

Government Engineering College, Ajmer
Department of CS&IT

I Mid Term 2018

Class: VI SEM CS

Sub: Theory Of Computation

Time: 1 Hrs

MM:10

Q1. Design finite state automaton for infix expression (Ex a+b-c) that accepts a language over $\Sigma = \{a-z, +, -, /, *\}$ (2)

Q2. Construct moore machine that takes base 4 no's as input and produces modulo 5 as output. (2)

Q3. Write regular expression (R) for the following ($\Sigma = a,b$)

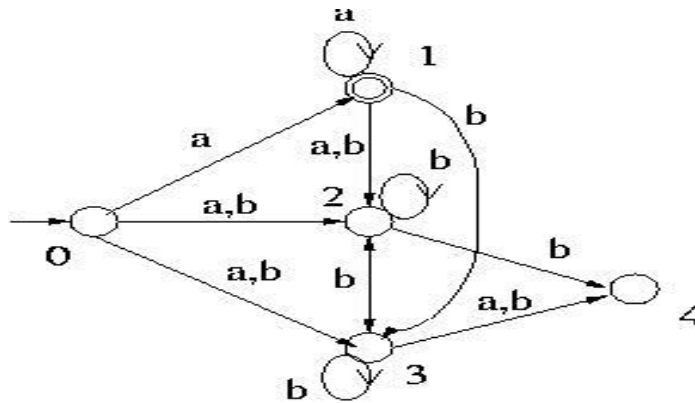
a) R that generate all string where length of string is atleast 3

b) R that generate all string where every 'a' must followed by 'b'

c) R that generate all string contain second symbol from RHS is 'a'

d) R that generate all string where each string contain atleast two b's (1)

Q4. Convert following NFA to DFA. (3)



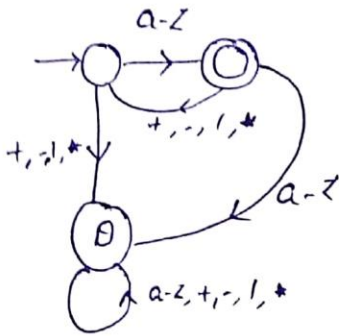
Q5. Find a grammar generating $\{a^i b^n c^n \mid n \geq 1, i \geq 0\}$. (2)

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Sub : TOC

ans 1



ans 2

$$\Sigma = \{0, 1, 2, 3\}$$

$$\Delta = \{0, 1, 2, 3, 4\}$$

	0	1	2	3	Δ
$\rightarrow q_0$	q_0	q_1	q_2	q_3	0
q_1	q_4	q_0	q_1	q_2	1
q_2	q_3	q_1	q_0	q_1	2
q_3	q_2	q_3	q_4	q_0	3
q_4	q_1	q_2	q_3	q_4	4

ans 3

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

b) $(b+ab)^*$

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

d) $a^* + a^*ba^* + a^*ba^*ba$

~~or~~ $a^*(b+\epsilon)a^*(b+\epsilon)a^*$

ans 4

$S \rightarrow AB$

$A \rightarrow aA / Aa / a / \epsilon$

$B \rightarrow bBc / bc$

ans 5

Transition table of DFA

States	a	b
0	123	23
(123)	124	234
23	4	234
(124)	12	234
234	4	234
(12)	12	234
4	0	0
0	0	0