Theory of Automata
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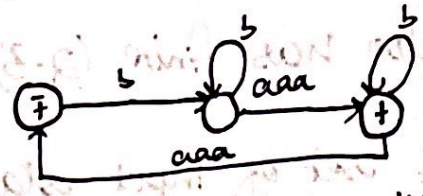
Roll Number: 20F-0336
Section: 6C

Q1:-

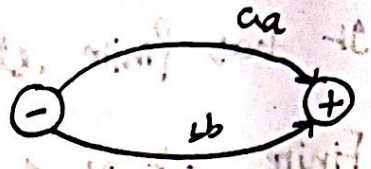
i)



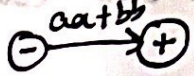
It can read null as initial & final states are same and self b loop fulfill the many b's condition.

GTG  b^*aaab^*

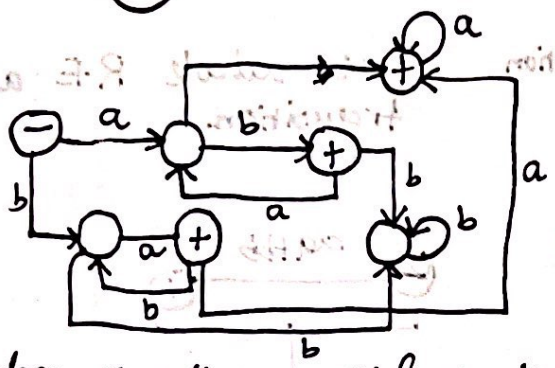
ii)



Output in clumps and not in single digit

GTG 

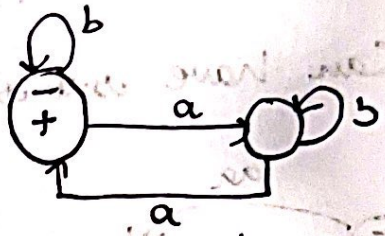
iii)



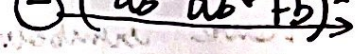
It does not allow multiple reading of same input or does not generate clumps, they only occur at end.

GTG 

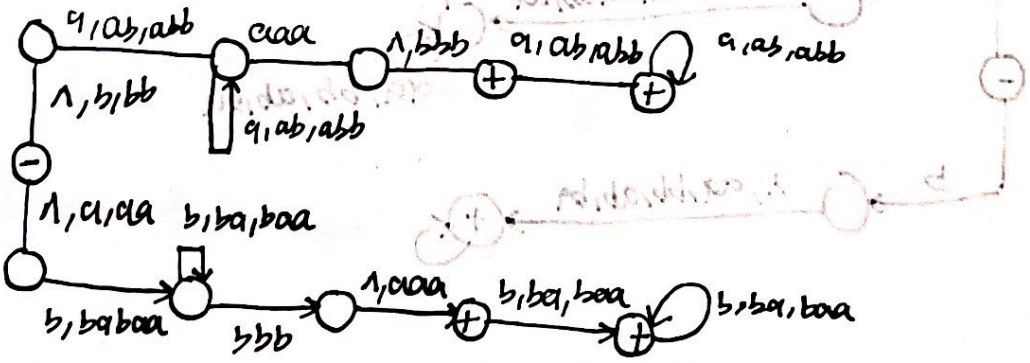
iv)



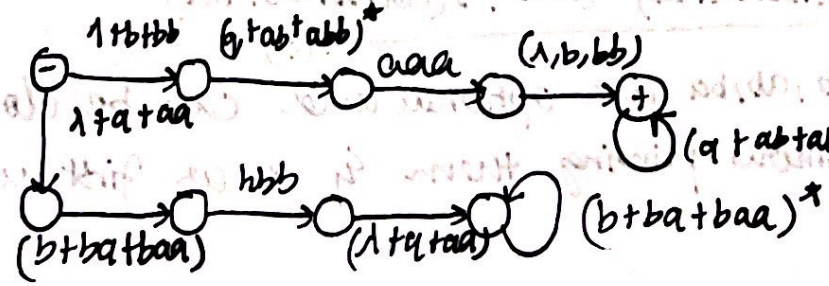
This will always generate even numbers of a as they are looped by a state and can't occur alone.

