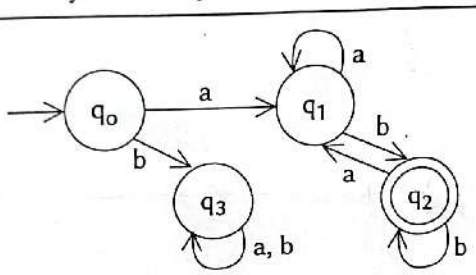
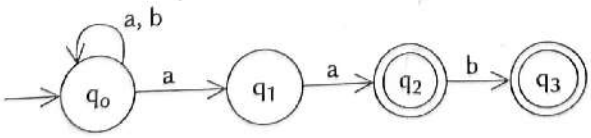
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Daffodil International University
Faculty of Science & Information Technology
Department of Software Engineering
Midterm Examination, Summer 2026
Course Code: SE234 Course Title: Theory of Computing
Sections & Teachers: DDK (A-C), KRY (D, N-O), SHN (E-H), AMR (I-L), AAA (M)

Time: 1:30 Hrs **Marks: 25**

Answer ALL Questions

[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]

1.	*a)*	**Model** a Deterministic Finite Automaton (DFA) over Σ={a, b} for the language - $L = \{w \mid w$ starts with ab and ends with $ba\}$. Show both the state diagram and the transition table.	[Marks-5]	CLO-1 *Level-4*
	b)	**Diagram** a Deterministic Finite Automaton (DFA) over Σ={0, 1} for the language - $L = \{w \mid w$ contains exactly two 1's $\}$.	[Marks-3]	
	c)	 **Trace** the computation of the above DFA for each of the following strings and **confirm** whether each string is accepted or rejected. i. abbaba ii. abbaaab	[Marks-2]	
2.	*a)*	**Model** a Non-deterministic Finite Automaton (NFA) over Σ={a, b} for the language $L = \{w \mid w$ where every a should be followed by $bb\}$. Show both the state diagram and the transition table.	[Marks-3]	CLO-2 *Level-4*
	b)	**Transform** the following NFA into an equivalent DFA using the *subset construction method.* 	[Marks-7]	
3.	*a)*	**Derive** a regular expression for the language $L = \{w \mid w$ has an even number of a's $\}$.	[Marks-3]	CLO-3 *Level-3*
	b)	**Derive** a regular expression for the language $L = \{w \mid w$ contains any number of a's followed by any number of b's $\}$.	[Marks-2]	