

Subset Method

Part 3 -

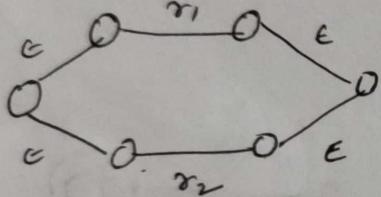
122
123
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128

Step 1 → Construct NFA with ϵ for given RE.

- ✓ Step 2 → Convert NFA with ϵ to NFA without ϵ .
- ✓ Step 3 → Convert NFA to DFA.

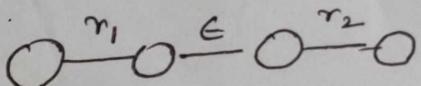
Union case

$$r_1 + r_2$$



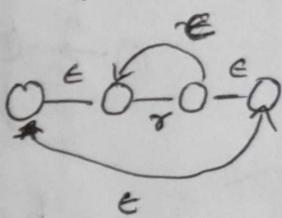
Concatenation

$$r_1 \cdot r_2$$



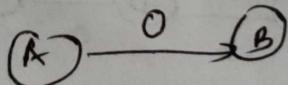
Closure

$$r_1^*$$

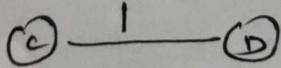


eg. $(0+1)^*$

$$0 \rightarrow$$

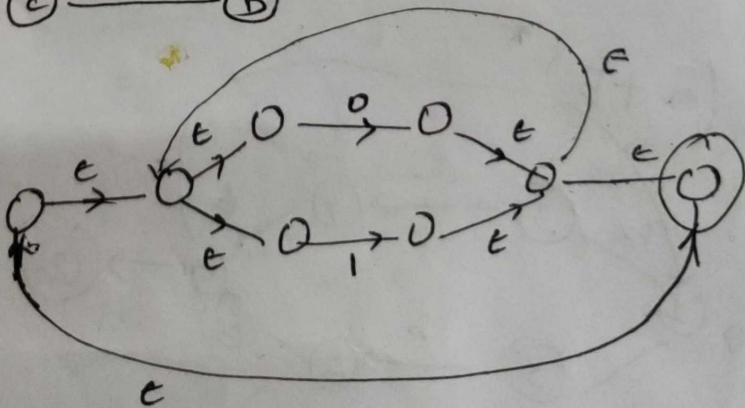


$$1$$



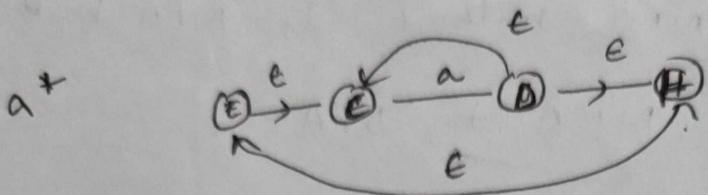
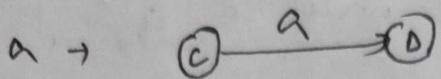
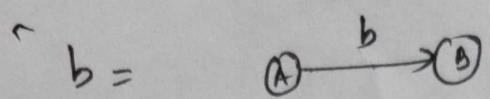
$$0+1$$

Union =

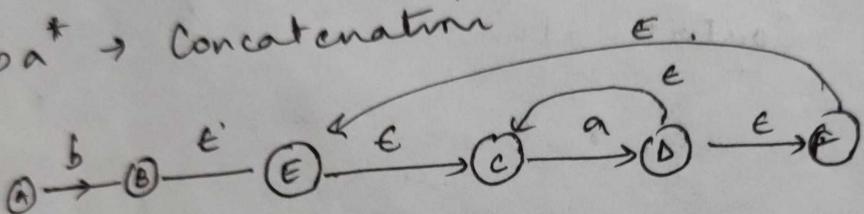


Q.

$$b + ba^*$$

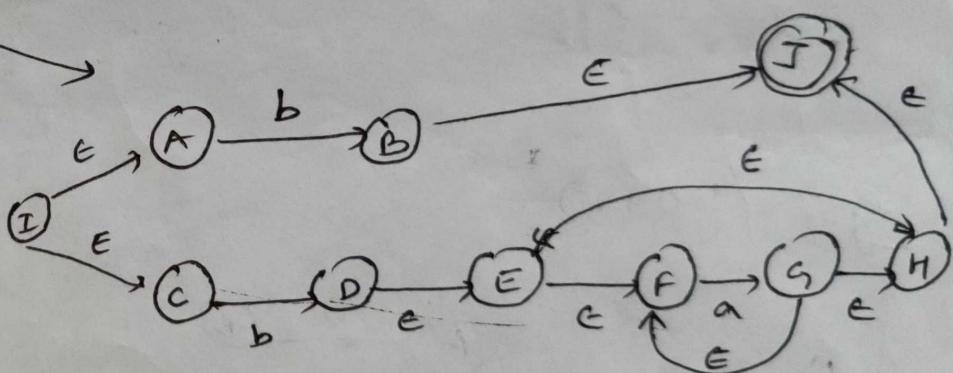
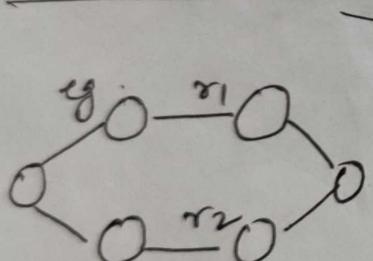


