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Daffodil International University

Faculty of Science & Information Technology

Department of Computer Science & Engineering

Mid Examination, Summer 2025

Course Code: CSE313, Course Title: Compiler Design

Level: 3 Term: 1 Batch: 64

Time: 01:30 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)***	**S → P M Y** **P → G T** **G → Gen | Millennial | Boomer** **T → z | x | alpha** **M → June | July | May | August** **Y → D D D D** **D → 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9** For the input string: "**Gen z June 2025**", **determine** whether the CFG is ambiguous or not.	**[5]**	**CO 1**
2.	***a)***	**Describe** the phases of a compiler for the following expression. **Exp = Sal - β1×X + β2×Y + β3×Z + ε * 0.3**	**[6]**	**CO 1**
	b)	Consider the following grammar. If there is Left Recursion then eliminate it. A → Cx | Ay B → m | An | Cp C → Ae | x	**[4]**	
3.	***a)***	A simplified access control system is being modeled using a Finite State Machine (FSM). In this system, a user must swipe their ID card (s), enter a correct PIN (p), and then the system grants access (a). The system also allows users to re-enter PIN if it was mistyped after swiping. **Design** a Finite Automaton (FA) that accepts all such strings. Clearly label all states, transitions, and final state(s) and **explain** the five components (5-tuples) of that Finite State Machine (FSM).	**[6]**	**CO 1**

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	b)	If the **3(a) FSM** is classified as a **NFA (Non-deterministic Finite Automaton)**, transform it into an equivalent **DFA (Deterministic Finite Automaton)**. If it is already a **DFA**, provide a justification for why it meets the criteria of determinism.	**[4]**	

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