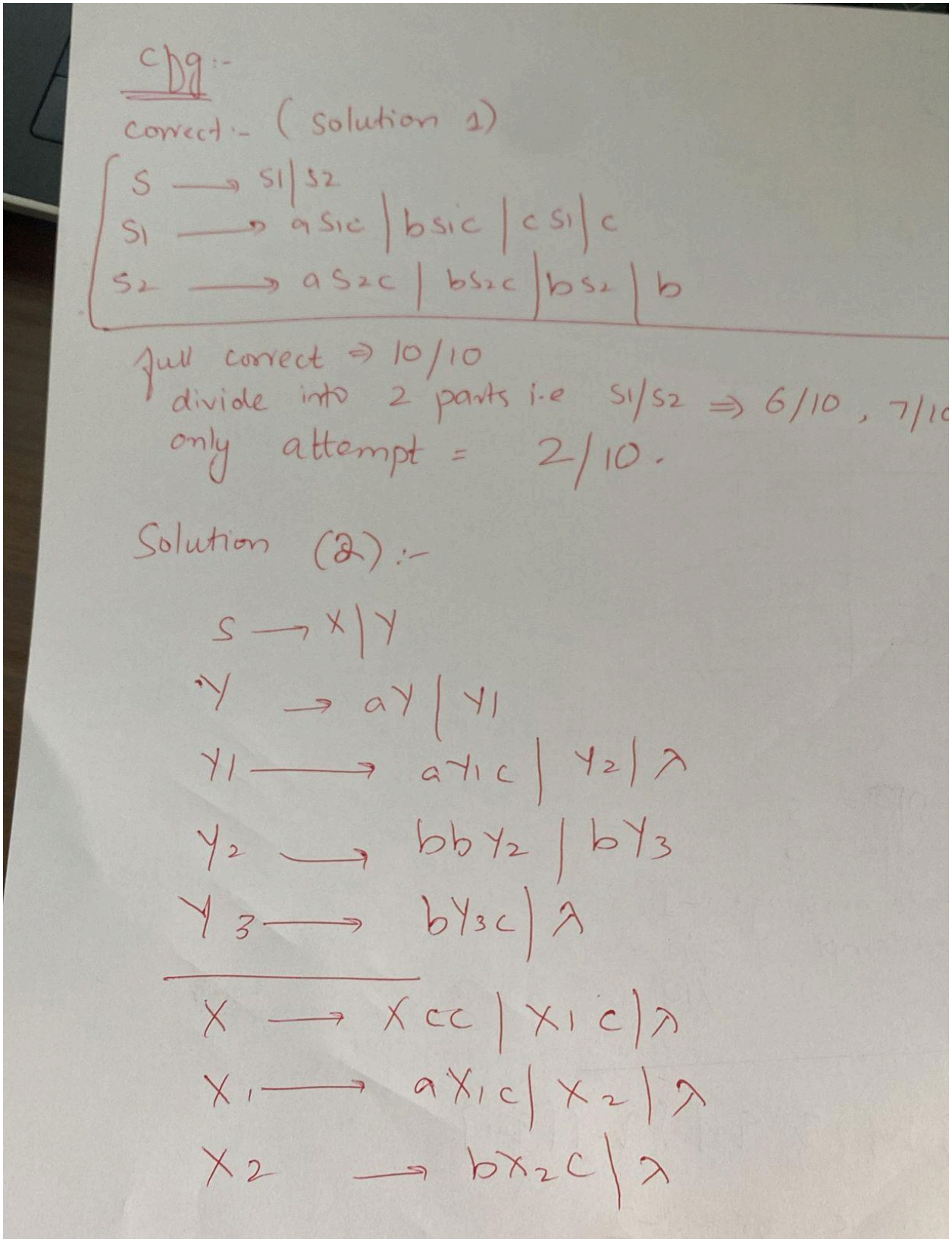
Question 1



CDg :-

Correct :- (Solution 1)

$S \longrightarrow S_1 | S_2$

$S_1 \longrightarrow aS_1c \mid bS_1c \mid cS_1 \mid c$

$S_2 \longrightarrow aS_2c \mid bS_2c \mid bS_2 \mid b$

full correct ⇒ 10/10

divide into 2 parts i.e S_1/S_2 ⇒ 6/10 , 7/10

only attempt = 2/10.