$ba^* \rightarrow$ Concatenation



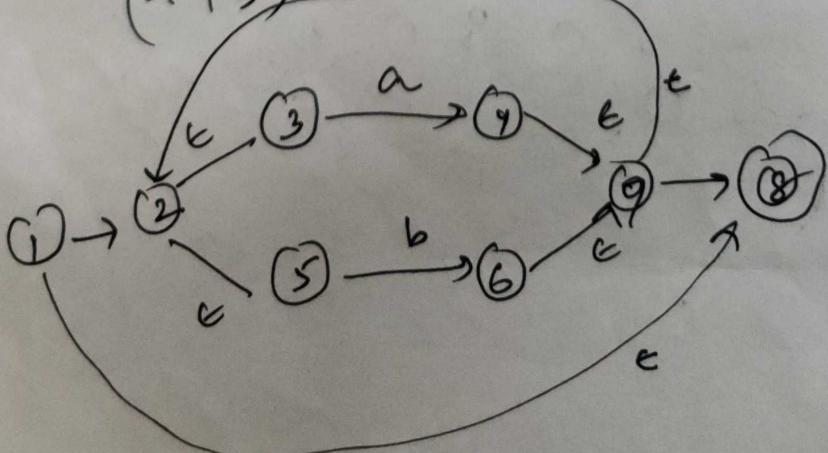
$b + ba^*$

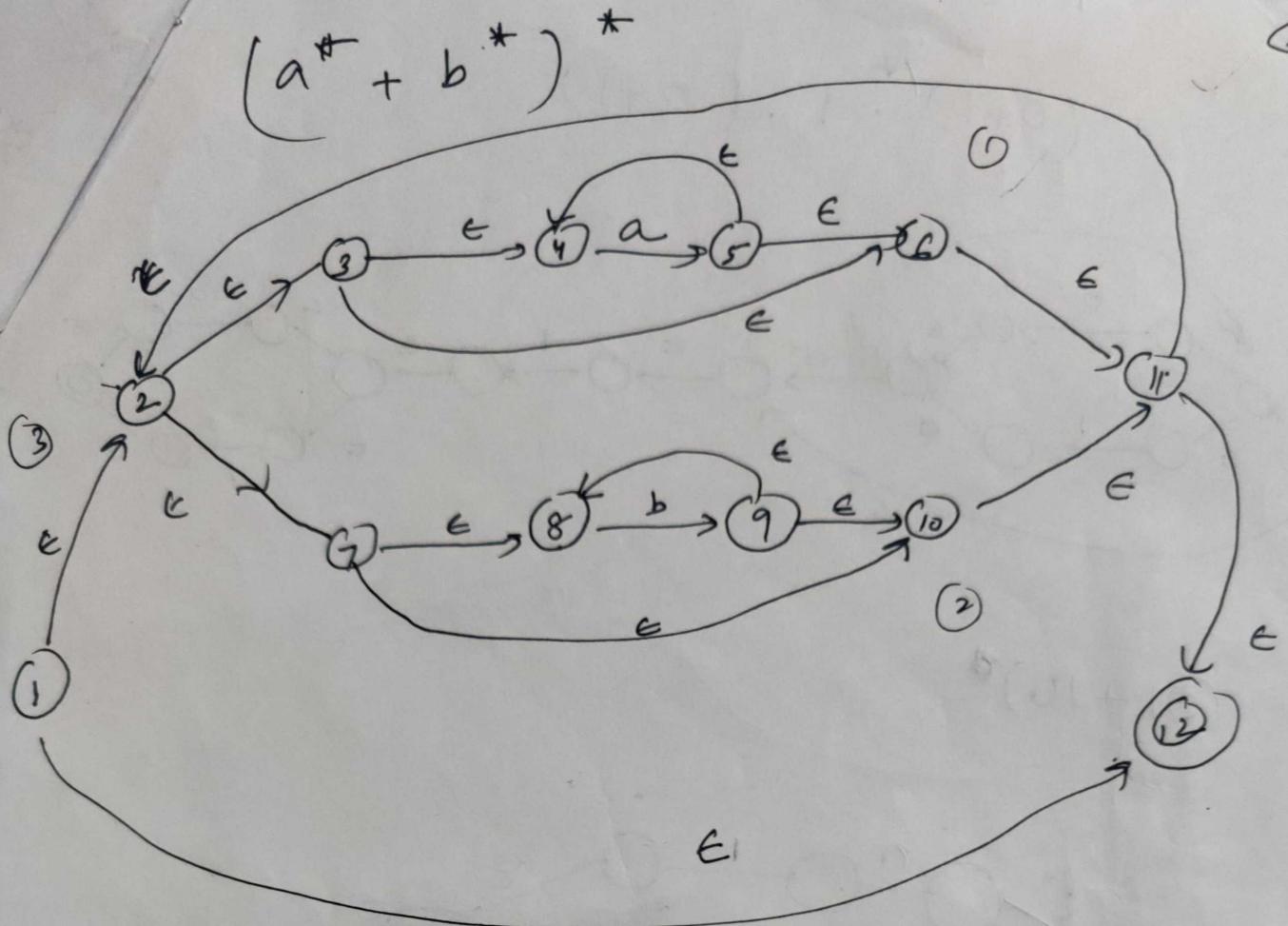
Union:



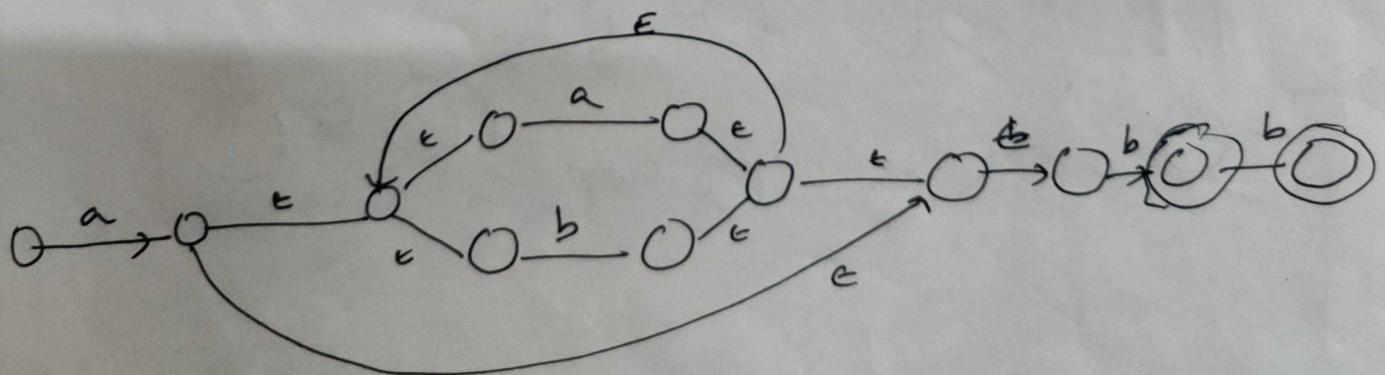
Q.

$(a+b)^*$





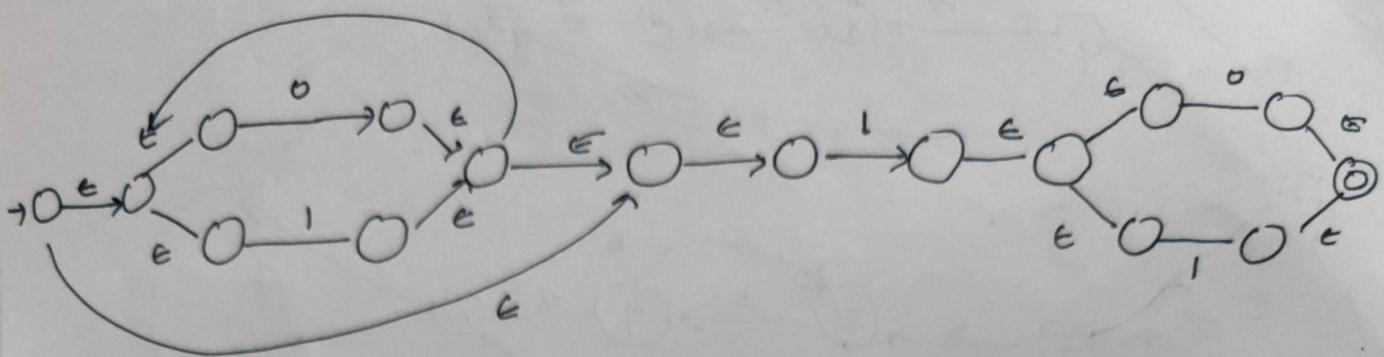
$R = (aa^* + bb^*)^*$
 $a \cdot (a+b)^* \cdot b \cdot b$



Q.

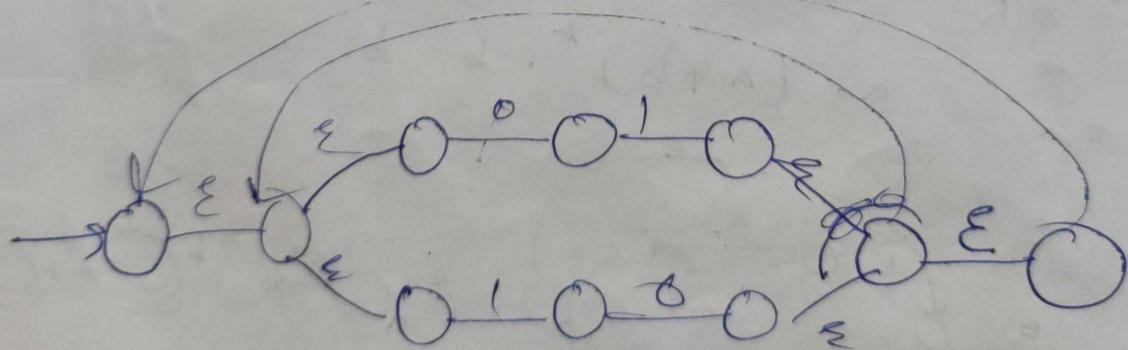
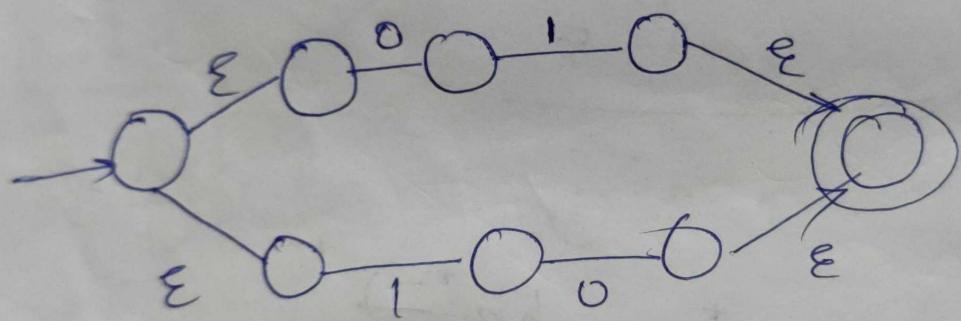
$$(0+1)^+ \cdot 1 \cdot (0+1)$$

$$f_A f_B \\ R = R_1 + \\ R_1 = b \\ R_2 = b$$



Q.

