



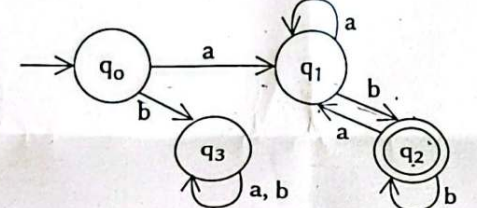
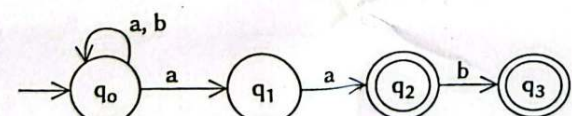
Daffodil International University
Faculty of Science & Information Technology
Department of Software Engineering
Midterm Examination, Summer 2026

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 $\Sigma = \{a, b\}$ for the language - $L = \{w \mid w \text{ starts with } ab \text{ and ends with } ba\}$. Show both the state diagram and the transition table.	[Marks-5]	CLO-1 Level-4
	b) Diagram a Deterministic Finite Automaton (DFA) over $\Sigma = \{0, 1\}$ for the language - $L = \{w \mid w \text{ contains exactly two 1's}\}$.	[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 $\Sigma = \{a, b\}$ for the language $L = \{w \mid w \text{ where every } a \text{ should be followed by } \underline{bb}\}$. 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]	
	a) Derive a regular expression for the language $L = \{w \mid w \text{ has an even number of } a\text{'s}\}$.	[Marks-3]	CLO-3 Level-3
	b) Derive a regular expression for the language $L = \{w \mid w \text{ contains any number of } a\text{'s followed by any number of } b\text{'s}\}$.	[Marks-2]	