NATIONAL INSTITUTE OF TECHNOLGY PATNA

Department of Computer Science & Engineering

END SEMESTER EXAMINATION, July-December 2021

B. Tech-CSE: Semester-V

Course Name: Compiler Design — Course Code: CS5404

Maximum Time: 2 hours — Max. Marks: 40

Instruction:

1. Attempt all questions.
2. Assume any suitable data, if necessary.
3. The Marks, CO (Course Outcome) and BL (Bloom's Level) related to questions are mentioned on the right-hand side margin.

	Questions	Marks	CO	BL
Q1.	Design LR(0) parsing table for the following CFG S → L = R | R L → * R L → id R → + L	5	CO-2	Create
Q2.	Explain the role of Symbol Table and Error Handler in the compilation process.	3	CO-1	Understand
	Construct the operator relation table and the function table for the following CFG T → XR / X R → bXR / bX X → WbX / W W → L * W / L L → id	7	CO-2	Analyze
Q3.	Design the syntax tree for the given SDT and show what will be the output if this SDT is carried out for the nnput String: "x+y+z" SDT: S → X + Y + Z {S.val = X.val+ Y.val + Z.val} X → num {X.val = num.val} Y → num {Y.val = num.val} Z → num {Z.val = num.val} Note: here x, y, and z are representing the last three digits of your roll number which need to be replaced by the last three digits of your roll number while solving the problem.	5	CO-1, CO-2	Create
Q4.	(a) Apply the optimization techniques to derive the optimized version of the following 3-address code	3	CO-4	Apply

	Y = W + X Z = Y Y = Y – V W = Z – V X = X*V X = Z/X			
	(b) Describe the concepts of Quadruples, Triples, and Indirect triples along with their advantages and limitations with the help of following expression (w+x)*(y+z)+(w+x+y)	7	CO-3	Remember
Q5.	(a) Explain the importance of the control flow analysis (CFA) in compiler design.	2	CO-4	Understand
	(b) Derive the three-address code (TAC) of the following high-level code and apply the CFA to identify the loop in the derived TAC Note: In this program x, y, and z are representing the last three digits of your roll number which you have to replace by the last three digits of your roll number while writing the TAC. *main()* *{* *int roll_no[] = {x, y, z};* *int sum = 0;* *for (int i = 0; i < 3; i++)* *{* *sum+ = roll_no[i];* *}* *if (sum < 100)* *printf ("CSE-I student");* *else* *printf ("CSE-II student");* *}*	8	CO-4	Create