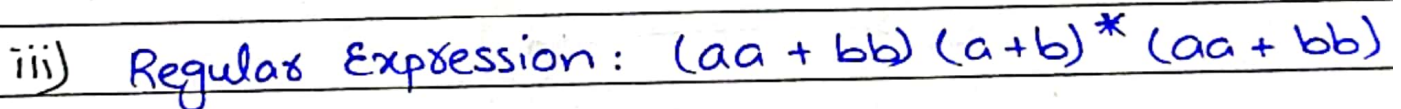-: Theory of Automata :- Date:
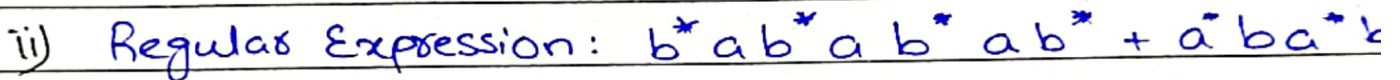
-: Assignment # 01 :-

-: Sec-A :-

Q 1)

i) Regular Expression : $[(b)^* aaaaa(b)^*]^+$

ii) Regular Expression: $b^* ab^* a b^* a b^* + a^* ba^* b$

iii) Regular Expression : $(aa + bb)(a+b)^* (aa + bb)$
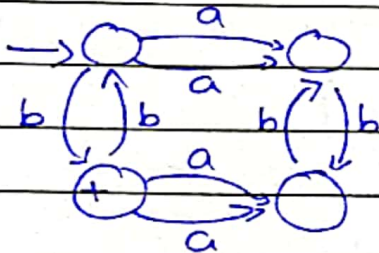
iv) Regular Expression : $(a + ba + bba)^* (bb + b + \varepsilon)$
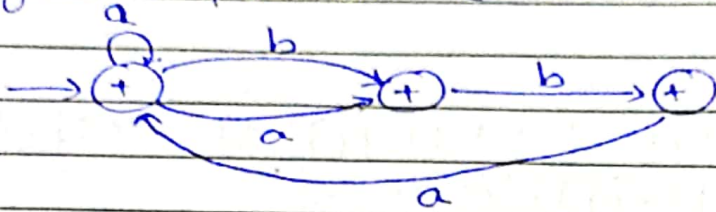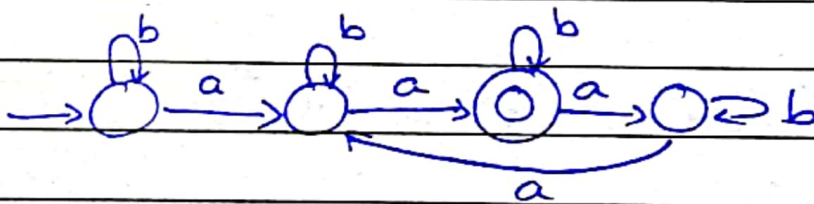

v) Regular Expression: $a^* bb^* a$
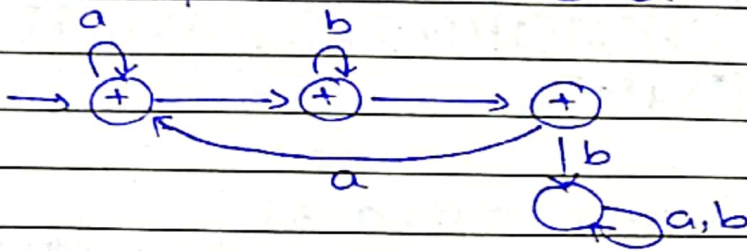
vii) R.E : $((ab + ba)(aa + bb)^* (ab + ba)^* b ((ab + ba)(aa + bb)^*$
$(ab + ba))^*$

vi) R.E $= (b^* a b^* a b^* a b^+)^* (b^* ab^* a b^*)$

-: Section - B :-

Q1)

1) $R.\varepsilon = [(]\{1\}[A-Z]\{1\}[\backslash-]\{1\}\backslash d\{3\}[)]\{1\}[,]\{1\}[(]\{1\}\backslash d$
$\{2\}[A-Z]\{1\}[,]\{1\}[a-zA-Z]^*$

2) $R.\varepsilon = [(]\{1\}\backslash d\{2\}[)]\{1\}[V]\{1\}\backslash d\{3\}[)]\{1\}[V]\{1\}[(]\{1\}\backslash d$
$\{3\}[)]\{1\}[,]\{1\}[(]\{1\}(Apt)\backslash s\{1\}\backslash d\{2,3\}[)]\{1\}[,]$
$[1\}[A-Za-z]^* \backslash d\{1\}$

Q2) here, $\varepsilon = \{comp, imp, virus, a-z\}$
$R.\varepsilon = (comp(a-z)^* + imp(a-z)^*)(zO^+(a-z)^*)(virus)$

Q3) here, $\varepsilon = \{a, e, i, o, u\}$
$\varepsilon_2 = \{b.l, d, m, r, m, n, s, t, c\}$
$\varepsilon = \{\varepsilon_1 . \varepsilon_2\}$
$R.\varepsilon = (\varepsilon_2 \varepsilon_1)^+ \varepsilon_2^*$

$\qquad\quad \varepsilon_1 \qquad\qquad\qquad \varepsilon_2 \qquad \varepsilon_3 \qquad \varepsilon_4$
Q4) $\Sigma = \{(!@\#\$\%\wedge\&*), (0-9), (A-Z), (a-z)\}$

$R.\varepsilon = (\varepsilon_1^+ . \varepsilon_2^+ + \varepsilon_3^+ . (\varepsilon_1+\varepsilon_2+\varepsilon_3+\varepsilon_4)^+)^+$

$\qquad\quad \varepsilon_1 \qquad \varepsilon_2 \qquad \varepsilon_3$
Q5) $\Sigma = \{PK, (0-9), (A-Z)\}$
$R.\varepsilon = (\varepsilon_1 (\varepsilon_2 \varepsilon_2)(\varepsilon_3 \varepsilon_3 \varepsilon_3 \varepsilon_3)(\sum_{n=1}^{5} \varepsilon_2)(\varepsilon_2 \varepsilon_2 \varepsilon_2))$