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Answer to the question no-5

(5)

Case 1	Case 2	Final Year	Amount	Case 1	Case 2	Final Year	Amount	Case 1	Case 2	Final Year	Amount	Case 1	Case 2	Final Year	Amount	Case 1	Case 2	Final Year	Amount
0000	000	2001-21	245,700	000	245,700	2001-21	245,700	000	245,700	2001-21	245,700	000	245,700	2001-21	245,700	000	245,700	2001-21	245,700
0001	010	2019-20	215,600	010	215,600	2019-20	215,600	010	215,600	2019-20	215,600	010	215,600	2019-20	215,600	010	215,600	2019-20	215,600
0010	100	2018-19	170,600	100	170,600	2018-19	170,600	100	170,600	2018-19	170,600	100	170,600	2018-19	170,600	100	170,600	2018-19	170,600
0011	101	2017-18	145,700	101	145,700	2017-18	145,700	101	145,700	2017-18	145,700	101	145,700	2017-18	145,700	101	145,700	2017-18	145,700
0100	110	2016-17	140,500	110	140,500	2016-17	140,500	110	140,500	2016-17	140,500	110	140,500	2016-17	140,500	110	140,500	2016-17	140,500
0101	111	2015-16	132,200	111	132,200	2015-16	132,200	111	132,200	2015-16	132,200	111	132,200	2015-16	132,200	111	132,200	2015-16	132,200
0110	0010	2014-15	125,700	0010	125,700	2014-15	125,700	0010	125,700	2014-15	125,700	0010	125,700	2014-15	125,700	0010	125,700	2014-15	125,700
0111	0011	2013-14	119,300	0011	119,300	2013-14	119,300	0011	119,300	2013-14	119,300	0011	119,300	2013-14	119,300	0011	119,300	2013-14	119,300
1000	0110	2012-13	105,400	0110	105,400	2012-13	105,400	0110	105,400	2012-13	105,400	0110	105,400	2012-13	105,400	0110	105,400	2012-13	105,400
1001	0111	2011-12	70,600	0111	70,600	2011-12	70,600	0111	70,600	2011-12	70,600	0111	70,600	2011-12	70,600	0111	70,600	2011-12	70,600

0.167
0.147
0.116
0.099
0.096
0.096
0.081
0.072
0.048

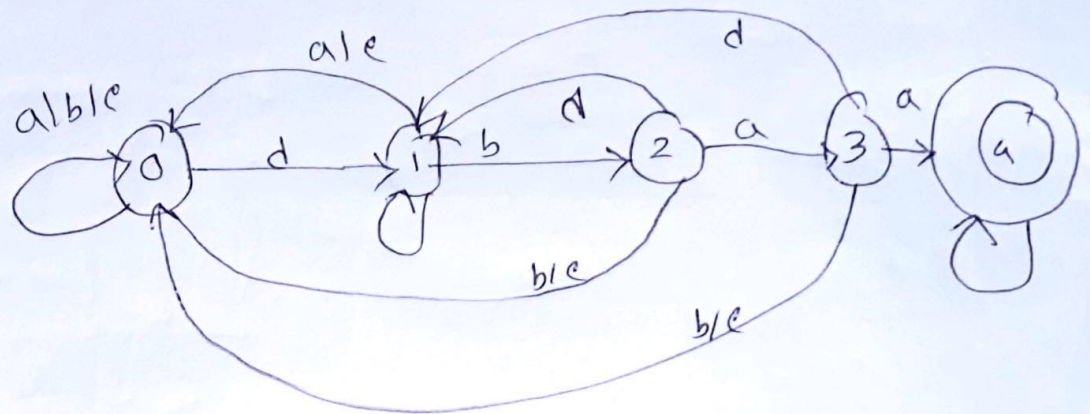
5 (b) Price -

$$\begin{aligned} & 245700 \times 3 + 215600 \times 3 + 170600 \times 3 + \\ & 14700 \times 3 + 140600 \times 3 + 132200 \times 3 + 125700 \times 4 \\ & + 119300 \times 4 + 105400 \times 4 + 70600 \times 4 \\ & = 4834900 \end{aligned}$$

5 (c)

Answers to the question no - 6

6 (a)



