Theory of Computation :- 24-Aug-18

Q2:) $(aaa+b)^*$

Q3:) $(a+b)^*(s1+s2+s3+s4)^+(a+b)^*$

Q4:) $a^*ba^*ba^* + a^*ba^*ba^*ba^*$

Q5:) (i) $(a+b)^*(aa+bb)$

(ii) $(a+b)^*(ab+ba) + a + b + \Lambda$

Q6:) $(b+\Lambda)(ab)^*aa(ba)^*(b+\Lambda) +$
$(a+\Lambda)(ba)^*bb(ab)^*(a+\Lambda)$

Q7:) $(a+b+bb)(a+ab+abb)^*$

Q8:) $(a+ba+bba)^*(\Lambda+b+bb)aaa(a+ba+bba)^*(bb+b+\Lambda) + (b+ab+aab)^*(aa+a+\Lambda)$
$bbb(b+ab+aab)^*(aa+a+\Lambda)$

Q9:)
(i) b^*a^* (ii) $(a+ba)^*b^* + b^*(a^*ab)^*a^*$

Q10:) $(b^*ab^*ab^*ab^*)^*$

Q11:) (i) $a^*(b(bb)^*aa^*)^*(\Lambda+b(bb)^*)$

(ii) $(aa+bb+(ab+ba)(aa+bb)^*(ab+ba))^*$

(iii) $(ab+ba)(aa+bb+(ab+ba)(aa+bb)^*(ab+ba))^*$

(15) $(ab)^*a$ and $a(ba)^*$

Represent same language no bb's and starting and ending with a

(ii) $(a^* + b)^*$ $(a+b)^*$

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

$a^* + b^*$ $a^* + b^*$

Both are all strings possible in $\Sigma = (a,b)$

(iii) $(a^* + b^*)^*$ $(a+b)^*$

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

$a^* + b^*$

$= (a^* + b)^*$ — Language with all strings (same)

(16) (i) Λ^* and Λ (ii) $(a^*b)^*a^*$

Null string $a^*(ba^*)^*$

$\Lambda = \Lambda$

$\Lambda\Lambda = \Lambda$

$\Lambda\Lambda\Lambda = \Lambda$

$\Lambda^* = \Lambda$ (same)

(iii) $(a^*bbb)^*a$, $a^*(bbba^*)^*$

→ same both because b occurs in clumps of 3.

(17) (i) $((a+bb)^*aa)^*$, $\Lambda + (a+bb)^*aa$

bb → i.e
b occur in even
(2) clumps and
string must end with
aa and Λ accepted

null accepted
+
string ends in
aa
and b occurs
in even no°

(ii) $(aa)^*(\Lambda+a)$, a^*

even aa's

add this
to make
add a

null accepted

either even a
or add a's
or even null

(same)

(iii) $a(aa)^*(\Lambda+a)b + b$, a^*b

$a(aa)^*(\Lambda)(b) + a(aa)^*ab + b$

add a's, b   even a's, b   b

① b – only b
② ab – add, + b
③ aab + even +, b

→ same →

(iv) $(b(bb)^*)^*(a(aa)^*$ ∝ ∝

$(a)(ba+a)^*b$ $aa^*b(aa^*b)^*$

① end with b must
② starts with a

② ending with b
② starts with a

(2) No bb's (2) No bb's

Same Language

(v) $\Lambda + a(a+b)^* + (a+b)^* aa (a+b)^*$

$[(b^* a)^* a b^*)^*$

Accepted

(1) null ✓

Accepted

(1) null ✓

(18) (i) ending with a or abbbb

(ii) starts with ba and b's occur in clumps of 2, also accepts Λ

(iii) starts with a and end with b and a, b's occur in odd clumps also accepts Λ

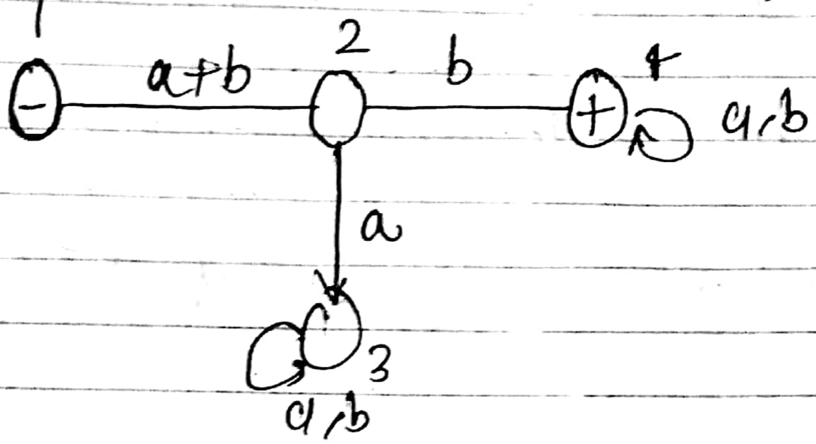
(iv)

(vi) No b's ~~consec~~ consecutive and always end in a, can take null.