$$(01+10)^+$$



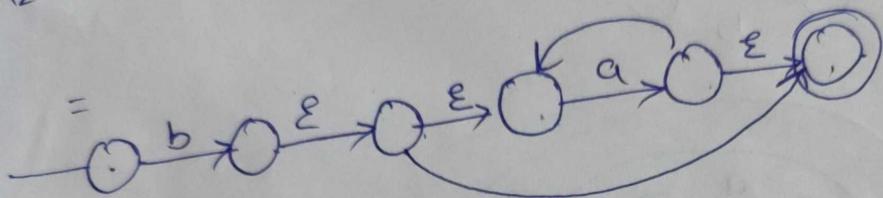
DFA for R^E $b + ba^*$

$$R = R_1 + R_2$$

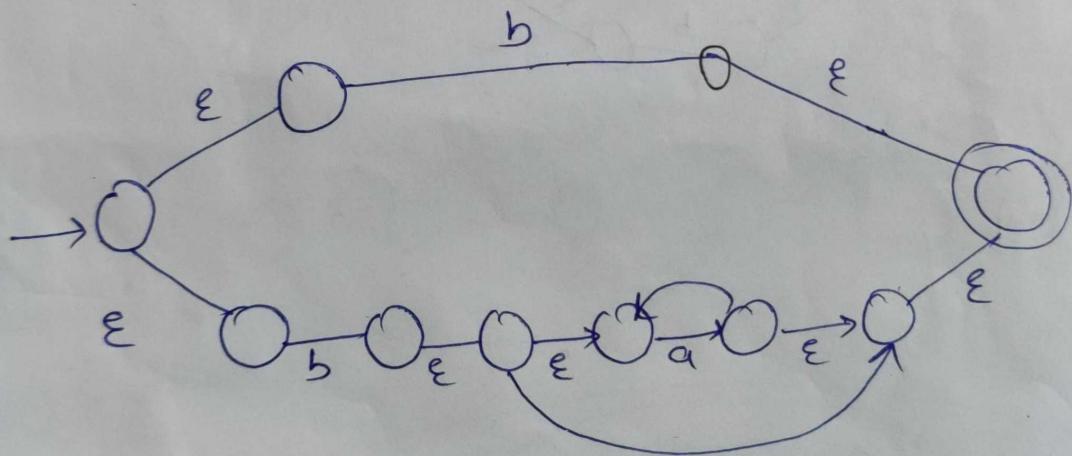
$$R_1 = b$$

$$R_2 = ba^*$$

$$R_2 = ba^*$$



$$R = R_1 + R_2$$



Q2
a(a+b)*ab.

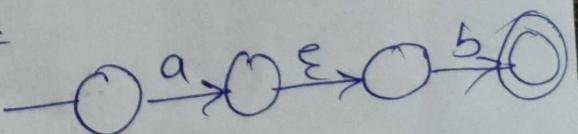
$$R = R_1 R_2 R_3$$

$$R_1 = a$$

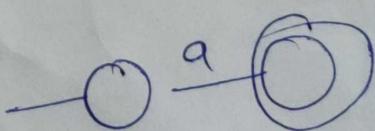
$$R_2 = (a+b)^*$$

$$R_3 = ab$$

$$R_3 =$$



$$R_1$$

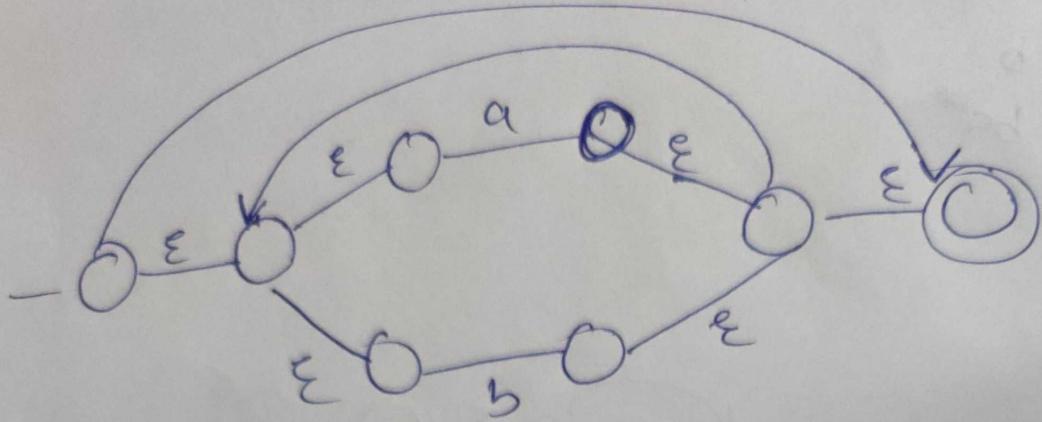


$$n_2 = (a+b)^{-1}$$

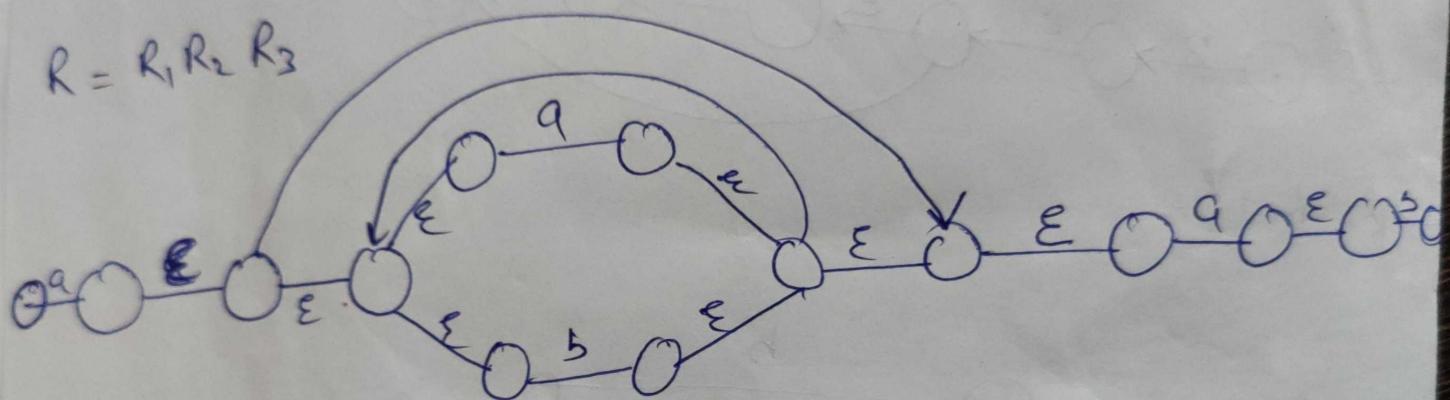
$\oplus \parallel$

R^{ϵ}

R''



