

① Design FA for the following:-

① strings that have odd no. of a's & even no. of b's. (5)

② strings that have ~~even~~ odd no. of a's & odd no. of b's. (5)
 $\{ \Sigma = (a, b) \}$

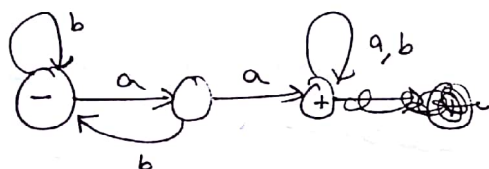
② Design PDA for the foll. language:-

① $L = a^m b^n \quad \forall \quad m > n$. (4)

② $L = a^m b^n \quad \forall \quad m \leq n$. (4)

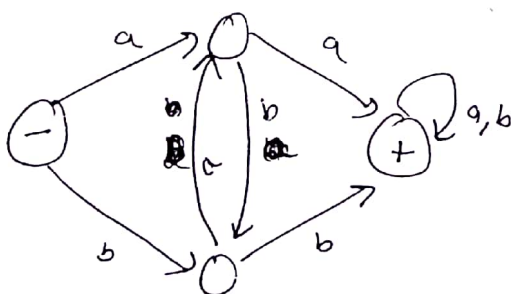
③ FA that accepts exactly one 'aaa' or 'bbb'. (aaaa not acceptable). (4)

④ Find $(FA)^*$ for the given FA.



(4)

⑤ Find RE for given FA using Bypass Algorithm.

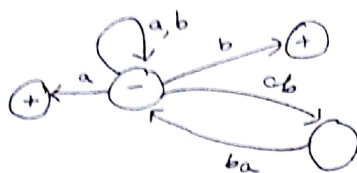


(4)

Test (Toc)

(49)

- ① Convert the foll TCM into RE using Bypass algorithm.



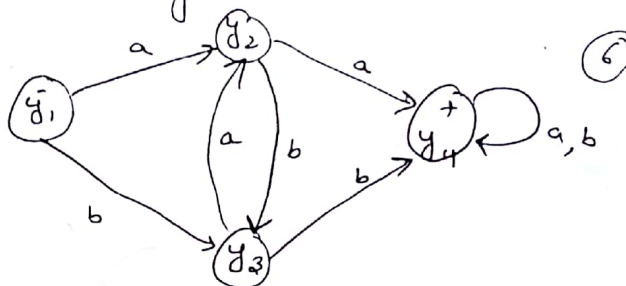
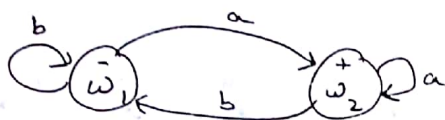
(41)

- ② systematically transform the foll. NFA into equivalent DFA.



(4)

- ③ given the foll FA, find FA₁, FA₂ systematically



(6)

- ④ write ~~RF-Z~~ construct DFA for the lang.

(4)+(4)

(a) having strings with exactly one occurrence of the substring aaa .

(b) having words that have an even number of substrings ab .

- ⑤ Construct FA accepting the following language:

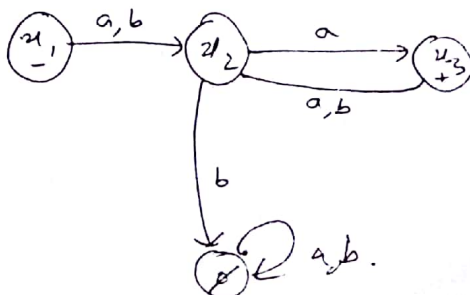
$\{w \in \{a, b\}^* : w \text{ does not contain } bbb \text{ as substring.}\}$

(3)

②

Successor Table

	a	b
A - x_1	x_2	x_2
B - x_2	x_3	\emptyset
C - x_3 (+)	x_2	x_2
D - \emptyset	\emptyset	\emptyset



Q-1. (a) Construct FA₁, FA₂

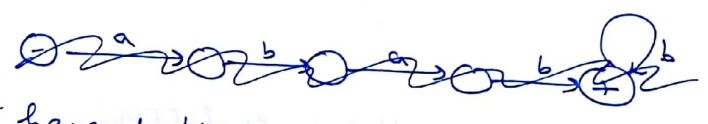
(b) Is the given lang. regular?

$$\Sigma = \{a, b\}$$

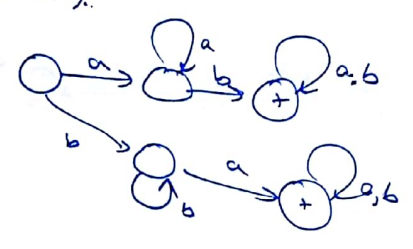
$$L = \{a^n b a^n, n \geq 1\}$$

Q-2. (a) FA that accepts only those words that begin or end with a double letter.

(b) ~~abab as substring. FA that have both the letter a & b in them~~ (4)
~~even no. of substring ab.~~



FA that have both the letters a & b in them (not necessarily in that order).



(2)

Q-3. (i) strings end in double letter.

$$(a+b)^*(aa+bb) \quad (2)$$

(ii) exactly one double letter in them :-

$$(b+1)(ab)^*aa(ba)^*(b+1) + (a+1)(ba)^*bb(ab)^*(a+1) \quad (3)$$



Q-4

Q-5

(a) PDA for the language $a^m b^n \mid m, n \geq 1 \text{ and } m \neq n$.

(b) CFG for Palindrome (even and odd)

Q-6

Draw TM that converts UwU to $UwUwU$. Explain all steps. name of TM ??