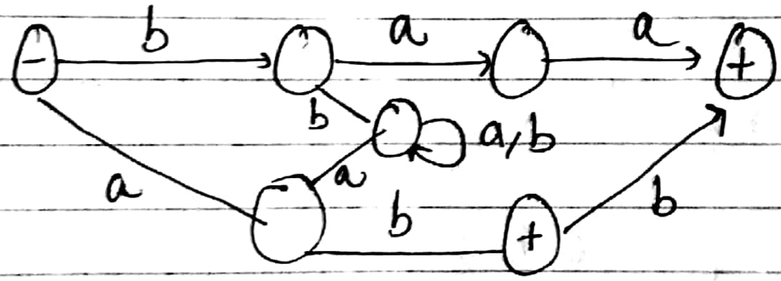
Ch-5

Q2:

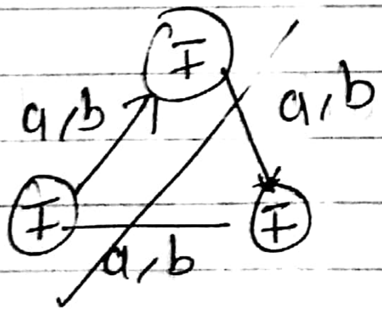
	a	b
1	2	2
2	3	4
3	3	3
4	4	4

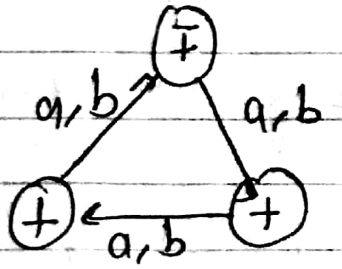


Q3:

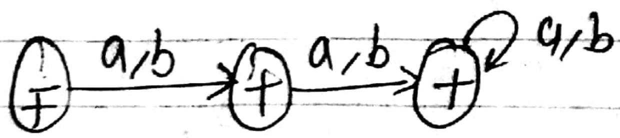


Q4: (i)





(ii)



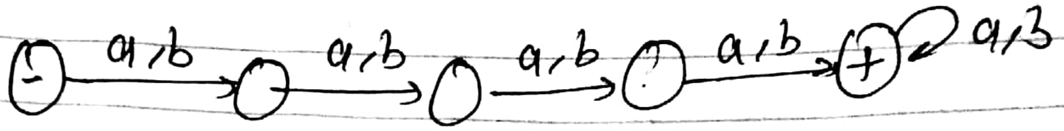
Λ it accepts $(a+b)^*$ R.E

or any string (depends on

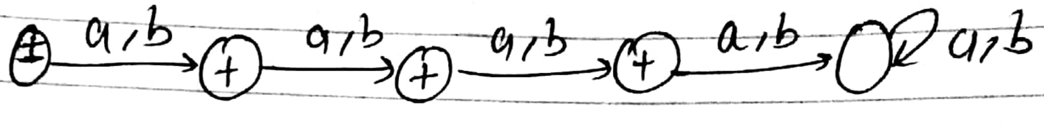
(iii) yes it must Reject some inputs.

Q5:)

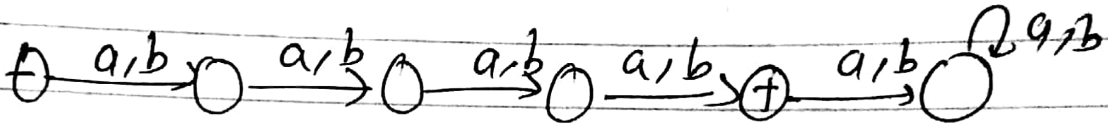
(i)



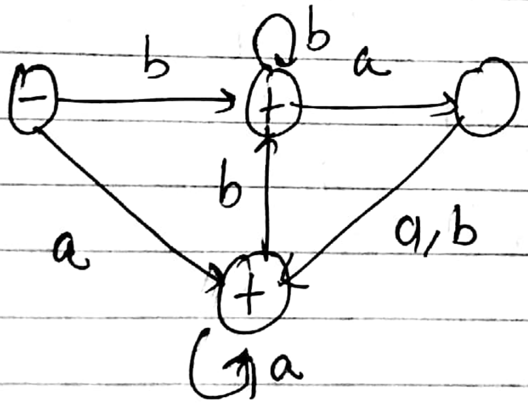
(ii)



