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KAMALA INSTITUTE OF TECHNOLOGY & SCIENCE, SINGAPUR

23AM28PC402

II.B. Tech. II. Semester Regular Examinations, June-2025

AUTOMATA THEORY AND COMPILER DESIGN

(AIML)

Time: 3 Hours

Max. Marks: 60

Note: Question paper consists of Part-A & Part-B.

i) **Part-A** for 10M, ii) **Part-B** for 50marks

- Part A** is compulsory, consists of 10 sub questions from all units carrying equal marks.
- Part-B** consists of **10 questions** (numbered from 2 to 11) carrying **10marks** each. From each unit there are 2 questions and the students should answer one of them. Hence the student should answer **5 questions** from **Part-B**.

PART-A		(10Marks)	
Q. No	Questions	Marks	BTL
1.a)	Give the formal definition of a language.	1	1
1.b)	Define DFA.	1	1
1.c)	Define a Context Free Grammar.	1	1
1.d)	What is meant by ambiguous grammar?	1	1
1.e)	Define Regular Grammar	1	1
1.f)	What is Turing machine?	1	1
1.g)	Write a short note on input buffering.	1	2
1.h)	Write the difference between Top-Down and Bottom-Up Parsing	1	2
1.i)	Construct a DAG for the expression $a=b^*c + b^*c$.	1	3
1.j)	What do you mean by machine dependent code generation?	1	1
PART-B		(50Marks)	
Q.No.	Questions	Marks	BTL
2. a)	Design FA for the following Regular Expression over $\Sigma\{0, 1\}$ a) $01(1+0)^*10$ b) $11(0+1)^*101(0+1)^*\{0, 1\}$	10M	6
OR			
3. a)	Construct a NFA with ϵ equivalent to the regular expression: $10 + (0 + 11)0^*1$.	5M	6
b)	Consider the Moore machine shown in the below figure. Construct the transition table. What is the output for input 01010? 	5M	6
4. a)	How do we eliminate ambiguity from a grammar? Explain with an Example	5M	1
b)	Explain elimination of left recursion in the grammar $E \rightarrow E+T/T$ $T \rightarrow T*F/F$	5M	2

	F→(E) /id		
OR			
5. a)	Describe the applications of regular expressions.	5M	2
b)	Discuss the Algebraic laws of regular expressions.	5M	2
6. a)	Explain top down parsing methods with example?	5M	2
b)	Construct a Turing machine for the languages containing set of all strings of balanced parenthesis.	5M	6
OR			
7. a)	Construct a PDA that accepts $L=\{0^n 1^{2n}\}$.	5M	6
b)	Difference between PDA and Turing Machine	5M	4
8. a)	Discuss about the role of the lexical analyzer	5M	2
b)	Discuss the problems associated with top-down parsing.	5M	3
OR			
9. a)	What will be the context free grammar for languages accepting palindromes of binary numbers? $E \rightarrow E + E \mid E - E \mid E * E \mid E / E \mid E . E \mid (E) \mid -E \mid id$	5M	1
b)	Consider the grammar given below. $E \rightarrow E + T$ $E \rightarrow T$ $T \rightarrow T *$ $F T \rightarrow F$ $F \rightarrow (E)$ $F \rightarrow id$ Prepare LR parsing table for the above grammar. Give the moves of LR parser on $id * id + id$.	5M	2
10.a)	Generate the three-address code for the following C program fragment while ($a > b$) <pre>{ if (c < d) x = y + z; else x = y - z; }</pre>	5M	2
b)	Define a Directed Acyclic Graph. Construct a DAG and write the sequence of instructions for the expression $a + a * (b - c) + (b - c) * d$.	5M	1
OR			
11.a)	Explain the following terms. a) Three address code. b) Variants of syntax trees.	5M	2
b)	Explain Intermediate code generation for Basic block, Control Flow and Boolean Expressions?	5M	2

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