Register number _____

SRM Institute of Science and Technology

Faculty of Engineering and Technology
Ramapuram Campus
Department of Computer Science & Engineering

Academic Year: 2022-23 (ODD)
Continuous Learning Assessment -2

Course Code & Title: 18CSC301T & Formal Languages and Automata Theory

Duration: 90 Mins **Date: 19.10.2022**
Year & Sem: III Year /V Sem (CSE, CSE with all specialization & IT) **Max. Marks: 50**

Set -A

Course articulation matrix:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO-1	3														3
CO-2		3	2												3
CO-3		3	3												3
CO-4		3	3												3
CO-5			3	1									2		3

Part - A

Instructions: Answer any two questions

Q. No	Question	Marks	BL	CO	PO	PI Code
1	Consider the following grammar S → NP VP S → Aux NP VP S → VP NP → Det NOM NOM → Noun NOM → Noun NOM VP → Verb VP → Verb NP Det → that | this | a | the Noun → book | flight | meal | man Verb → book | include | read Aux → does i. How many productions in the given CFG are already in CNF? (1 Mark) a. 16 b. 12 c. 4 d. 13 ii. The given production are Type _____ grammar. (1 Mark) a. 0 b. 1 c. 2 d. 3 iii. List the terminal and non-terminal symbols (3 Marks)	25	3	2, 3	4	4.2.1

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	iv. Give the equivalent PDA rules for the grammar given in question (5 marks) v. Check if the above grammar could generate the string "does this flight include a meal" (4 marks) vi. Simplify the grammar (7 Marks) vii. Convert the above CFG to Chomsky Normal Form (CNF) (4 Marks)					
2	Read the following scenario and answer the following questions. Consider there are two color cubes (Red and Yellow) they are equal in number. The logic is Red cube to be taken and stack all the Red cubes first. Later once no more Red cubes are available, for each Yellow cube remove one Red cube from the stack. Make sure stack should be cleared. i. What is the maximum stack size for a PDA? (1 Mark) a. n b. 2 ^ n c. infinite d. n * n ii. Is the language generated for the given scenario is regular? (1 Mark) a. Yes b. No iii. Generate the accepting language for above Scenario. (3 Marks) iv. Construct CFG for the above Scenario. (4 Marks) v. Design PDA transitions for the given scenario. (5 marks) vi. List the PDA and CFG Tuple representations for above scenario. (4 Marks) vii. Illustrate a PDA Diagram for the above scenario. (4 Marks) viii. Check whether 3 consecutive yellow followed by three consecutive red balls can be taken? (3 Marks)	25	4	2, 3	4	4.2.1
3	Consider the following CFG for any programming construct BLOCK → STMT | { STMTS } STMTS → ε | STMT STMTS STMT → EXPR | if (EXPR) BLOCK | while (EXPR) BLOCK | do BLOCK while (EXPR) | BLOCK EXPR → a | constant | EXPR + EXPR | EXPR – EXPR | EXPR * EXPR | EXPR/EXPR i. What can be told about the given grammar? (1 Mark) a. It is ambiguous for the string a+a*a b. It is unambiguous for the string a+a*a c. It cannot derive the string a+a*a d. It can derive the string a+*a- ii. Which of the following is not true about ambiguous grammar? (1 Mark) a. It has two leftmost derivations. b. It has two rightmost derivations. c. It is sufficient to derive one leftmost and one rightmost derivation to prove its ambiguity. d. It has two parse trees. iii. Remove the null production (3 Marks) iv. Remove the unit production (4 Marks) v. Remove the useless symbols (4 Marks) vi. Convert it into GNF (12 Marks)	25	3	2	4	4.2.1