Solution (2) :-

$S \longrightarrow X | Y$

$Y \longrightarrow aY \mid Y_1$

$Y_1 \longrightarrow aY_1c \mid Y_2 \mid \lambda$

$Y_2 \longrightarrow bbY_2 \mid bY_3$

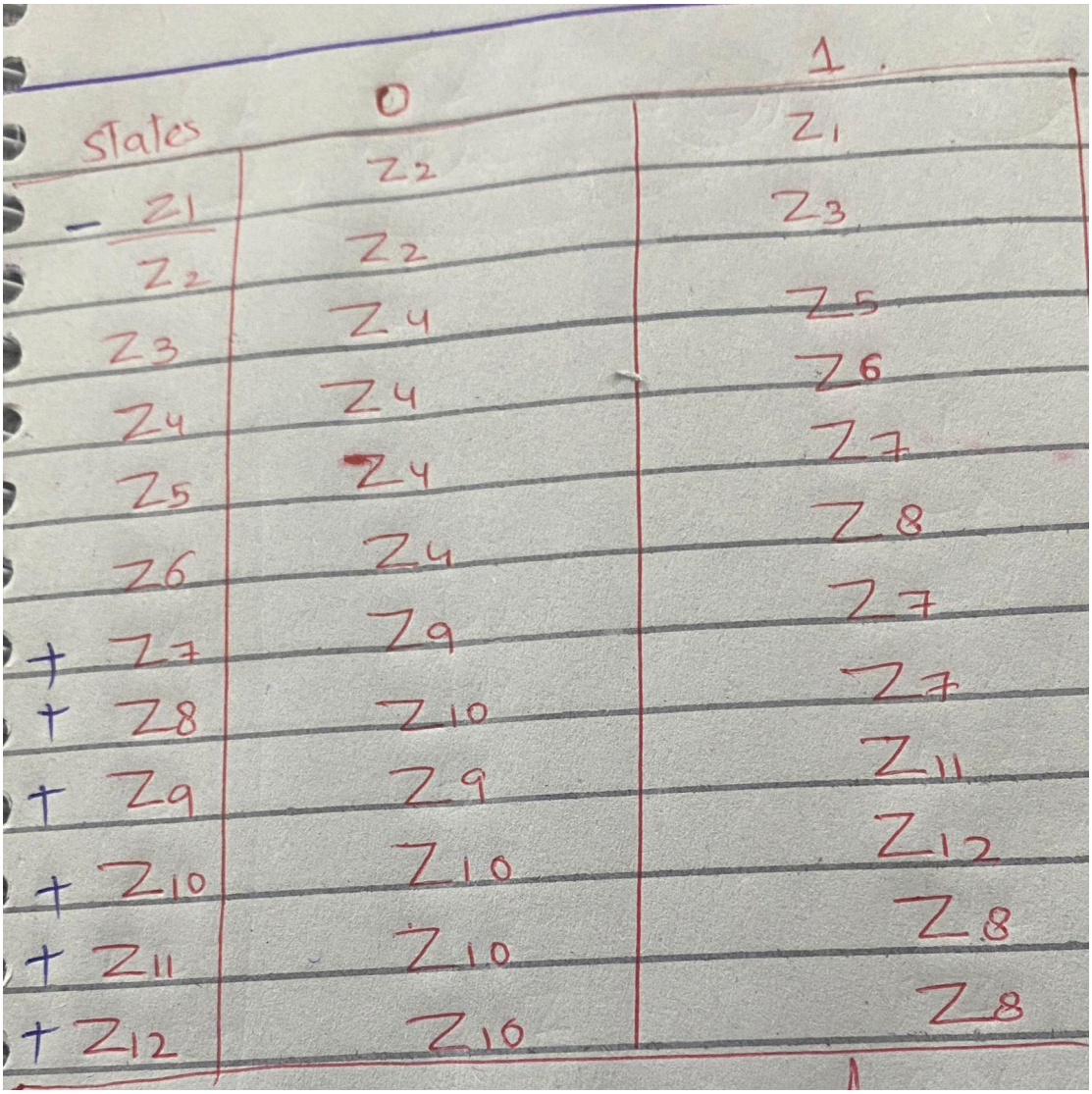
$Y_3 \longrightarrow bY_3c \mid \lambda$

