

QPS

Page No

Date

Q.1 D) PDA to CFG

- ① PDA component - (01)
- ② Transition for Non-terminal - (02)

$$S \rightarrow OBB \quad \delta(q, \epsilon, S) = (q, OBB) \quad - (02)$$

$$B \rightarrow OS \quad \delta(q, \epsilon, B) = (q, OS)$$

$$B \rightarrow 1S \quad \delta(q, \epsilon, B) = (q, 1S)$$

$$B \rightarrow O \quad \delta(q, \epsilon, B) = (q, O)$$

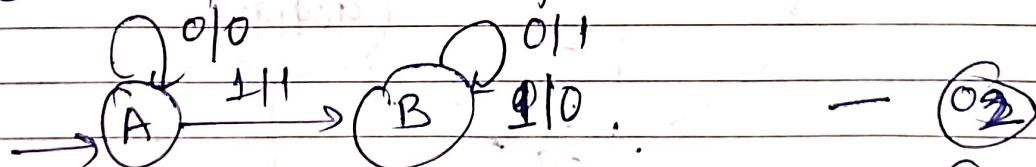
- ③ Transition for terminal - (02)

$$\text{Terminal } 0 : \delta(q, 0, 0) = (q, \epsilon)$$

$$\text{Terminal } 1 : \delta(q, 1, 1) = (q, \epsilon)$$

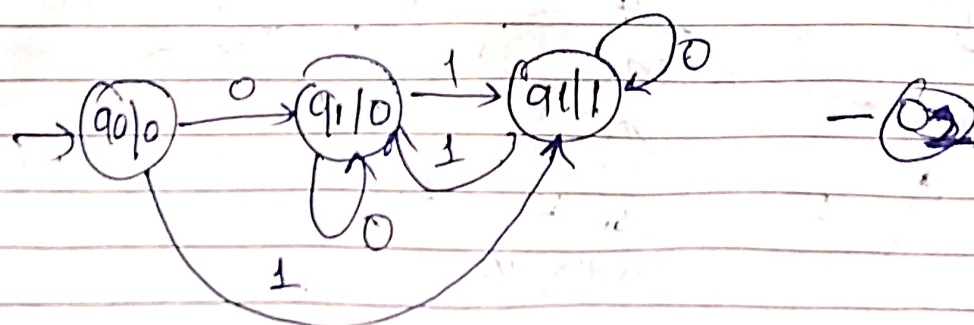
Q.2 a)

- ① algorithm / steps for conversion of binary no. to 2's complement - (02)
- ② Mealy m/c component - (01)



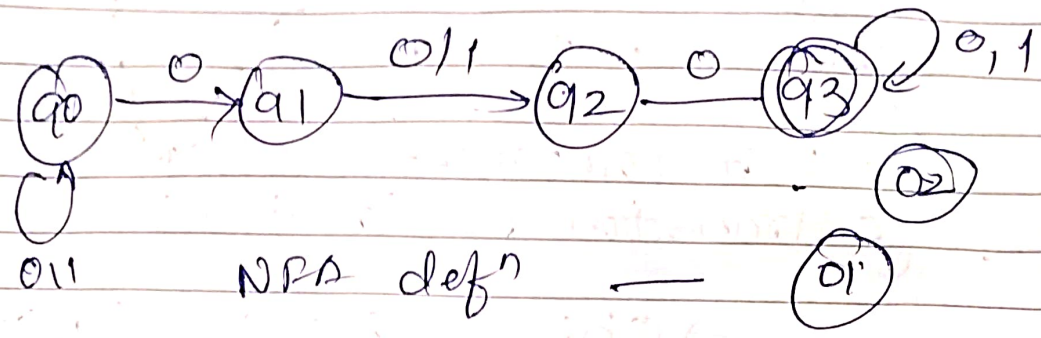
Transition function - (01)

- ③ Moore m/c component - (01)