$$R = R_1 R_2 R_3$$



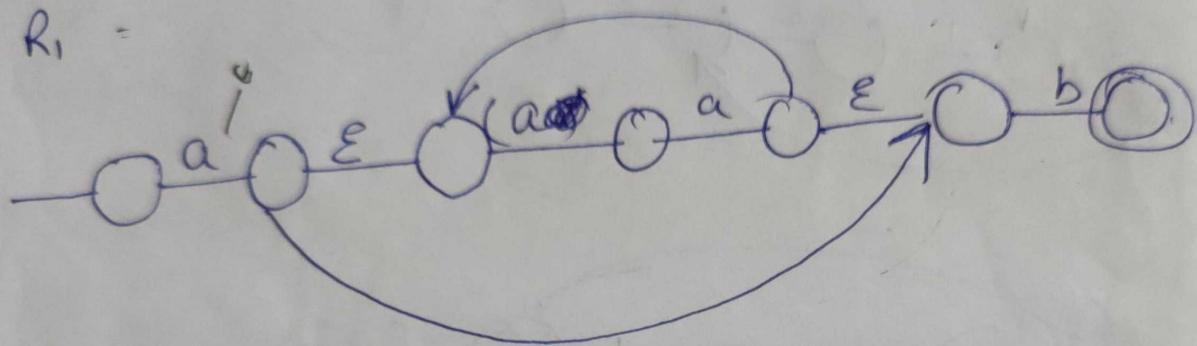
$$RE = (a(aa)^*b + ab^*a)^*$$

$$R = (R_1 + R_2)^*$$

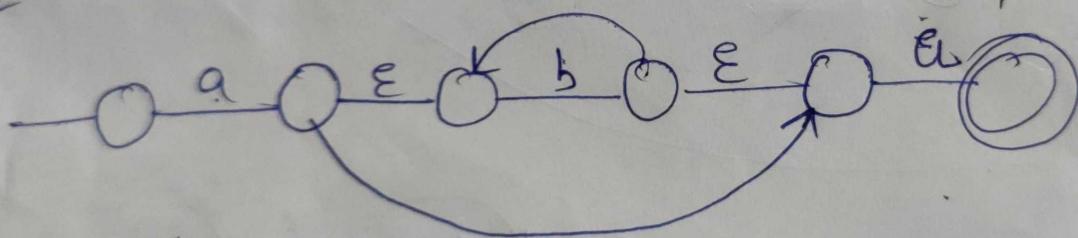
$$R_1 = a:(aa)^*.b$$

$$R_2 = ab^*a$$

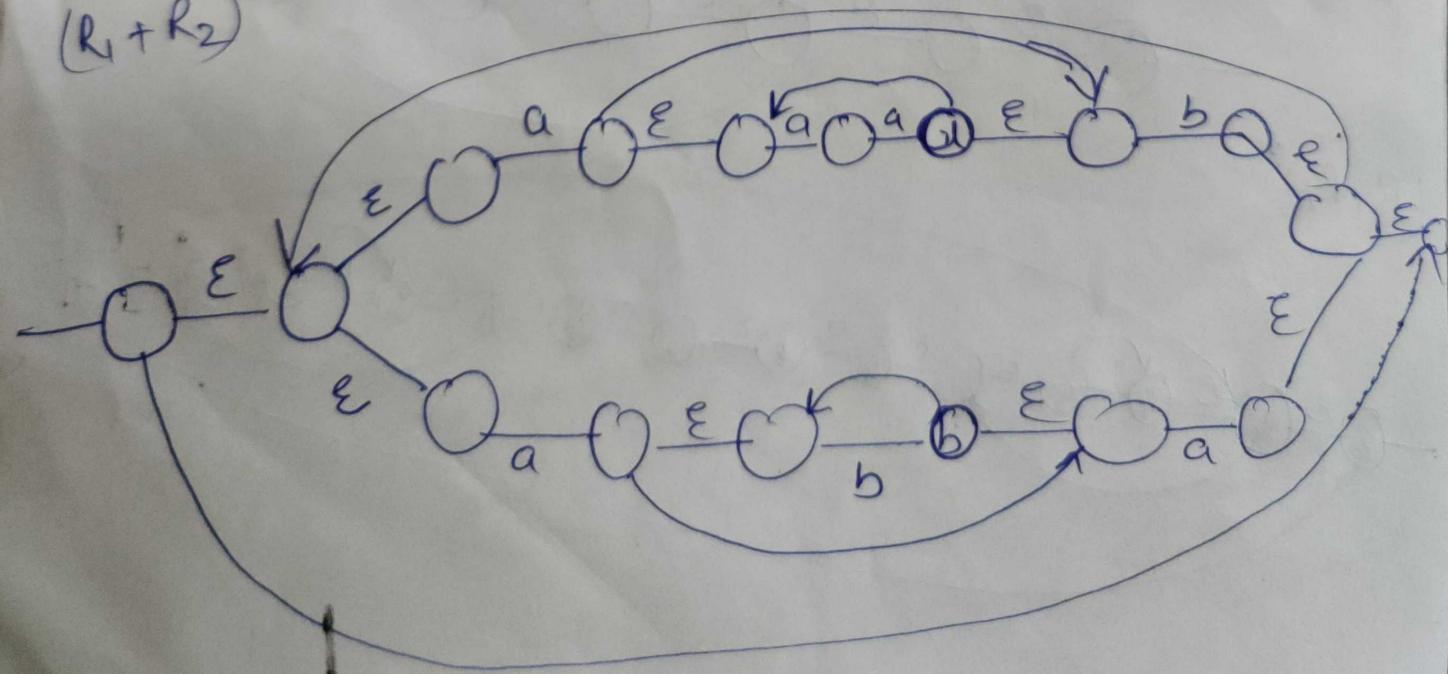
R_1



R_2



$(R_1 + R_2)^*$



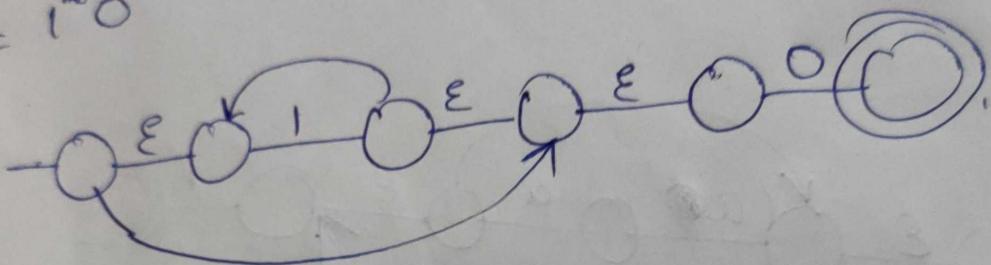
$$Q = ((1^* 0) \ 01^*)^* \quad ((1^* 0) \ 01^*)^*$$