6 (b) Here is input symbol

in \ st	a	b	e	d
0	0	0	0	1
1	0	2	0	1
2	3	0	0	1
3	4	0	0	1
4	4	4	4	4

6 (c) Here,

$$T = \{a, b, c, d\} ; N = \{u_0, u_1, u_2, u_3, u_4\}$$

$$1) u_0 \rightarrow a u_0 \mid b u_0 \mid c u_0 \mid d u_1$$

$$2) u_1 \rightarrow a u_0 \mid b u_2 \mid c u_0 \mid d u_1$$

$$3) u_2 \rightarrow a u_3 \mid b u_0 \mid c u_0 \mid d u_1$$

$$4) u_3 \rightarrow a u_4 \mid b u_0 \mid c u_0 \mid d u_1$$

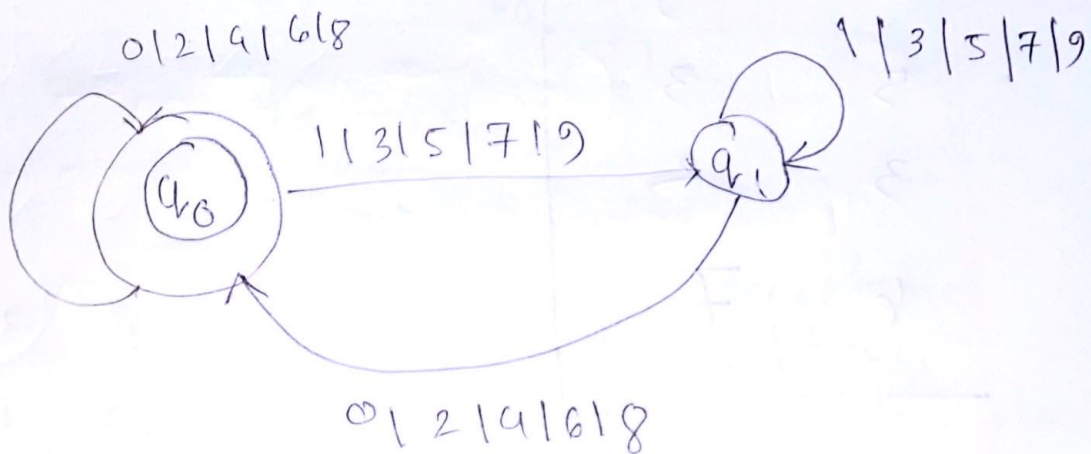
$$5) u_4 \rightarrow a u_4 \mid b u_4 \mid c u_4 \mid d u_4$$

$$6) u_3 \rightarrow a$$

Answer to the question no-1

(a)

	0 2 4 6 8	1 3 5 7 9
$\rightarrow q_0$	q_0	q_1
q_1	q_0	q_1



(b) Here is 3 number with minimum length input and transition are shown in a tabular format

input

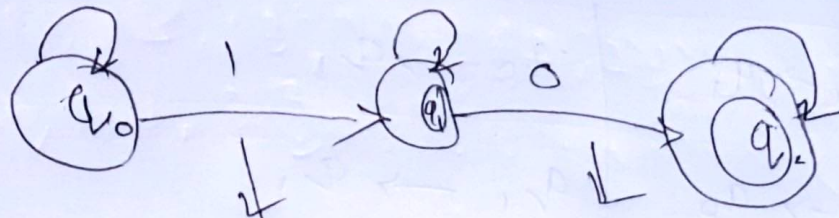
5	3
2	5
5	3
3	2
6	7

Transition

$q_0 \rightarrow q_1$	$q_0 \rightarrow q_1$
$q_1 \rightarrow q_0$	$q_1 \rightarrow q_1$
$q_0 \rightarrow q_1$	$q_1 \rightarrow q_1$
$q_1 \rightarrow q_1$	$q_1 \rightarrow q_0$
$q_1 \rightarrow q_0$	$q_0 \rightarrow q_1$

Here 35327 is not acceptable
and 52536 is acceptable as reach
 q_0 state.

Q1 (c) DFA Regular Expression



$(0+1)^*$

1

(0^*) 0 (1^*)



$(0+1)^* 1 0^* 0 1^*$

Answer to the question no-3

$$3. a) L(F) = \{a, b, d\}$$

$$L(N) = \{1, 2, 3\}$$

$$L(F) \cdot L(N) = \{a, b, d\} \cdot \{1, 2, 3\}$$

$$= \{a_1, a_2, a_3, b_1, b_2, b_3, d_1, d_2, d_3, a, b, d, 1, 2, 3\}$$

$$(b) L(F) \cup L(N)$$

$$= \{a, b, d\} \cup \{1, 2, 3\}$$

$$= \{a, b, d, 1, 2, 3\}$$

$$L(F) \cup L(N) \cdot L(N)$$

$$= \{a, b, d, 1, 2, 3\} \cdot \{1, 2, 3\}$$

$$= \{a_1, a_2, a_3, b_1, b_2, b_3, d_1, d_2, d_3, 11, 12, 13, 21, 22, 23, 31, 32, 33, a, b, d, 1, 2, 3\}$$

\therefore length 24.

$$(c) \quad L(N)^{16}$$

$$\text{we know } L(N)^n = \frac{p(p^n - 1)}{p - 1}$$

$$\text{Here } n = 16$$

$$p = 3$$

$$L(N)^{16} = \frac{3(3^{16} - 1)}{3 - 1}$$

$$= 645070080$$

$$(11) L(N)^7$$

Here,

$$n = 7$$

$$p = 3$$

$$L(N)^7 = \frac{3(3^7 - 1)}{3 - 1}$$

$$= 3279 \text{ Ans.}$$

$$(d) G_2 = \langle \langle \{a, b\} \rangle, \{a, b\} \rangle, \{a, b\} \rangle$$

$$1) x \rightarrow aya$$

$$2) y \rightarrow aya$$

$$3) y \rightarrow b$$

$$x \rightarrow aya$$

$$\rightarrow aaya$$

→ aaa γ aaa

→ aaaa γ aaaa

→ aaaaa γ aaaaa

→ aaaaaa γ aaaaaa

→ aaaaaabaaaaaa