~~Transition~~ Transition function - 01

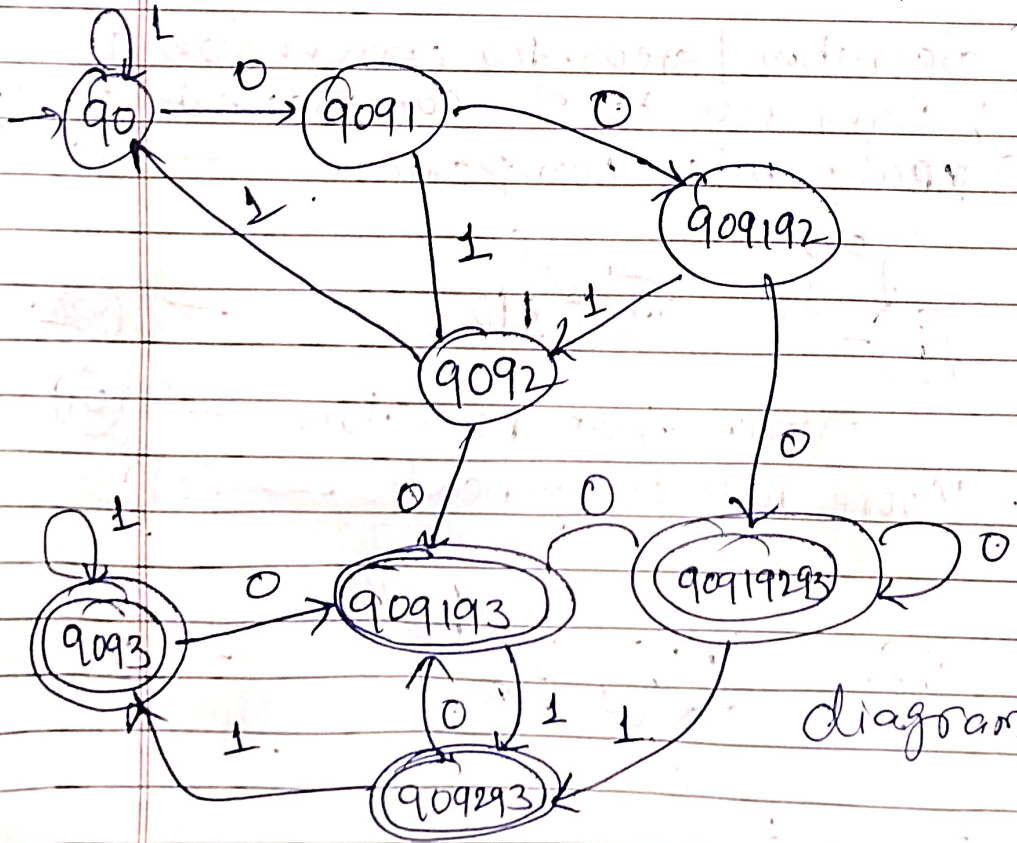
Q.28.



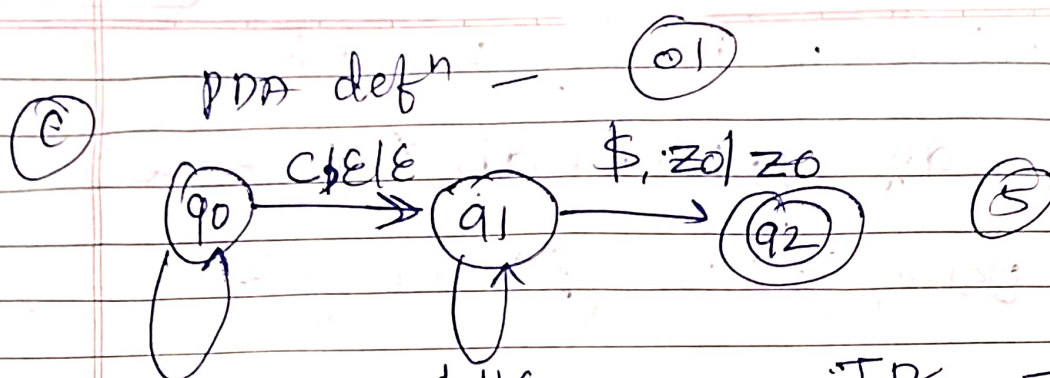
	0	1
q0	q0, q1	q0
q1	q2	q2
q2	q3	φ
q3	q3	q3

