Daffodil International University

Faculty of Science & Information Technology

Department of Software Engineering

Final Examination, Spring 2025

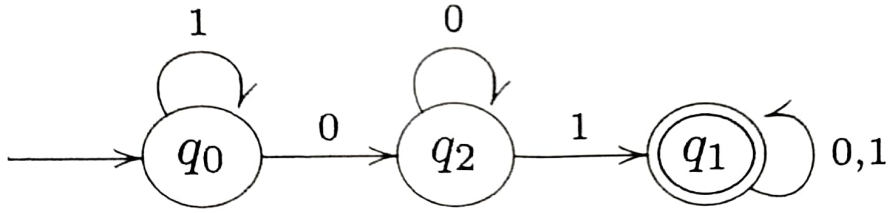
Course Code: SE234; Course Title: Theory of Computing

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 {∈, 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 ⇢ AB / aaB A ⇢ a / Aa B ⇢ b	[Marks-3]	
	e)	**i) Construct context free grammars to accept the following languages. Σ = {0, 1}** **{w | w 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 | n ≥ 1, m > 2}.		
	f)	Consider the following Context free grammar and **evaluate** any derivation and parse tree for the string acbd. S ⇢ AB A ⇢ c | aA B ⇢ d | bB	[Marks-4]	
	g)	**Illustrate** a Non deterministic finite automata for the following regular expression by using the Lemma method. $a^*(a+b)^+b + ab$	[Marks-5]	
	h)	**Construct a Push down Automata for the following language:** **L = {a^n b^m c^m d^n ; n,m >=1}**	[Marks-5]	
2.	*a)*	**Picture** a Turing Machine **graphically** over ∑= {a,b} for the language, L= (w | where w 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. **Summarize** the initial configuration of the Turing machine by mentioning the operations on the tape.	[Marks-3]	

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