GTG 

v)

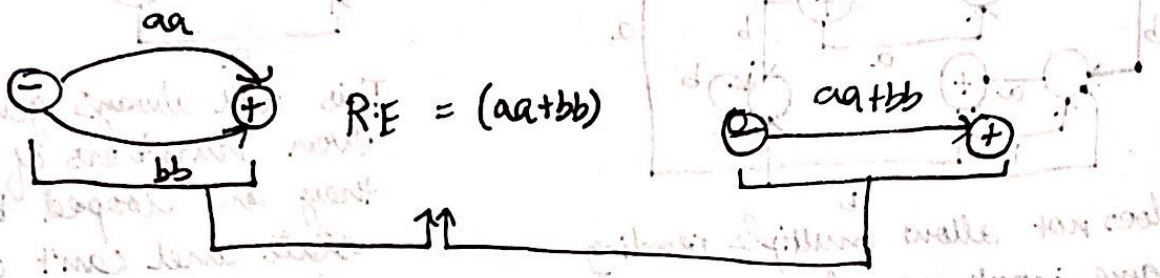


GTG.



Q No 2:

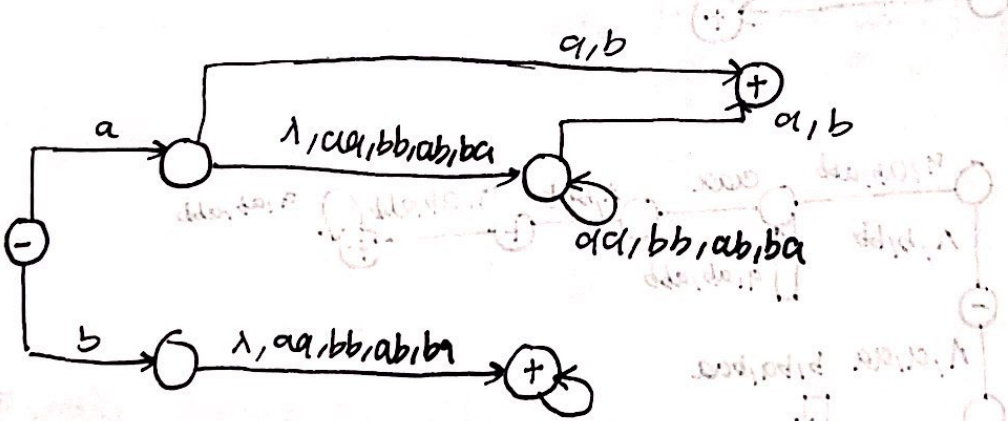
Transition Graph	General Transition Graph
-> It has finite states	It also has finite (2-3) states
-> Finite set of Inputs	Finite set of input states
-> States can be null	States can't be null.
-> Null is an input	Null is an input
-> Can have sub string transition	has whole R.E as transition.



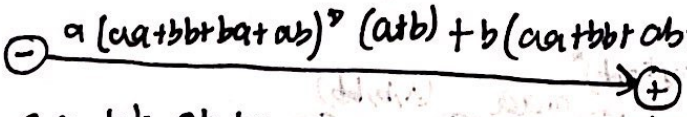
-> have symbols like ', | uses only "*" or "+"

Q: No: 3

(i)

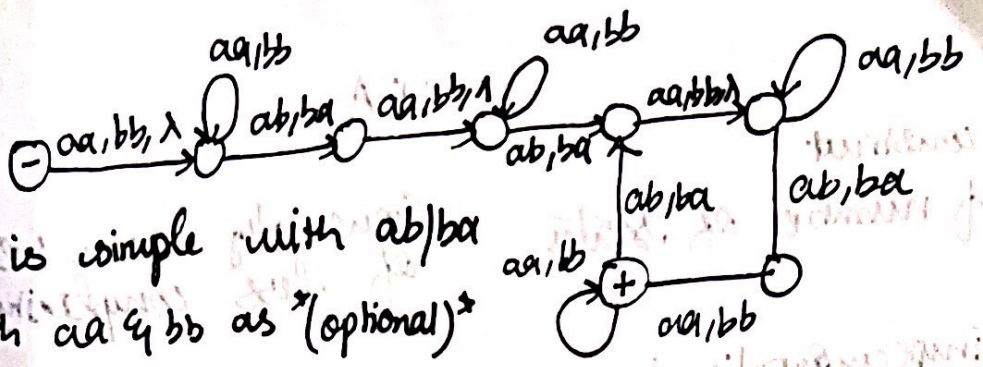


GTG



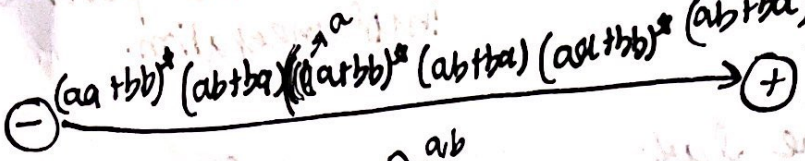
aa, bb, ab, ba are optional and can be done with or without printing them & a as first will never be alone.