$X \longrightarrow Xcc \mid X_1c \mid \lambda$

$X_1 \longrightarrow aX_1c \mid X_2 \mid \lambda$

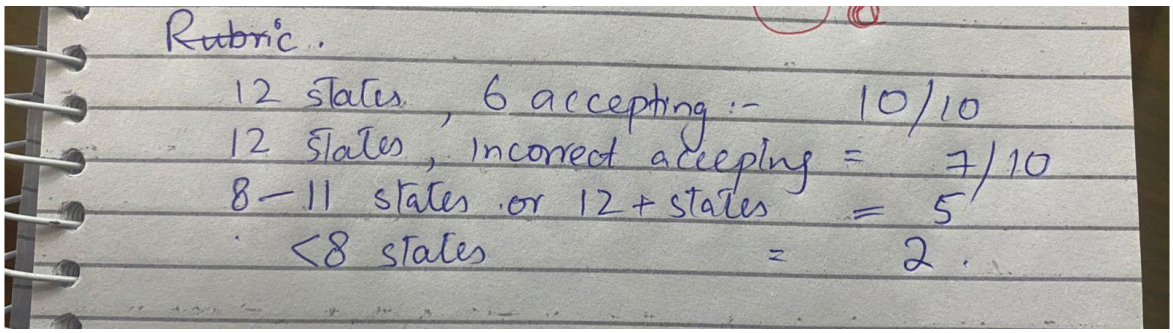
$X_2 \longrightarrow bX_2c \mid \lambda$

Rubric
Question 2



States	0	1
→ Z_1	Z_2	Z_1
Z_2	Z_2	Z_3
Z_3	Z_4	Z_5
Z_4	Z_4	Z_6
Z_5	Z_4	Z_7
Z_6	Z_4	Z_8
† Z_7	Z_9	Z_7
† Z_8	Z_{10}	Z_7
† Z_9	Z_9	Z_{11}
† Z_{10}	Z_{10}	Z_{12}
† Z_{11}	Z_{10}	Z_8
† Z_{12}	Z_{10}	Z_8

Solution :
Rubric :



Question 3

ε nfa - nfa

	0	1
A	{A,B,C,D}	ϕ
B	{C,D}	ϕ
C	ϕ	{B,D}
D	D ϕ	ϕ

nfa to dfa :-

A	0	1
A	ABCD	ϕ dead
ABCD	ABCD	BD
BD	CD	dead
CD	D	BD
D	D	dead
dead	dad	dead

Rubric :-

enfa to nfa = 5
nfa to dfa = 5
dead state missing = -1
only attempt = 2/10 or 3/10.

Question 4

Q:4

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

not remove q_5 = -2

only attempt = 2/5

Question 5

Q5. $(ab)^k a^k$

3 rules:

① xy^iz where $i>0$ must be in L.

② $|y| > 0$ → size of part y ~~cannot~~ must be greater than 0.

③ $|xy| <= p$ → length of x and y combined should be less than the string being tested.

$(ab)^k a^k$ assume $k=3$

ababaaaa

x y z

x: ab, y: aba, z: baaa

10

test xy^2z:

ab(aba)(aba)aaa : ~~ababaabaaaa~~ ababaababaaa

2as between bs → not valid

$(ab)^2 a (ab)^2 a^2$ ∴ does not fit L therefore the language is irregular.