$$R = (R_1, R_2)$$

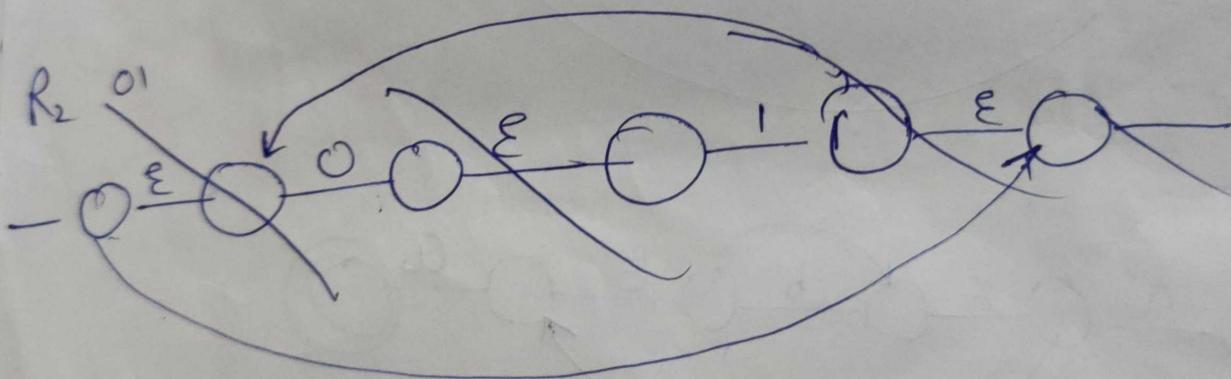
$$R_1 = (1^* 0)^*$$

$$R_2 = (01^*)^*$$

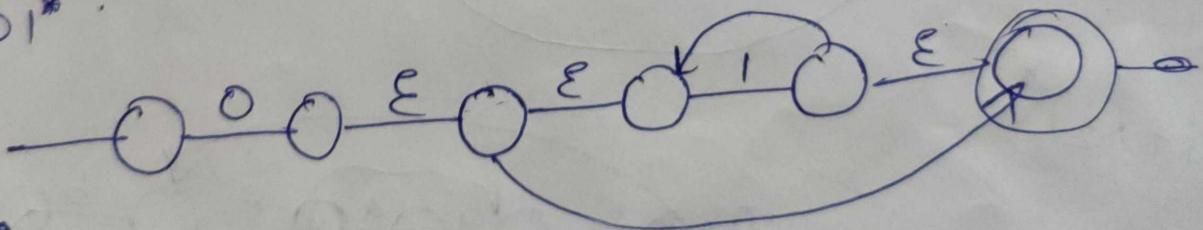
$$R_1 = 1^* 0$$



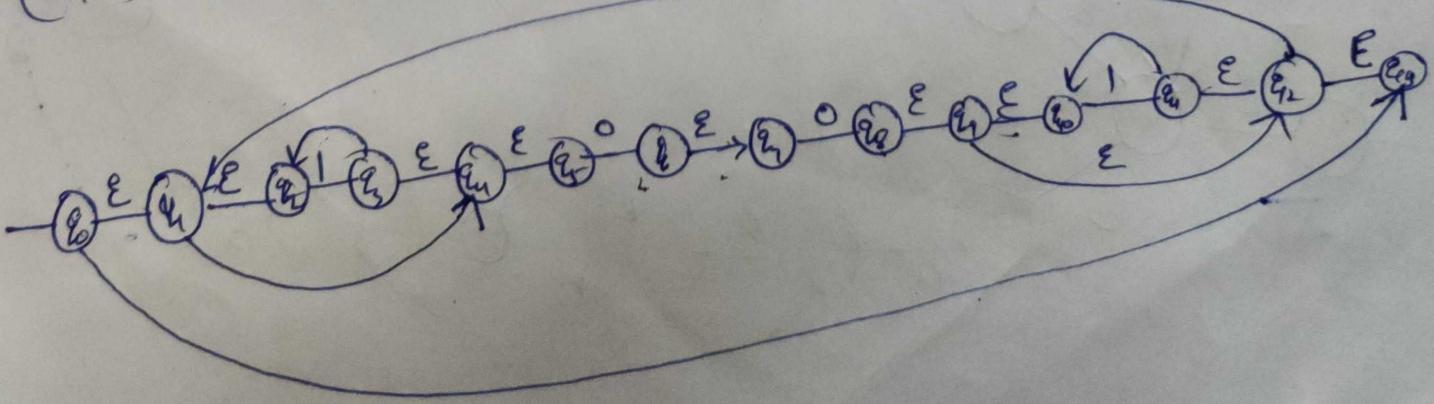
$$R_2 = 01^*$$



$$R_2 = 01^*$$



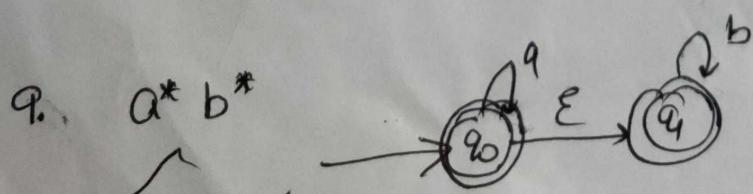
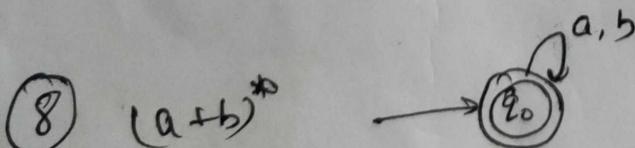
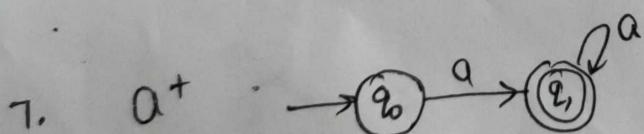
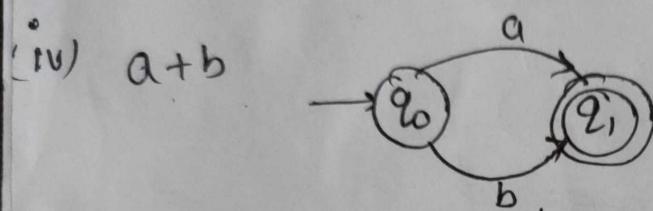
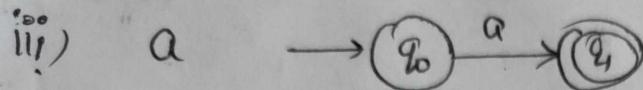
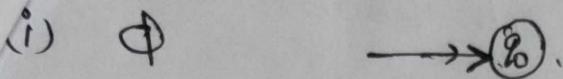
$$(R_1, R_2)^*$$



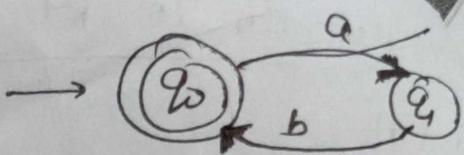
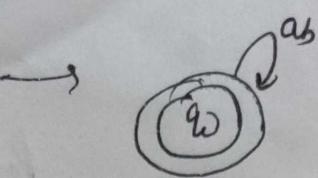
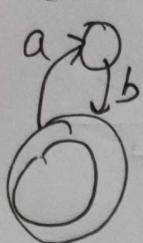
to Automata to RE

ϵ to FA

Part 3 -



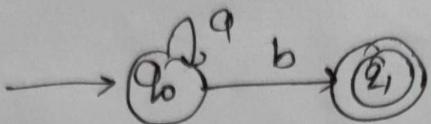
10. $(ab)^*$



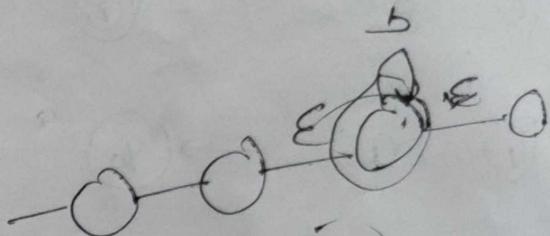
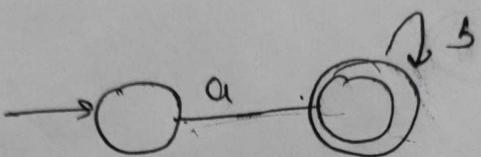
two synon on any
transition not possible

ab abab abab

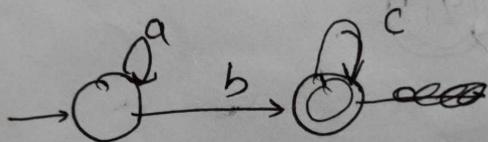
11. $a^* b$



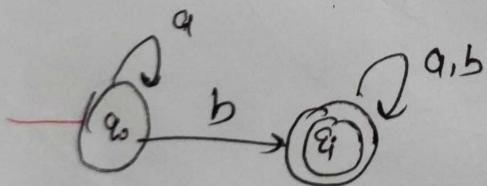
12. ab^*



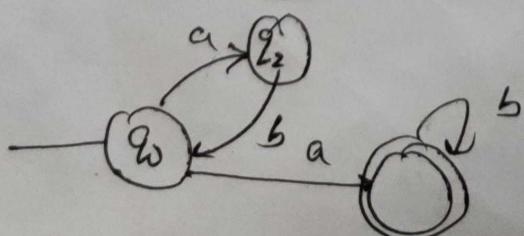
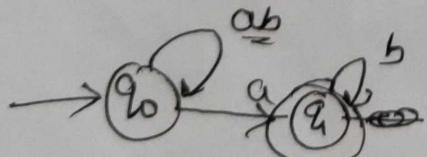
13. abc^*



14. $a^* b (a+b)^*$

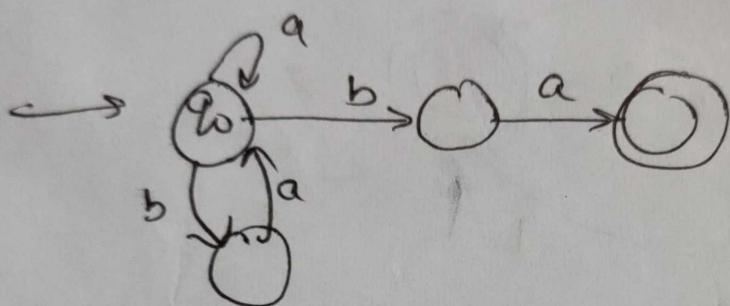
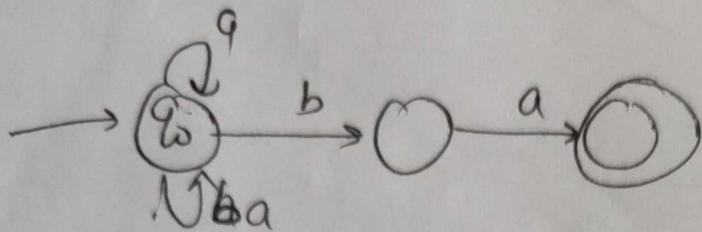
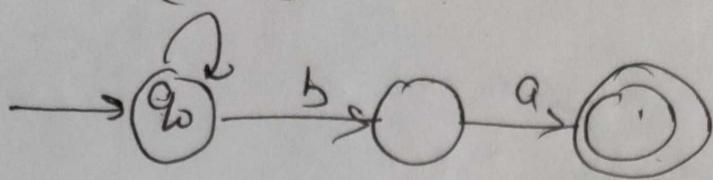


15. $(ab)^* ab^*$

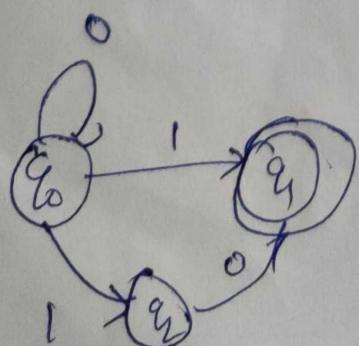
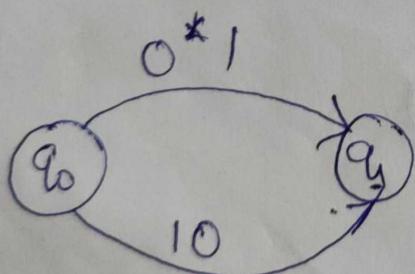


