MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY BHOPAL
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

EXAMINATION: MID TERM

MONTH and YEAR: March 2025

Course: B.Tech. Semester: 4th

Subject Code: CSE 223

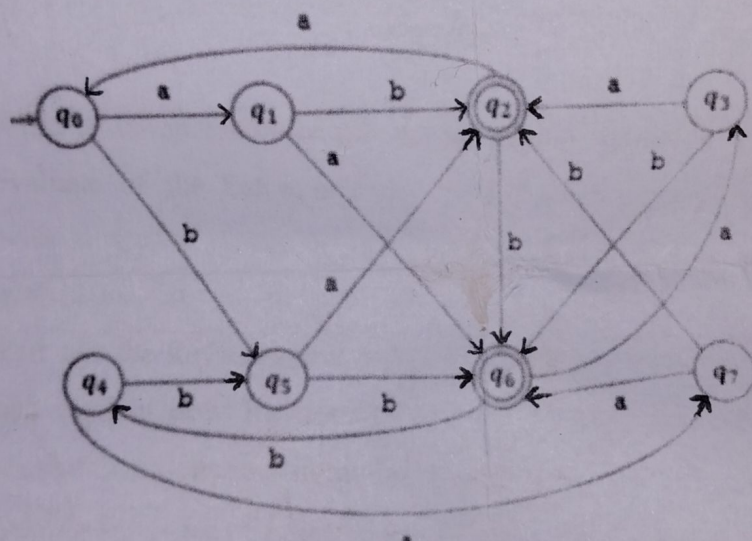Subject Name: Theory of Computation

Maximum Marks: 20

Duration: 1:30 Hour Date: 20/03/2025

Time: 9:30AM to 11:00 AM

Note: *Attempt all the questions. All questions carries equal marks.*

No.	Question	Marks	CO
1. (a) (b)	Construct DFA for the following Languages: All the strings of $\{0,1\}$ with at least length 4 begin and end with substring '10'. $L = \{(2n_a(w) + n_b(w)) \bmod 3 < 2 \mid w \in \{a,b\}^*, n_a(w)$ and $n_b(w)$ are number of a's in w and number of b's in w respectively$\}$	04	CO1
2.	Find a DFA that accepts the following Regular expressions: $((aa + bb + \epsilon)(ab + ba)^*)^* + a$	04	CO2
3.	Minimize the following DFA	04	CO1
4.	Let R_1 and R_2 are two regular languages, show that $R_1 \cap R_2$, $R_1 \cup R_2$ and $R_1 - R_2$ are also regular.	04	CO2
5. (a) (b)	Find the Context Free Grammar for the following languages: $L = \{a^n b^m \mid n \le m \le 2n$ where $n, m \ge 0 \}$ $L = \{n_a(w) = 2n_b(w) \mid w \in \{a,b\}^*\}$ OR	04	CO3
5.	Find the PDA for the following language: $L = \{a^n b^m \mid n \ne m$ where $n, m \ge 0 \}$		

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