(ii) T.G

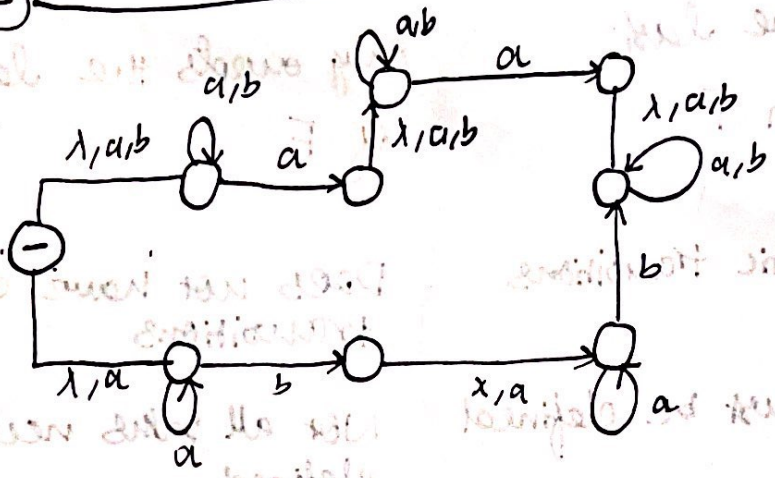


pair is simple with ab/ba
with aa & bb as *(optional)*

GTG



(iii) TG

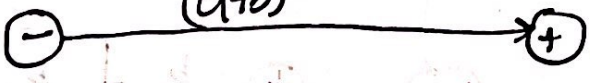


GTG (a+b)* a (a+b)* a (a+b)* + a* b a* b

This will always produce either two a's or two b's

(iv) Already done on paper

GTG (a+b)+



(v) Already drawn on paper

GTG a (a+b)* + a (a+b)* b + λ

or

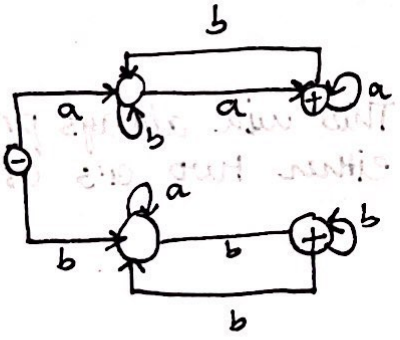
1 (1+0)* + 1 (1+0)* 0 + E

Q4:-

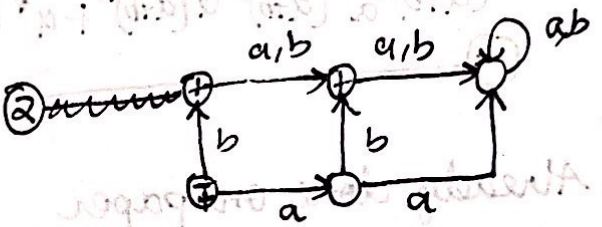
DFA	NFA
→ Harder to construct because of number of states	Generally easier because of less complexity.
→ Practical implementation is possible	limited but possible practical implementation.
→ Accepts input if the last visited state is in F	Only accepts the last state of F
→ Have deterministic transitions	Does not have deterministic transitions
→ Every way must be defined	Not all paths need to be defined