$(a+ba)^* ba$

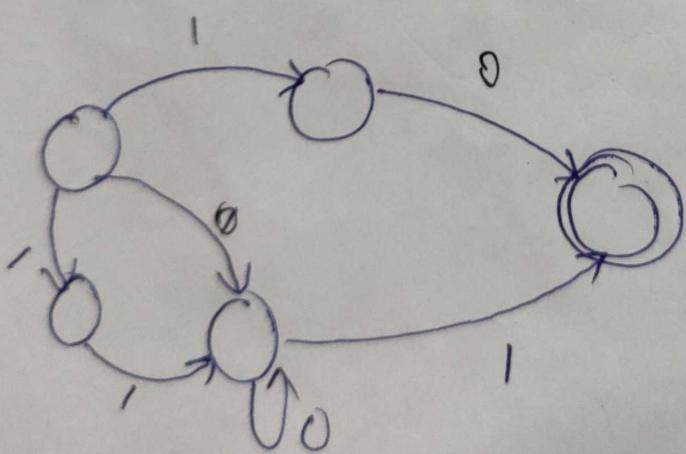
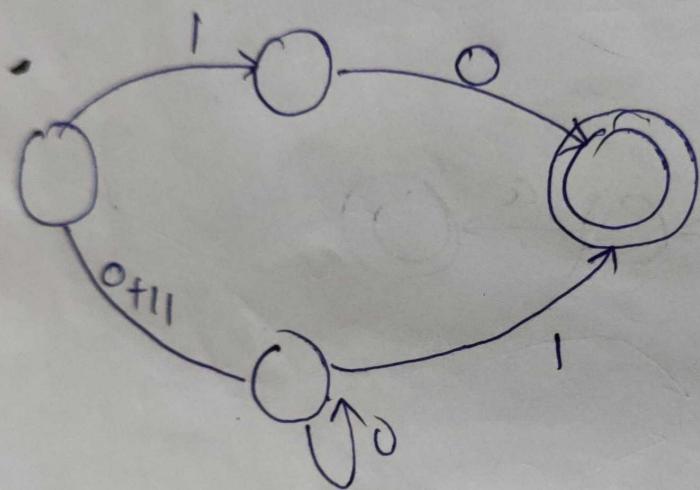
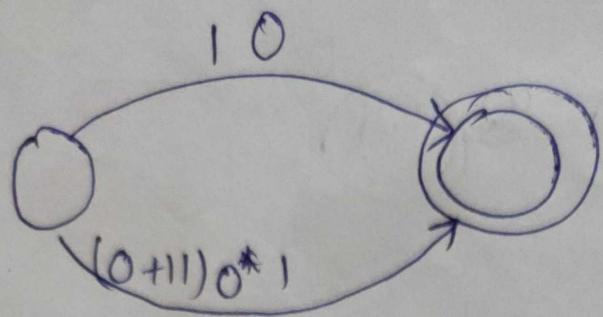
$(a+ba)^*$

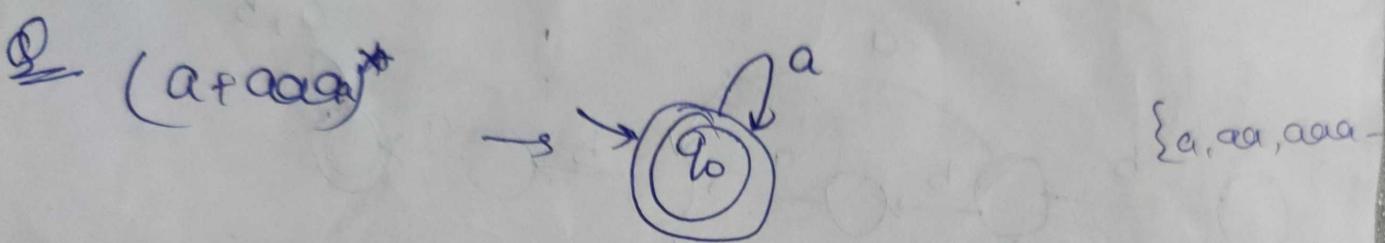
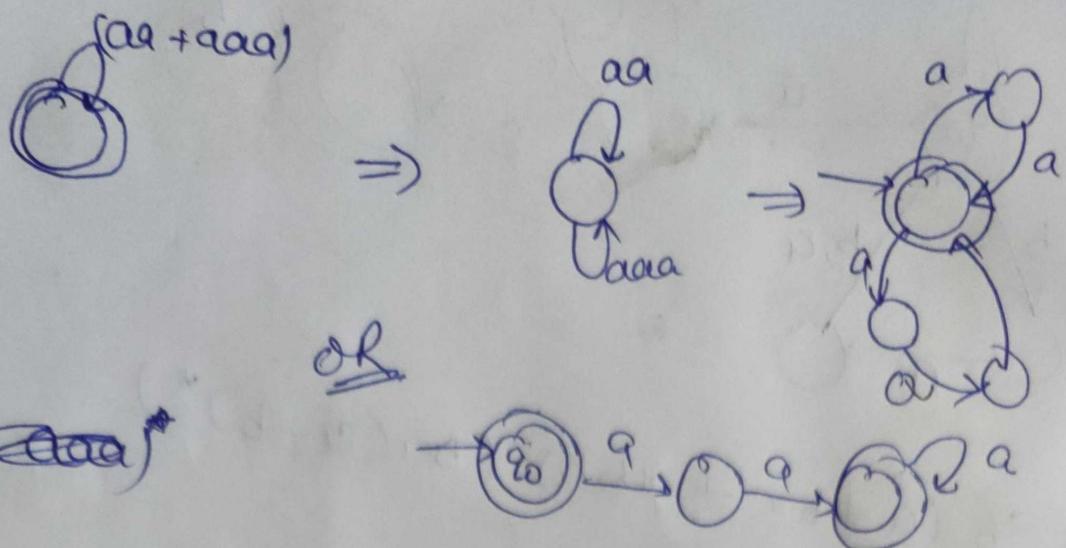


17 $O^* I + 10$

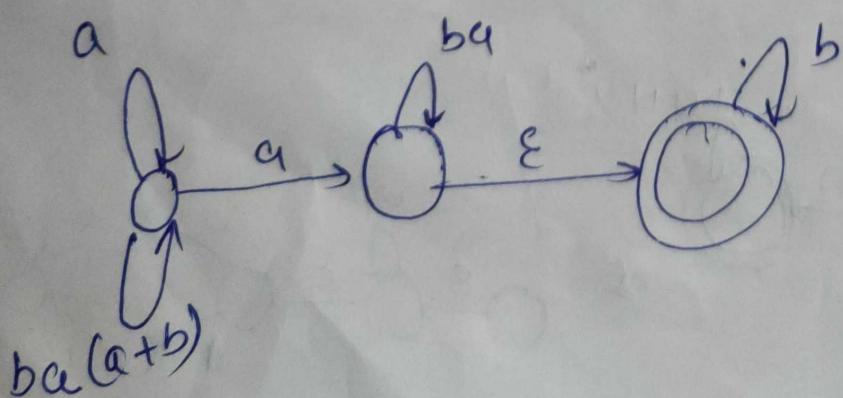
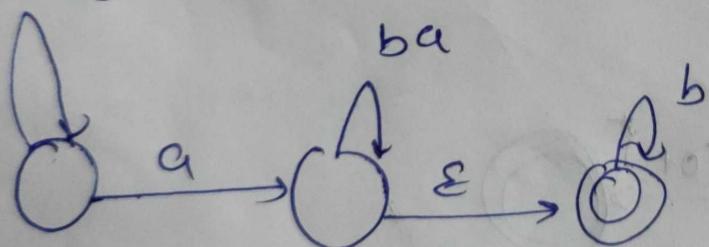


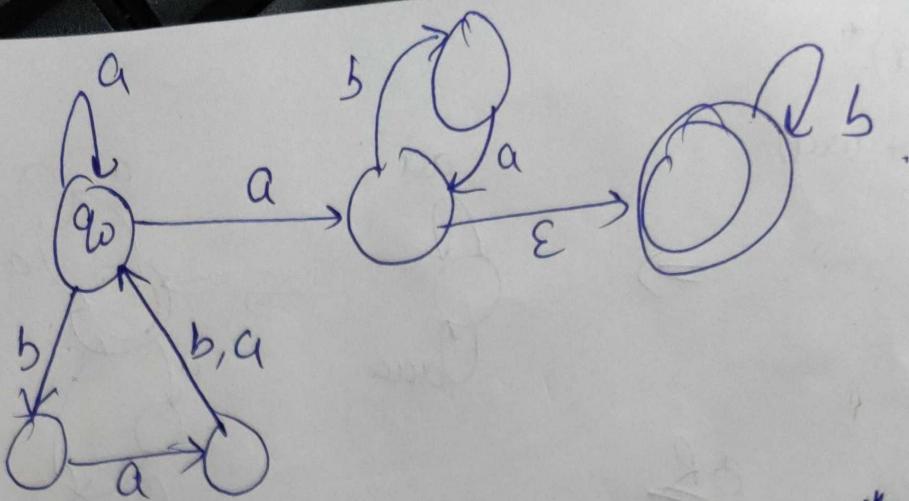
Q $10 + (0+11)0^*$)