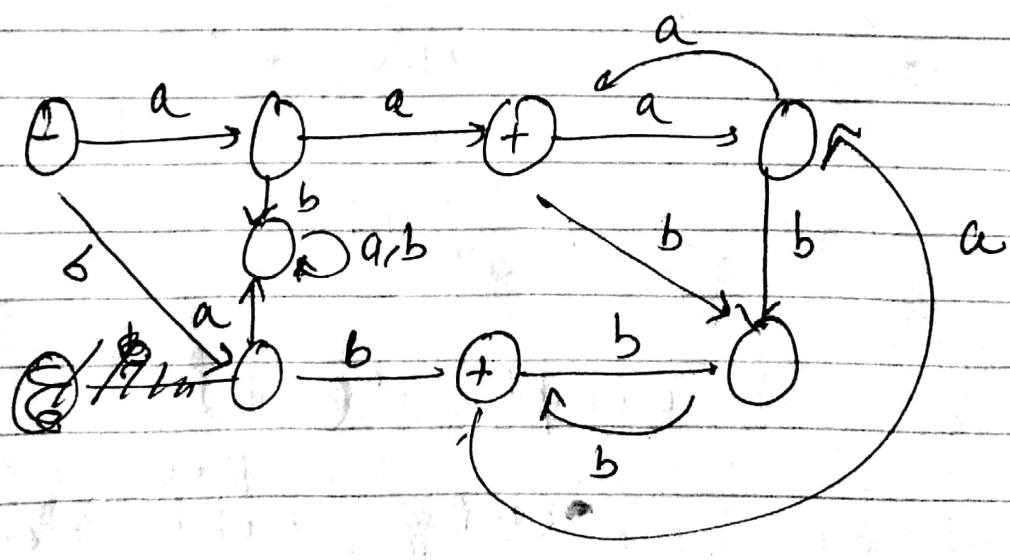
(iii)