Q5:-

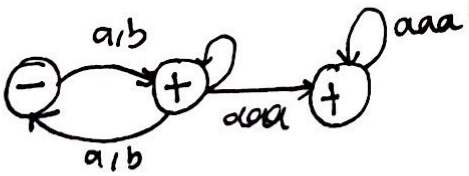
①



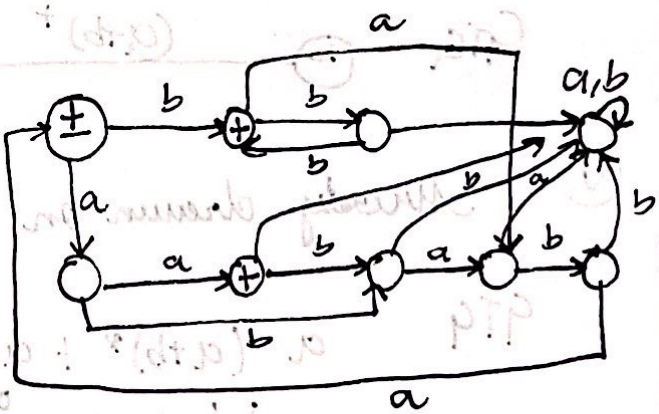
②



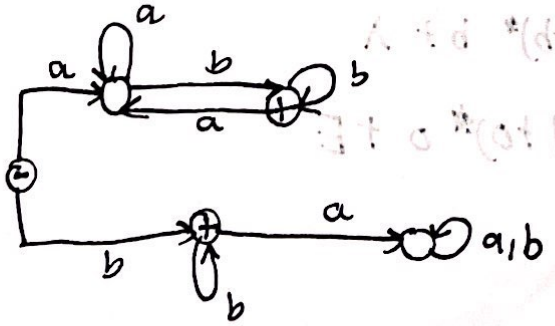
③



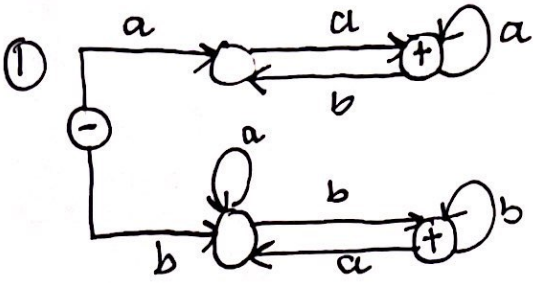
④



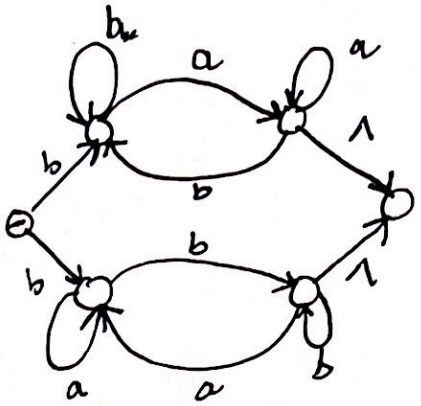
⑤



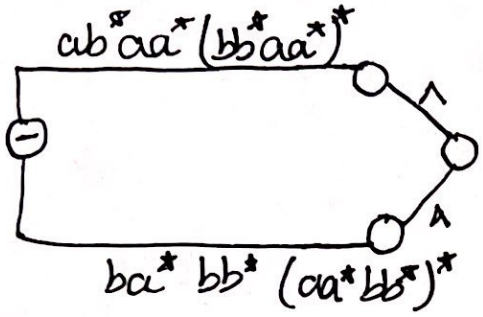
Question 6

① 

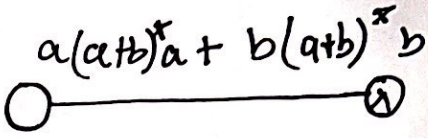
remove final →

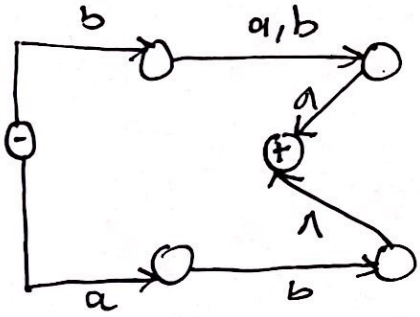


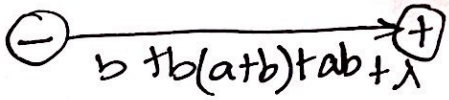
removing first 2

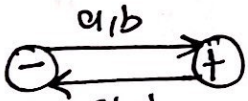


removing remaining

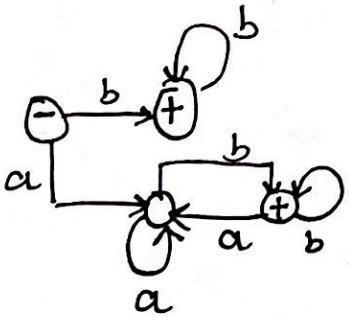


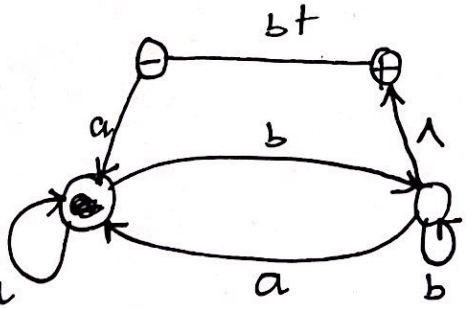
② 

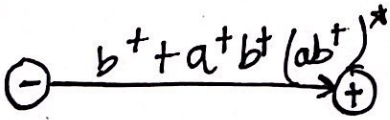
→ 

③ 

= (a+b)((a+b)(a+b))*

⑤ 

→ 

↙ 

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