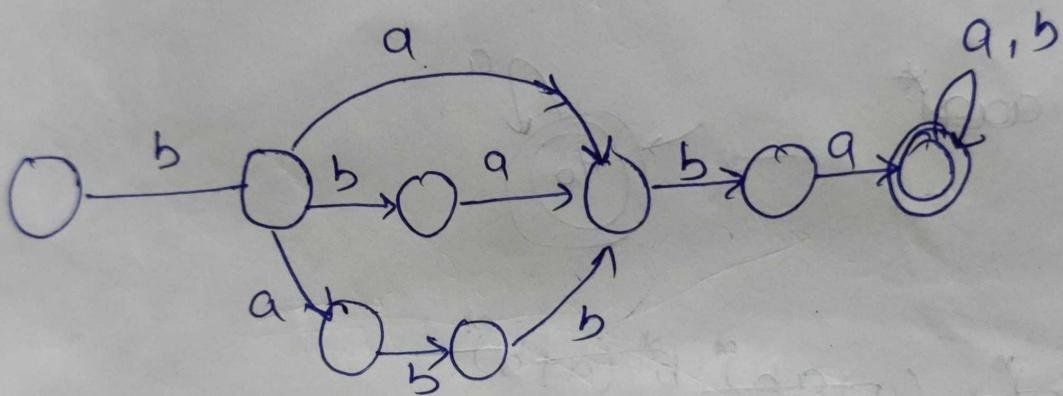


$\underline{Q} \quad \cancel{(ab)^* + (a+ab)^* b^* (a+b)^*}$
 $[a + (ba(a+b))]^* a(baw)^* b^*$
 $a + [ba(a+b)]$

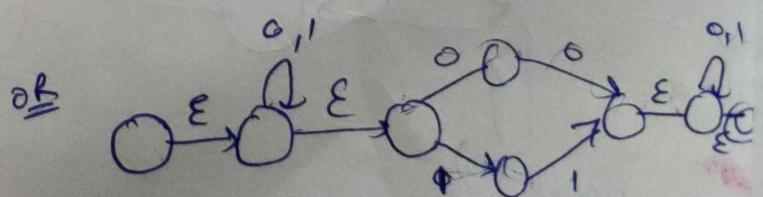
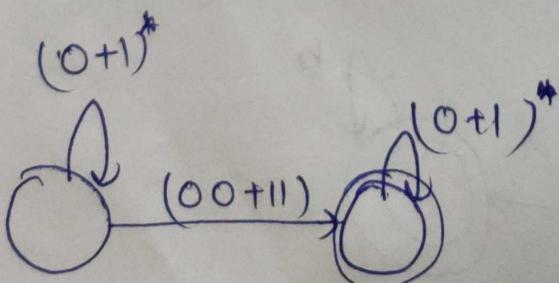
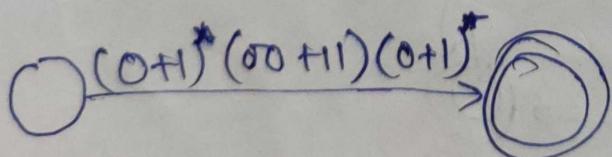


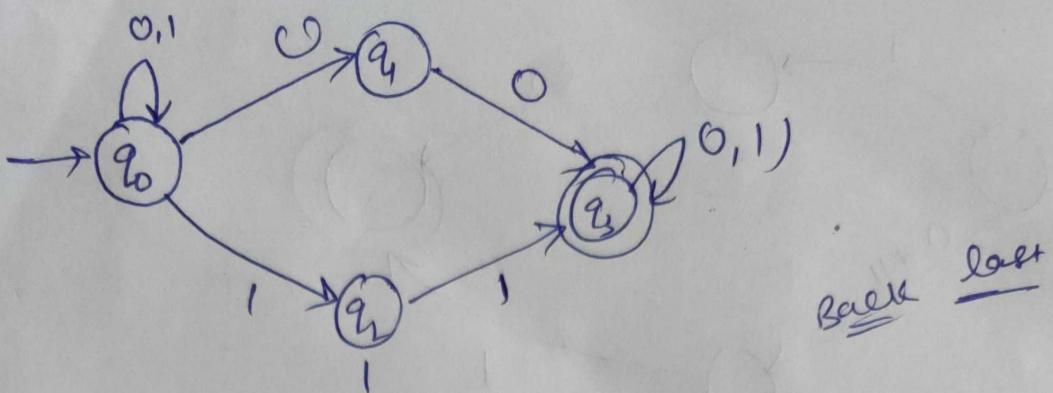


② $\neg b(a + ba + ab) (ba(a+b))^*$

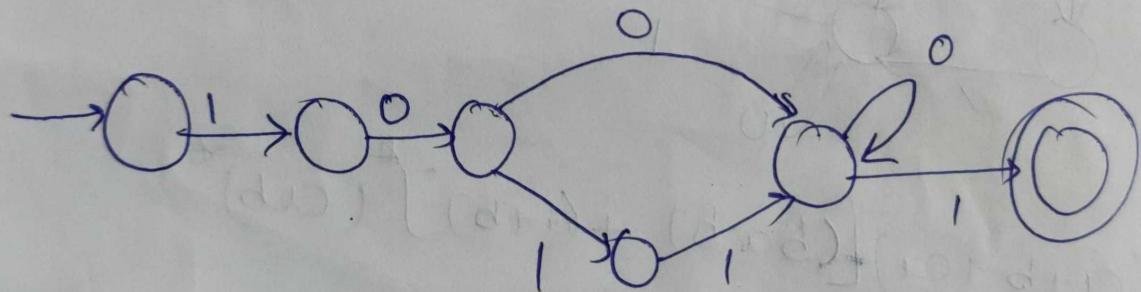
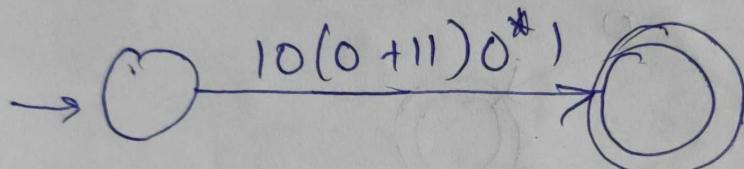


③ $(0+1)^*(00+11)(0+1)^*$

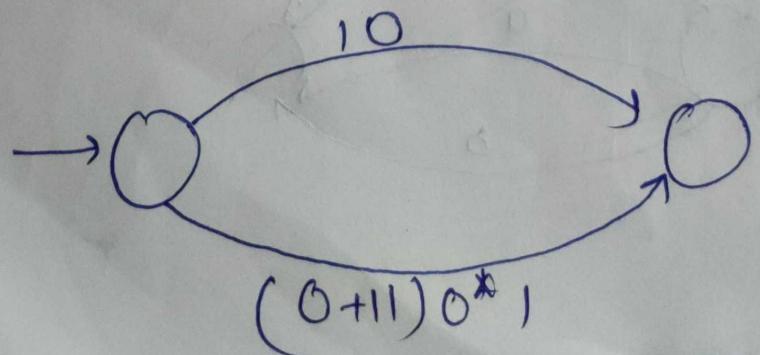
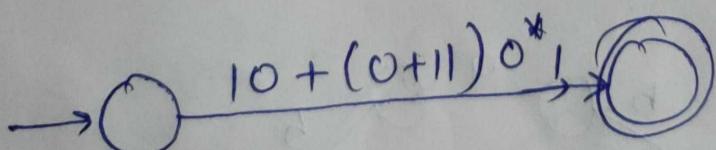