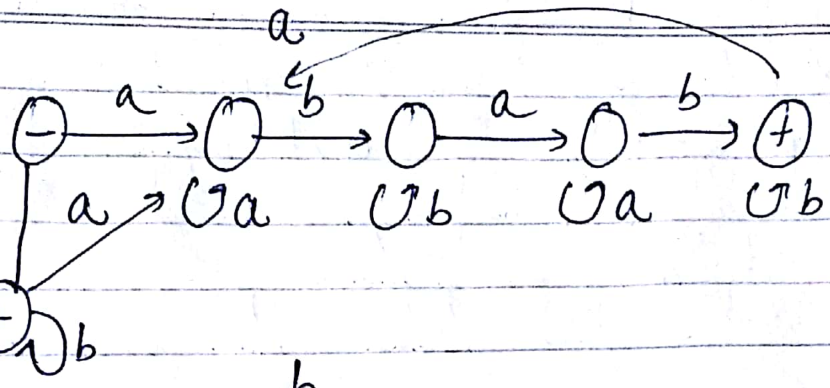
Q6:) do not end -ba



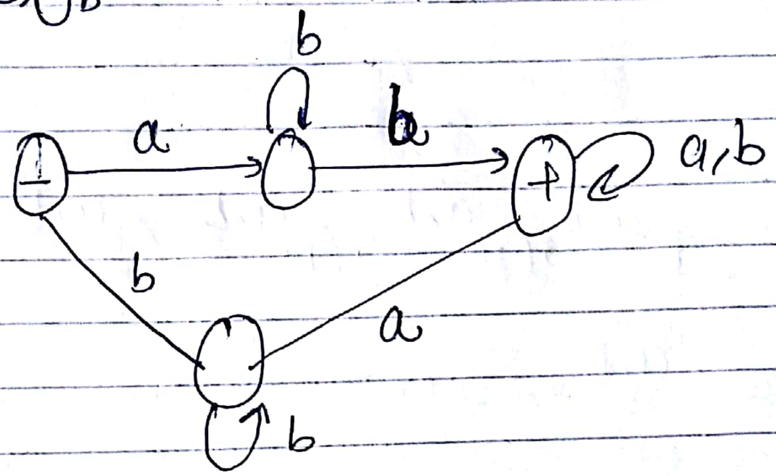
Q7: begin or end with double letter



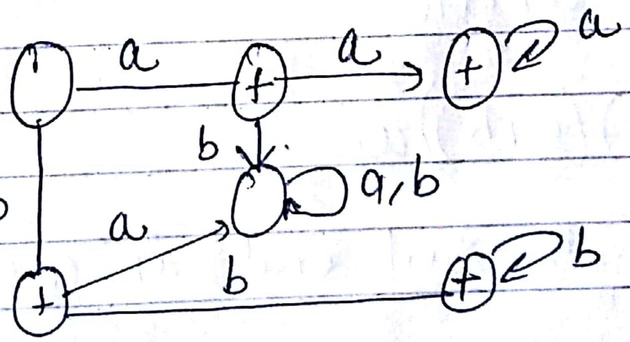
(8)



(9) (i)

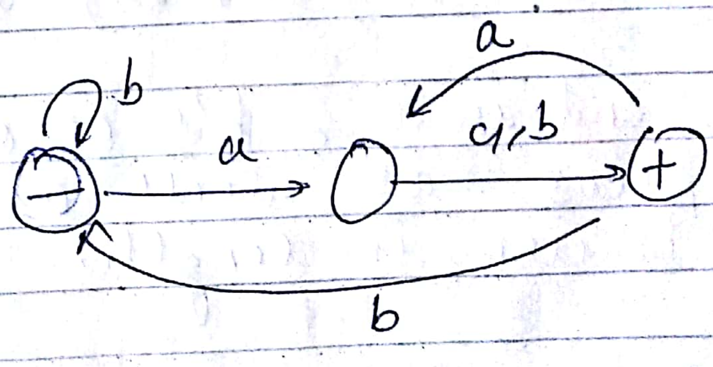


(ii)

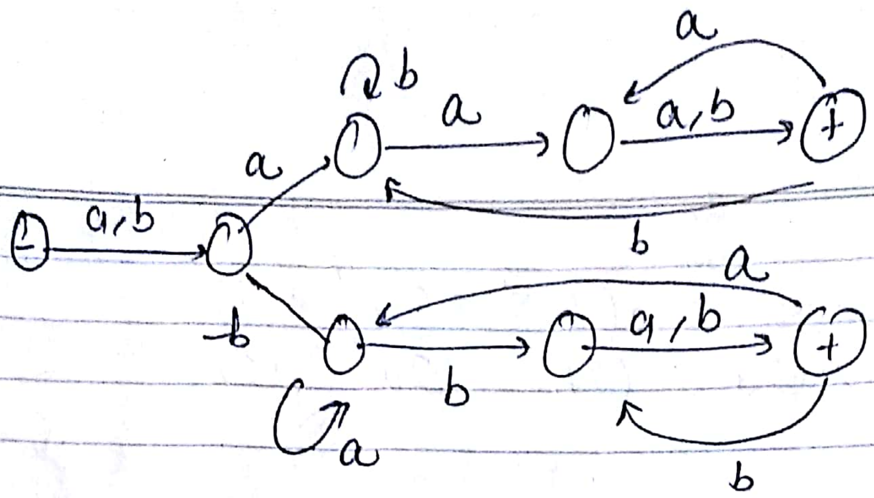


(14)

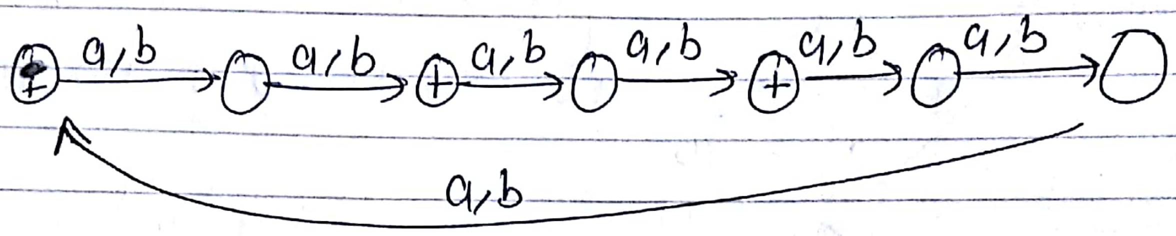
(i)



(ii)



(15)



(17) (i) Words that end in a and are odd in length

R.E $\rightarrow$ $((a+b)(a+b))^{*}a$

(ii) Even in length but end in a

R.E $(a+b)(aa+ab+ba+bb)^{*}a$

(iii) All words end in a, b's occur only at odd places as well as word is even in length

R.E $\rightarrow$ $(a+b)(a)((a+b)(a))^{*}$

(iv) all done above

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