



Daffodil International University  
Faculty of Science & Information Technology  
Department of Software Engineering

Final Examination, Spring 2025

Course Code: SE234; Course Title: Theory of Computing

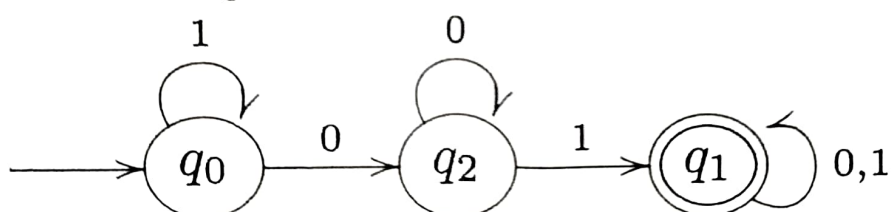
Sections & Teachers: FBR (A,B,C,D), FJT (E, F, G, H), RJM (I)

Time: 2:00 Hrs

Marks: 40

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)	Demonstrate the regular language for the following expression and show one supported and one not supported string: $0^* (100^*)^*$	[Marks-3]	CLO-3 Level-3
	b)	L1) Discover regular expressions corresponding to the language of the binary alphabet where strings have length at least 4 and its third symbol from the right end will not be 1. L2) Discover a Regular expressions defined over $\{a, b, c\}$ for Language $\{\epsilon, c\}$	[Marks-5]	
	c)	Apply state elimination method to discover the Regular expression from the following DFA 	[Marks-5]	
	d)	Examine whether the given grammar is ambiguous or not- $S \rightarrow AB / aaB$ $A \rightarrow a / Aa$ $B \rightarrow b$	[Marks-3]	
	e)	i) Construct context free grammars to accept the following languages. $\Sigma = \{0, 1\}$ $\{w \mid w \text{ starts and ends with the different symbol}\}$ ii) Construct a CFG that generates the language:	[Marks-5]	

		$L(G) = \{ a^n b^m c^m d^{2n} \mid n \geq 1, m > 2 \}$ .		
	f)	Consider the following Context free grammar and <b>evaluate</b> any derivation and parse tree for the string <u>acbd</u> . $S \rightarrow AB$ $A \rightarrow c \mid aA$ $B \rightarrow d \mid bB$	[Marks-4]	
	g)	<b>Illustrate</b> a Non deterministic finite automata for the following regular expression by using the Lemma method. $a^*(a+b)^+b + ab$	[Marks-5]	
	h)	<b>Construct a Push down Automata</b> for the following language: $L = \{ a^n b^m c^m d^n \mid n, m \geq 1 \}$	[Marks-5]	
2.	a)	<b>Picture a Turing Machine graphically</b> over $\Sigma = \{a, b\}$ for the language, $L = \{ w \mid w \text{ contains } baa \}$	[Marks-2]	CLO-4 Level-3
	b)	Turing machines are theoretical models of computation that can be used to define what problems are computationally decidable. <b>Summarize</b> the initial configuration of the Turing machine by mentioning the operations on the tape.	[Marks-3]	