

28 March 2017, 1:00 m – 2:00 pm

Course Code: CS301	Course Name: Theory of Automata
Instructor Names: Shaharbano - Sehrish Hina	
Student Roll No:	Section No:

Instructions :

- Return the question paper.
- Read each question completely before answering it. There are 5 questions and 2 pages.
- In case of any ambiguity, you may make assumption. But your assumption should not contradict any statement in the question paper.
- Start each question in a new sheet.

Time: 60 minutes.

Max Marks : 50 points

✓ Question 1:

(2+2+1) Points

Build the R.E. for the language

- $L1 = \{w : n_a(w) \text{ and } n_b(w) \text{ are both even}\}.$
- $L3 = \{w : 2n_a(w) + 3n_b(w) \text{ is even}\}.$
- Is $L1 + L3$ a regular Language? Give one statement reason.

✓ Question 2:

10 Points

Construct the FA Model from the R.E.

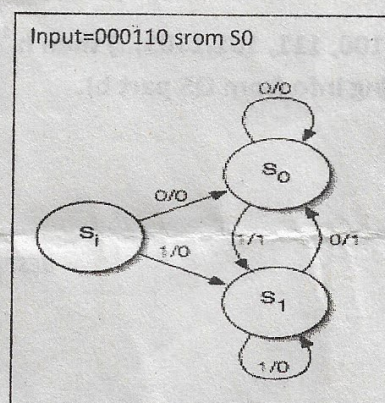
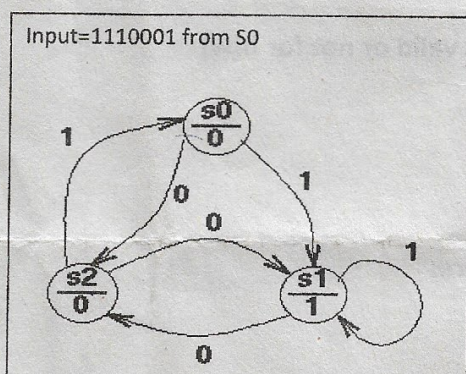
$(a+b)^* ab^*(a+b)^*$

✓ Question 3:

(5+5) Points

Find the output string and transition table:

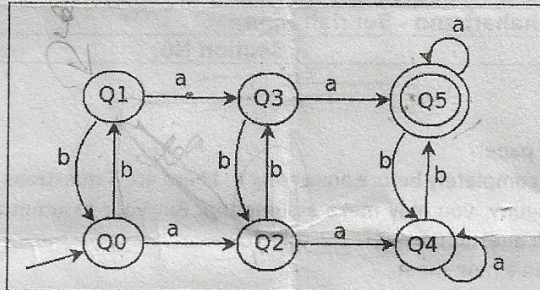
- reading Moore from the Machine
- reading Mealy from the Machine



✓ **Question 4:**

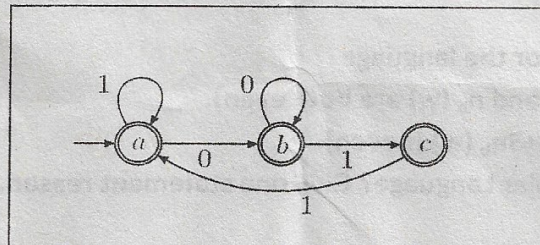
Find the R.E. by state elimination method:

Possible ways
 ① | — — ② | — —
 ③ — — ④ | — —
 there are loops

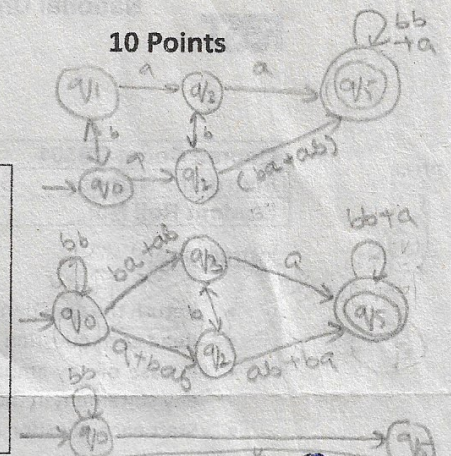


or transitive method

①+②, ①+③
 ④+②, ④+③



10 Points



$(ba+ab)(bb)^*a$ ①
 $+ (ba+ab)(bb)^*b(ab+ba)$ ②
 $+ (a+ba)(bb)^*(ab+ba)$ ③
 $+ (a+ba)(bb)^*ba$ ④

if you concatenate so find that ① and ④ are same, similarly ② and ③ are same. So choose either ① or ④ and ② or ③

(5+5+5) Points

✓ **Question 5:**

a) Let $L = \{ a^n b^n a^n \mid n > 0 \}$ then find if L is a regular or non regular language using Pumping Lemma.

b) Let $\Sigma = \{a, b\}$, $T = \{0, 1\}$ $h(a) = 0011$ and $h(b) = \epsilon$
 if $w = abaab$ then find $h(w) = ??$

c) Let $M = \{100, 111, 101, 1101, \dots\}$ then $h^{-1}(L)$ is valid or not for $h(w)$
 (using info from Q5 part b).

BEST OF LUCK!

$(a b b b b b b a) (a b b b b b b a)$