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)	$S \rightarrow P\ M\ Y$ $P \rightarrow G\ T$ $G \rightarrow Gen \mid Millennial \mid Boomer$ $T \rightarrow z \mid x \mid alpha$ $M \rightarrow June \mid July \mid May \mid August$ $Y \rightarrow D\ D\ D\ D$ $D \rightarrow 0 \mid 1 \mid 2 \mid 3 \mid 4 \mid 5 \mid 6 \mid 7 \mid 8 \mid 9$ For the input string: "Gen z June 2025", determine whether the CFG is ambiguous or not.	[5]	CO1
2.	a)	Describe the phases of a compiler for the following expression. $Exp = Sal - \beta1 \times X + \beta2 \times Y + \beta3 \times Z + \varepsilon * 0.3$	[6]	CO1
	b)	Consider the following grammar. If there is Left Recursion then eliminate it. $A \rightarrow Cx \mid Ay$ $B \rightarrow m \mid An \mid Cp$ $C \rightarrow Ae \mid x$	[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]	CO1
	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]	