



Sri Sivasubramaniya Nadar College of Engineering, Kalavakkam – 603 110
(An Autonomous Institution, Affiliated to Anna University, Chennai)

Department of Information Technology

Continuous Assessment Test – II

Regulations – R2021

Degree B.E. / B. Tech.	B.Tech	Branch	IT
Semester	III	Date of CAT	31-05-2023
Subject Code & Name	UIT2404 & Automata Theory and Compiler Design		
Time: 90 Minutes	Answer All Questions		Maximum: 50 Marks

(K1: Remembering, K2: Understanding, K3: Applying, K4: Analyzing, K5: Evaluating)

CO1:	Construct automata, regular expression for any pattern.
CO2:	Write Context free grammar for any construct.
CO3:	Build the different Phases of compiler and apply the various optimization techniques.
CO4:	Design Turing machine for a given language
CO5:	Explain decidability, semi-decidability, and undecidability

Part – A (4 × 2 = 8 Marks)

		KL	CO	PI
1.	Compare PDA and DFA.	K2	CO1	1.1.1 1.4.1 2.1.3
2.	Compute FIRST and FOLLOW for the following grammar: $S \rightarrow (L) / a$ $L \rightarrow SL / \epsilon$	K2	CO1	1.3.1 1.4.1 2.1.3
3.	Why some grammars can't be parsed by LL(1) parser?	K3	CO3	1.3.1 1.4.1 2.1.3
4.	Write the equivalent left factored grammar for the following grammar. $S \rightarrow aAb \mid aB$ $A \rightarrow a \mid ab$ $B \rightarrow ccd \mid ddc$	K2	CO2	1.1.1 1.3.1 1.4.1 2.1.3

Part – B (3×6 = 18 Marks)

		KL	CO	PI
5.	Design a pushdown automata that accepts the set of all strings of 0 and 1 with an equal number of 0 and 1.	K3	CO1	1.1.1 1.4.1 2.1.3 13.1.1

6.	Construct the output of various stages of compilation in translating the input string, " $a = (b * c * d) + 100/2$ " into target code. Explain result of each stage in detail.	K3	CO3	1.1.1 1.4.1 2.1.3 13.1.1
7.	Construct the top down and bottom-up parse tree for the string 00101 by following the context free grammar given below. $S \rightarrow A1B$ $A \rightarrow 0A / \epsilon$ $B \rightarrow 0B / 1B / \epsilon$	K3	CO2	1.1.1 1.4.1 2.1.3 13.1.1

Part – C (2 × 12 = 24 Marks)

		KL	CO	PI
8.	Convert the following CFGs to CNF and GNF. $S \rightarrow AB, A \rightarrow B, B \rightarrow aBb / \epsilon$ $S \rightarrow aA / bB, B \rightarrow bB / b, A \rightarrow aA / a$	K3	CO2	1.1.1 1.4.1 2.1.3 13.1.1
OR				
9.	Find equivalent simplified CFG by eliminating all the useless symbols and productions $S \rightarrow AC + B, A \rightarrow a, C \rightarrow c + BC, E \rightarrow aA + \epsilon$	K3	CO2	1.1.1 1.4.1 2.1.3 13.1.1
OR				
10.	Consider the grammar $S \rightarrow (L) a$ $L \rightarrow L, S S$ Construct the operator precedent relations for the grammar and parse the following sentence (a, ((a, a), (a, a))) using the precedence relations.	K3	CO3	1.1.1 1.4.1 2.1.3 13.1.1
OR				
11.	Consider the following grammar $S \rightarrow SS + SS * a$ a) Construct the collection of LR(0) items for this grammar. b) Construct the parsing table. Is the grammar SLR? Justify. c) Show the actions of your parsing table on input aa^*a^+	K3	CO3	1.1.1 1.4.1 2.1.3 13.1.1

10 aa^*a^+

1002 a^*a^+

1050 a^*

105a2 a^*a^+

10553 a^*a^+

1055#5 a^*a^+

1050 a^*a^+

10202 a^*a^+

10553 a^*a^+

1055+4 a^*a^+

105 a^*a^+