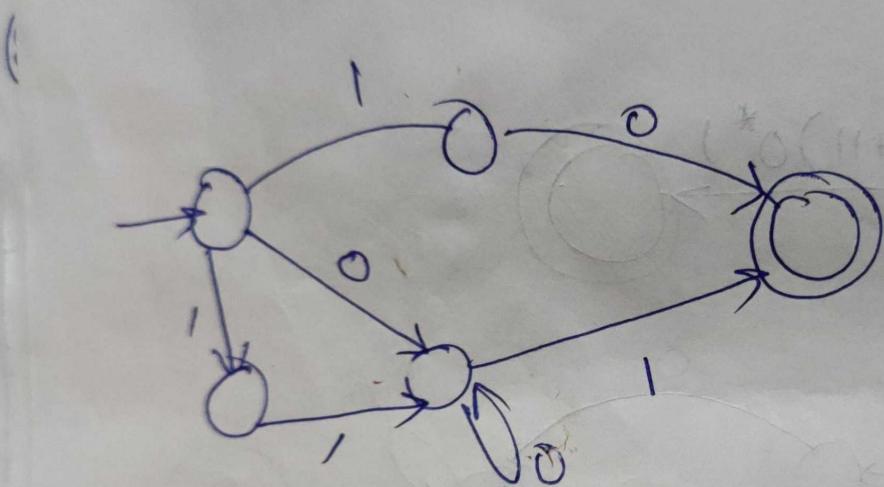
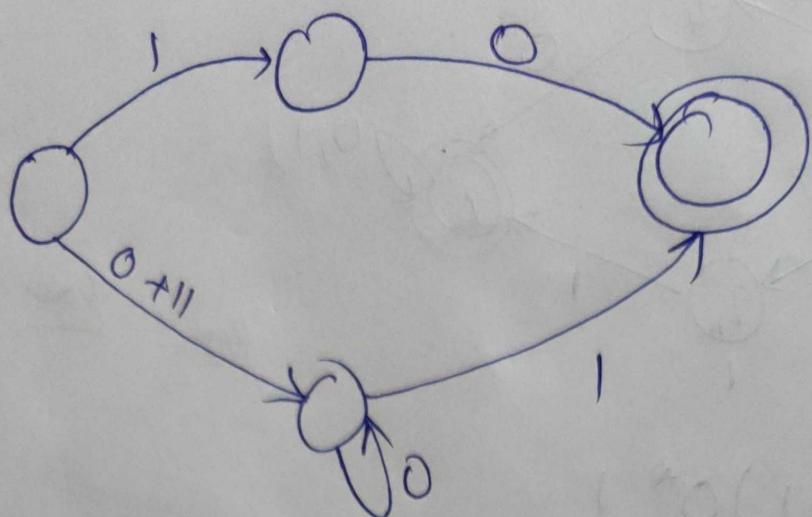


$$\underline{Q} \quad 10 + (0+11)0^*1$$



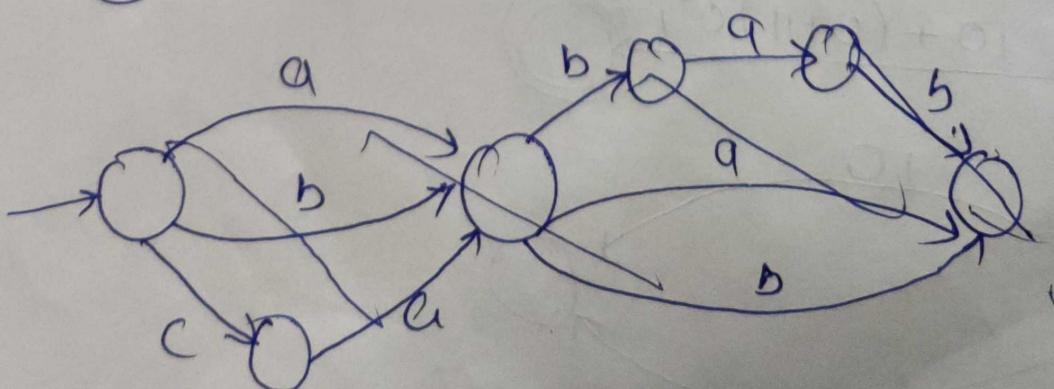
$$\underline{Q} \quad 10 + (0+11)0^*1$$

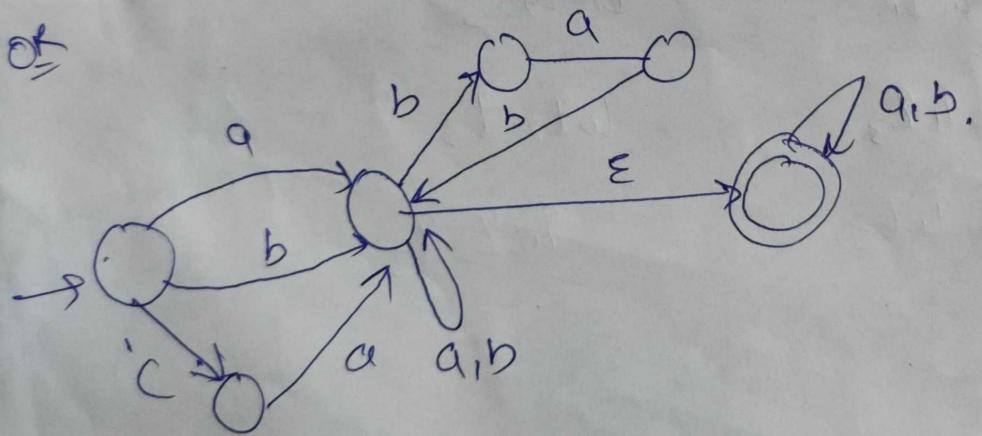
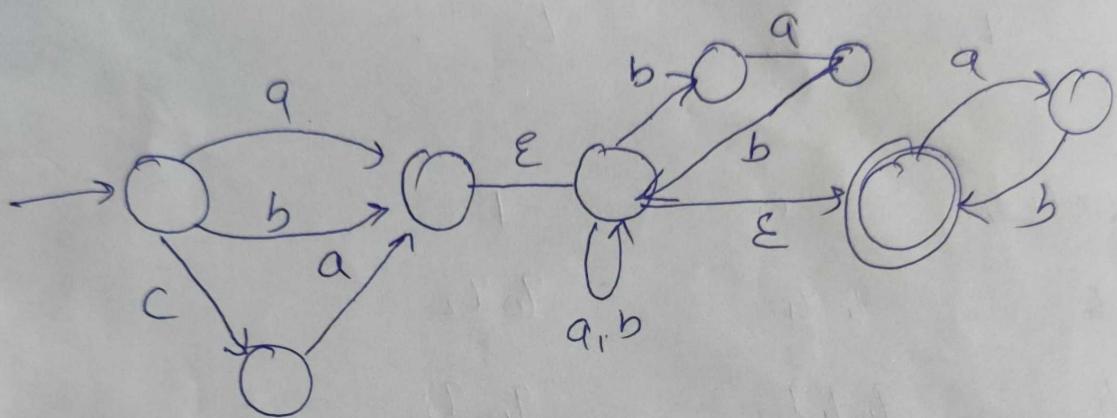
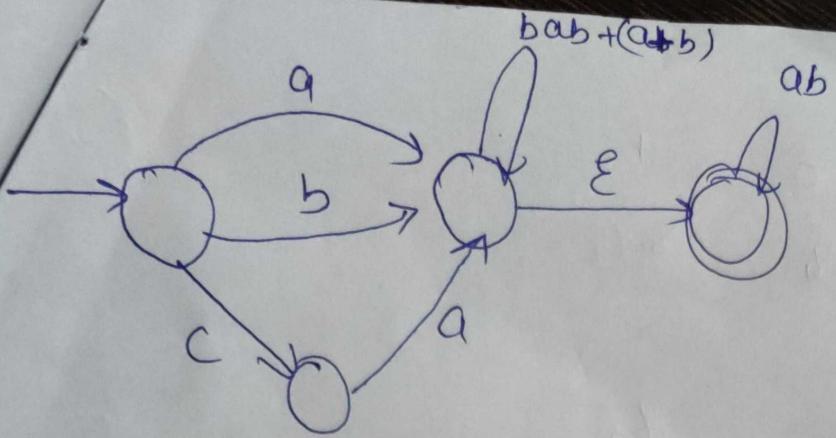




$$Q(a+b+c)(bab + (a+b))^* (ab)^*$$

$$(a+b+c)(bab + (a+b))^* (ab)^* \rightarrow Q$$





state

q_0

q_1

q_2

q_3

0

q_0, q_1

q_3

-

q_3

)
 $q_0 q_2$

-

q_3

q_3

state

$\rightarrow (q_0)$

$q_0 q_1$

$q_0 q_2$

$(q_0 q_1 q_3)$

$(q_0 q_1 q_2 q_3)$

0

$q_0 q_1$

$q_0 q_1 q_3$

$q_0 q_1$

$q_0 q_1 q_3$

$q_0 q_1 q_3$

1

$q_0 q_2$

$q_0 q_2$

$q_0 q_2 q_3$

$q_0 q_2 q_3$

$q_0 q_2 q_3$

4