VIT
Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)
CHENNAI

Reg. Number:	

Continuous Assessment Test (CAT) – I AUGUST 2025

me	:	B.Tech – Core and Specialization	Semester	:	Fall 2025-2026
Code Title	:	BCSE307L, Compiler Design	Class Number	:	CH2025260100672 CH2025260100673 CH2025260100674 CH2025260100675 CH2025260102433 CH2025260102434 CH2025260102435 CH2025260102436
y	:	MERCY RAJASELVI BEAULAH P SURESHKUMAR WI SUGANYA R ARAVINDKUMAR S NATHEZHTHA T LEKI CHOM THUNGON SREEJA P S KOWSIGAN M	Slot	:	E1+TE1
ion	:	90 Minutes	Max. Mark		50

ral Instructions: < Use this space to provide additional information such as graph sheet, data book etc.>

rite only your registration number on the question paper in the box provided and do not write other formation

se statistical tables supplied from the exam cell as necessary

se graph sheets supplied from the exam cell as necessary

nly non-programmable calculator without storage is permitted

Answer all questions

	Description	Marks	CO	BT Level
	Discuss the comprehensive roles and responsibilities of each phase within a compiler's architecture (3 marks), emphasizing their interaction with critical components such as the symbol table and error handler (2 marks). In parallel, demonstrate the transformation of the provided code snippet as it progresses through these compiler phases, illustrating key outputs representative of each stage (5 marks). Code snippet: **result = (a + b) * (c - d) / e**	10	1	K3
	In a simplified stock market model, each trading day is categorized as either up-dominant or down-dominant, where: (i) **r** → denotes a rise in the stock trend (ii) **f** → denotes a fall in the stock trend The patterns for each type of day are defined as follows: (i) **Up-dominant day:** f* r r* (ii) **Down-dominant day:** (f | r)* r f The stock market model is represented as either an up-dominant day or a down-	15	1	K3

dominant day: **f* r r* | (f | r)* r f**
Convert the given regular expression (RE) of the stock market model into a Deterministic Finite Automaton (DFA) using the direct method, by completing the following steps:

a. Construct the syntax tree and compute **Firstpos** and **Lastpos**. (6 marks)
b. Compute **Followpos**. (4 marks)
c. Construct the DFA. (5 marks)

In a robot movement language, a robot can perform a series of commands like Move, Turn and Repeat. Following are the rules to perform commands were S is the starting symbol:

S → CmdList
CmdList → CmdList Cmd | Cmd
Cmd → Move | Turn | Repeat
Move → *forward* ***num*** | *forward* | *backward* ***num*** | *backward*
Turn → *left* | *right*
Repeat → *repeat* CmdList

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Whereas the terminals are – {forward, backward, left, right, num}
And Non terminals are {S, CmdList, Cmd, Move, Turm, Repeat}

Transform the above CFG to LL(1) grammar and Construct the LL(1) parsing table **(10 Marks).**
Illustrate the full parser trace and parse tree for the given input string :
forward num left right backward (5 Marks).

In a miniature drone flight path language, each path consists of waypoints joined by connectors and may optionally have altitude adjustments. This is formally represented by the following grammar were S is the start symbol:

S → WCW
W → W-A | A
A → height
C → ↔ | =>

Where the terminals are{height, -,↔ ,=>}, the height is the altitude specification , - is the waypoint separator and ↔ ,=> are the different types of connectors between waypoints

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1. Construct the operator precedence relation table for this grammar. (6 Marks)
2. Parse the string: **height - height ↔ height - height** (4 Marks)

Note: -, ↔ , => are left associative and – has higher precedence than ↔ and =>, whereas ↔ and => are of equal precedence.

**********All the best **********

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