Question Paper Code: R22A31IT01

R22

ANURAG Engineering College

(An Autonomous Institution)

III B.Tech I Semester Regular Examinations, December – 2024

AUTOMATA AND COMPILER DESIGN

(INFORMATION TECHNOLOGY)

Time: 3 Hours **Max. Marks: 60**

Section – A (Short Answer type questions) (10 Marks)

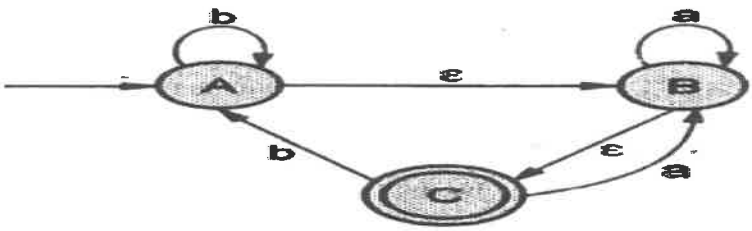
Answer All Questions

		Course Outcome	B.T Level	Marks
1.	Give any two differences between NFA and DFA.	CO1	L1	1M
2.	Explain transition diagram, transition table with example.	CO1	L1	1M
3.	Differentiate left linear and right linear derivations.	CO2	L2	1M
4.	Define Context Free Grammars.	CO2	L1	1M
5.	Define Turing Machine	CO3	L1	1M
6.	List the steps to convert CFG to PDA.	CO3	L2	1M
7.	Differentiate between top-down parser and bottom-up parser.	CO4	L2	1M
8.	Define the following terms: a) Lexeme b) Token	CO4	L1	1M
9.	Define L attribute and S attribute.	CO5	L1	1M
10.	What are Abstract Syntax trees?	CO5	L1	1M

Section B (Essay Questions)

Answer all questions, each question carries equal marks. **(5 X 10M = 50M)**

11. A) Convert the following NFA with € into equivalent NFA without € — CO1 L3 10M



OR

B) Convert the following NFA into DFA — CO1 L3 10M

State	0	1
→q0	q0	q1
q1	{q1, q2}	q1
*q2	q2	{q1, q2}

Draw complete DFA

12. A) Construct Leftmost Derivation, Rightmost Derivation, Derivation Tree for the following grammar — CO2 L3 10M

$G = (V, T, P, S)$ with V = {E}, $S = E$, $T = \{id, +, *, (,)\}$

E->E+E

E->E* E

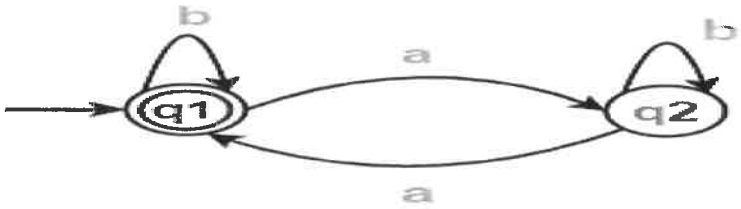
E-> (E)

E->id

Obtain id+id*id in right most derivation, left most derivation

OR

B)	i) Convert given Finite Automata to Regular Expression using Arden's theorem with an example.	CO2	L3	6M



	ii) Apply pumping lemma for the language L= {an/n is prime} and prove that it is not regular.			4M
13. A)	i) Define Push Down Automata. Explain the basic structure of PDA with a neat graphical representation.	CO3	L2	4M
	ii) Design a PDA for the following language L= {0 n 1 2n / n≥1}.			6M
	OR			
B)	Construct a Transition diagram for Turing Machine to accept the following language. L = { 0n1n0n | n ≥1}	CO3	L3	10M
14. A)	Explain the various phases of a compiler with an illustrative example	CO4	L2	10M
	OR			
B)	Construct an LALR Parsing table for the following grammar: E-> E+T |T T-> T*F|F F->id	CO4	L3	10M
15. A)	What is a three-address code? Mention its types. How would you implement the three-address statements? Explain with examples.	CO5	L3	10M
	OR			
B)	i) Explain the Translation scheme of SDD.	CO5	L2	5M
	ii) Give syntax directed translation scheme for simple desk calculator			5M