PVP 23

Code: 23IT3503

III B.Tech - I Semester - Regular Examinations - NOVEMBER 2025

AUTOMATA THEORY & COMPILER DESIGN
(INFORMATION TECHNOLOGY)

Duration: 3 hours Max. Marks: 70

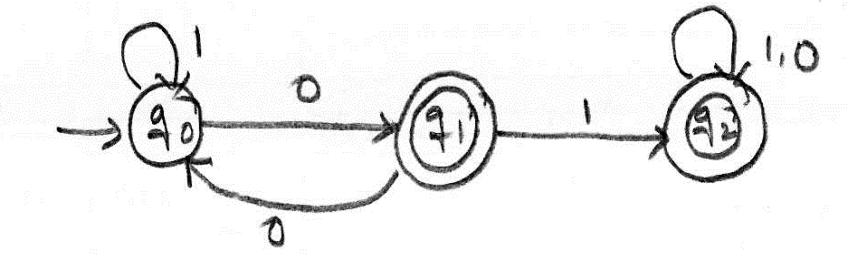
Note: 1. This question paper contains two Parts A and B.
2. Part-A contains 10 short answer questions. Each Question carries 2 Marks.
3. Part-B contains 5 essay questions with an internal choice from each unit. Each Question carries 10 marks.
4. All parts of Question paper must be answered in one place.

BL – Blooms Level CO – Course Outcome

PART – A

		BL	CO
1.a)	What are the applications of Finite Automata?	L2	CO1
1.b)	What are the differences between DFA and NFA?	L2	CO1
1.c)	Describe ambiguous grammar with an example.	L2	CO2
1.d)	Describe halting problem of a Turing Machine.	L2	CO2
1.e)	Differentiate between pass and phase of a compiler.	L2	CO3
1.f)	Define pumping lemma for CFG.	L2	CO2
1.g)	Bottom-up parsing is more powerful than Top-down parsing. Justify.	L2	CO3
1.h)	What do you mean by the strength of attribute grammar?	L2	CO3
1.i)	Explain about Constant folding.	L2	CO4
1.j)	Distinguish between Machine Dependent and Independent optimization.	L2	CO4

PART – B

			BL	CO	Max. Marks
		UNIT-I			
2	a)	Define and describe Finite Automata. Illustrate NFA with an example.	L3	CO1	5 M
	b)	Construct DFA to accept strings of a's and b's having an even number of a's and even number of b's.	L3	CO1	5 M
		OR			
3	a)	Construct Finite Automata for the regular expression (11+0)*(00+1)*.	L3	CO1	5 M
	b)	Find the regular expression generated by the following Finite Automata. 	L3	CO2	5 M
		UNIT-II			
4	a)	Design a PDA for equal number of a's and b's.	L3	CO2	5 M
	b)	What is ambiguous grammar? Check whether the given grammar is ambiguous or not? S→ i C t S | i C t S e S | a, C→ b	L3	CO2	5 M
		OR			
5	a)	Describe the process of designing a PDA with given CFG with suitable example?	L2	CO2	5 M

	b)	Construct Turing Machine for accepting strings of the language defined as $L= \{WCW^r \mid W \in (0 + 1)^*\}$.	L3	CO2	5 M
		UNIT-III			
6	a)	Illustrate different phases of a Compiler for position = initial +rate *60.	L3	CO3	5 M
	b)	Consider the following Conditional statement: if (x > 3) then y = 5 else y = 10; How does a lexical analyser help the above statement in the process of compilation?	L3	CO3	5 M
		OR			
7	a)	State whether the following grammar is LL(1) or not. Justify the answer. $S \rightarrow aBCd \mid dCBe$ $B \rightarrow bB \mid \varepsilon$ $C \rightarrow ca \mid ac \mid \varepsilon$	L3	CO3	5 M
	b)	Write the stepwise procedure of FIRST( ) and FOLLOW( ) with an example.	L3	CO3	5 M
		UNIT-IV			
8	Validate whether the following grammar is SLR or not? Justify. $E \rightarrow E - T \mid T$ $T \rightarrow F \mid *f$ $F \rightarrow i \mid (E)$		L3	CO3	10M
		OR			

9	a)	Demonstrate the functioning of Shift-Reduce parsing with a neat diagram and an example.	L3	CO3	5 M
	b)	Write SDT syntax tree for an arithmetic expression a = b+c*d.	L2	CO3	5 M
UNIT-V					
10	a)	Define Three address code. Outline various Three Address code representations for the expression. x + - y * (- y + z).	L2	CO4	5 M
	b)	Write a short note on i) Type Checking. ii) Type Conversions.	L2	CO4	5 M
OR					
11	a)	Describe various issues in the design of a Code Generator.	L2	CO4	5 M
	b)	Elaborate Peephole optimization technique.	L3	CO4	5 M