	0	1
q0	q0, q1	q0
q0, q1	q0, q1, q2	q0, q2
q0, q1, q2	q0, q1, q2, q3	q0, q2
q0, q2	q0, q1, q3	q0
q0, q1, q3	q0, q1, q2, q3	q0, q2, q3
q0, q2, q3	q0, q1, q3	q0, q3
q0, q3	q0, q1, q3	q0, q3

Transition



Diagram



1,0/1,0

0,1/0,1

1,1/1,1

0,0/0,0

1,0/1,0

0,1/0,1

IDS

(04)

(d) stepwise

$$① \quad q_1 = \epsilon + q_1a + q_3a \quad \text{--- (1)}$$

$$q_2 = q_2b + q_1b + q_3b \quad \text{--- (2)}$$

$$q_3 = q_2a. \quad \text{--- (3)}$$

② Being final state in the form

$$R = Q + RP$$

Use (3) in (2)

$$q_2 = q_1b + q_2b + q_2ab.$$

$$q_2 = q_1b + q_2(b+ab). \quad \text{--- (4)}$$

Using arden's theorem.

$$q_2 = q_1b(b+ab)^* \quad \text{--- (5)}$$

Using (5) in (3) we get.

$$q_3 = q_1 b (b + ab)^* a. \quad \text{--- (6)}$$

Using (6) in (1) we get-

$$q_1 = \epsilon + q_1 a + q_1 b (b + ab)^* a a.$$

$$q_1 = \epsilon + q_1 (a + b (a + ab)^* aa) \quad \text{--- (7)}$$

apply arden's theorem.

$$q_1 = (a + b (a + ab)^* aa)^*$$

$$R/E \text{ for DFA} = (a + b (a + ab)^* aa)^*$$

(E) LND - (04)

RMD - (04)

parse tree - (02)

