



# University of Central Punjab

Mid Term Exam (Spring 2024)

Department of Computer Sciences



Program/Semester: BSCS/6<sup>th</sup>

Course Title: TOA

Time Allowed: 90 Minutes

Course Code: CSAL- 3253

Registration No: .....

Max Marks: 40

Q1: (3+7)

Write first 6 strings in increasing order of the following language and design a Deterministic Finite Automata (DFA):

$\Sigma = \{a,b\}$   $L = \{x \mid x \in \Sigma^* \text{ x contains exactly three a's and at least two b's.}\}$

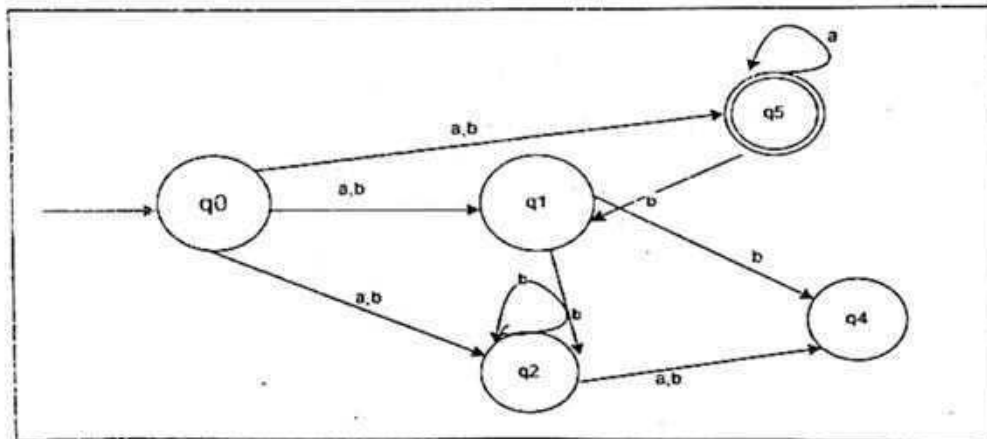
Q2: (5+5)

Write down the Regular Expression for the following Languages;

- a-  $\Sigma = \{a,b\}$   $L = \{x \mid x \in \Sigma^* \text{ x contains even number of b's AND odd no of a's}\}$
- b- Write a regular expression for all strings which does not end with aba over  $\Sigma = \{a,b\}$

Q3: (10)

Convert the following NFA into DFA.



Q4: (3+7)

Write first 9 strings of the following strings and Construct an NFA for the following language:  
 $L = \{w \in \{a,b\}^* \mid \text{contain at least one occurrences of aba and does not end with b.}\}$

Good Luck 😊