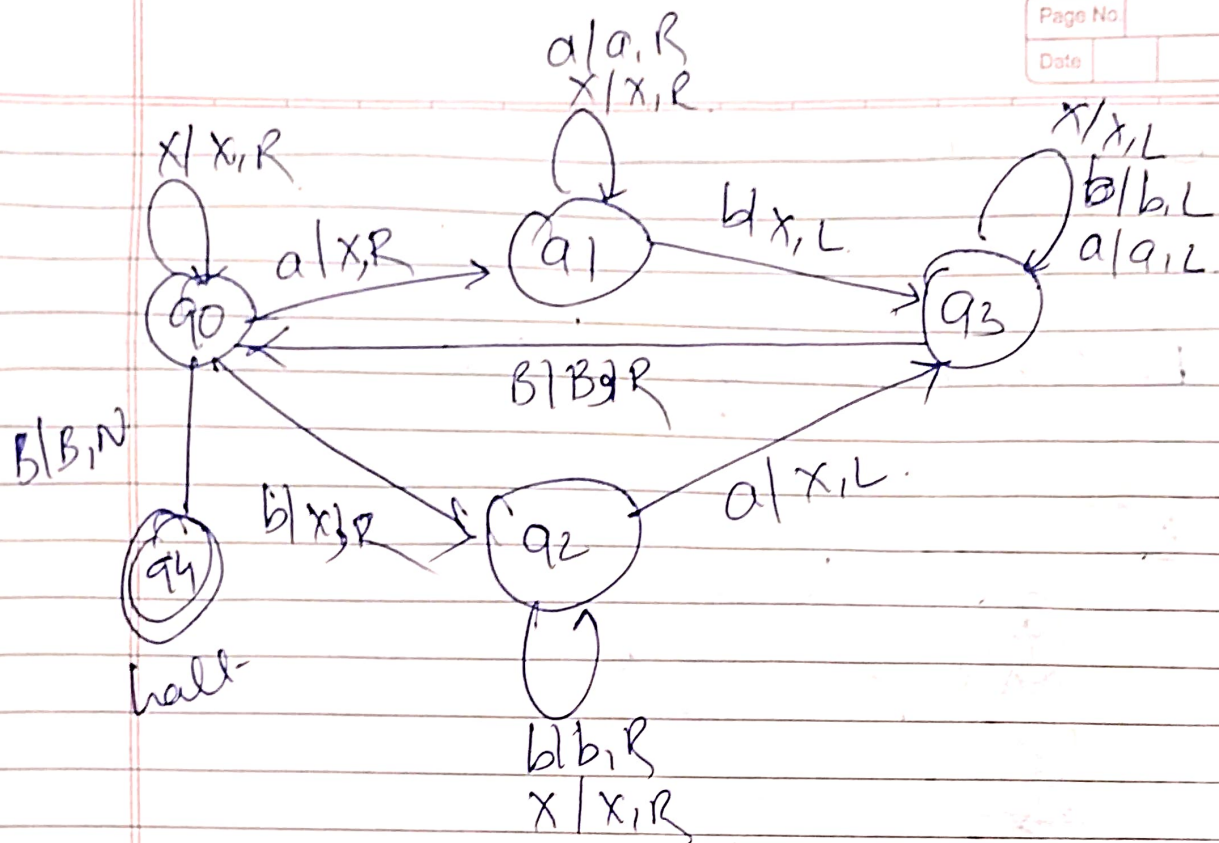
(F) TM.

(1) defⁿ - (02)

(2) Transition diagram - (03)

(3) Transition table - (03)

(4) Example trace - (02)



* (2) ① Remove ϵ -production — ②

$$\begin{aligned}
 S &\rightarrow ASB \mid AB \\
 A &\rightarrow aAS \mid a \mid aA \\
 B &\rightarrow Sbs \mid A \mid bb \mid bs \mid sb \mid b
 \end{aligned}$$

② Remove unit production — ③

$$B \rightarrow A$$

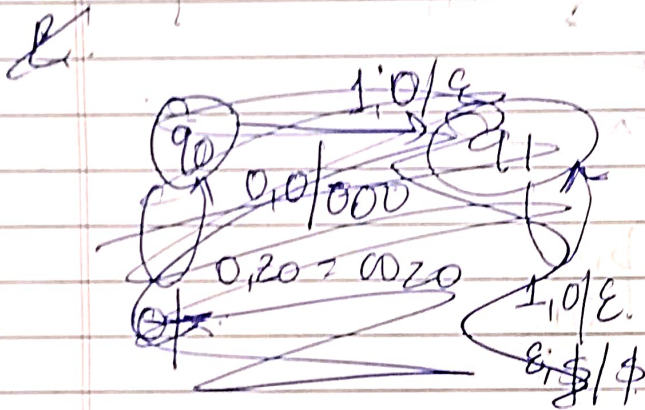
$$B \rightarrow Sbs \mid aAS \mid a \mid aA \mid bb \mid bs \mid sb \mid b$$

③ Conversion — ④

$$\begin{aligned}
 S &\rightarrow PB \mid AB \\
 A &\rightarrow UP \mid a \mid UA \\
 B &\rightarrow QS \mid UP \mid a \mid UA \mid W \mid VS \mid SV \mid b \\
 P &\rightarrow AS \quad Q \rightarrow SV \quad U \rightarrow a \quad V \rightarrow b
 \end{aligned}$$

Q. FA applⁿ - 02
 PDn " - 02
 TM " - 01

E) 5 properties of decision of RL - 05



E) proper justification 5 points - 5M.

P) 5 valid points - 05M.