

Roll Number: \_\_\_\_\_

**Thapar Institute of Engineering and Technology, Patiala**  
**Department of Computer Science and Engineering**  
**Mid Semester Test**

**B.E. COE/CSE: Semester-VII**

**Course Name: Compiler Construction (UCS 802)**

**October 3, 2024, at 8 AM**

**Time: 2 Hours M. Marks: 30**

**Faculty: Shalini Batra, Karun Verma, Rupali Bhardwaj, Geeta Kasana, Shashank Singh**

*Note: Attempt all the questions. Attempt parts of one question in sequence. Draw neat diagrams wherever required. Pencil should only be used to draw diagrams. Assume any missing data. Use of calculator is strictly not allowed.*

		Marks	Bloom's	CO Mapping
Q1	Consider a regular expression $ab(a b)ba^*$ a) Using the syntax tree method, draw the annotated syntax tree. Find the <i>firstpos</i> , <i>lastpos</i> and <i>followpos</i> . b) Construct the DFA for the above regular expression using the syntax tree method.	(4)  (2)	L3  L3	CO1  CO1
Q2	a) Consider the following grammar: $A \rightarrow Cd$ $B \rightarrow Ce$ $C \rightarrow A   B   f$ Eliminate left recursion from given grammar by considering the order of non-terminals C, B, and A only. b) Perform left factoring on given grammar- $S \rightarrow aSSbS   aSaSb   abb   b$	(3)      (3)	L3     L3	CO2     CO2
Q3	Use the following grammar and answer the following questions $S \rightarrow XBZ$ $X \rightarrow aX   \epsilon$ $B \rightarrow cBd   D$ $D \rightarrow e   \epsilon$ $Z \rightarrow f   \epsilon$ a) Compute the <b>FIRST</b> and <b>FOLLOW</b> sets for all non-terminal symbols. b) Construct the LL(1) parsing table based on the given grammar. c) Determine if the string " <i>aaced</i> " can be parsed using the LL(1) parser. Show the step-by-step parsing process using a stack.	      (2) (2) (2)	      L3 L3 L3	      CO2 CO2 CO2
Q4	Consider Grammar $G = \{\{S, E, P\}, \{id, =, (, ), +\}, \{S\}, P\}$ , where P is a set of Productions consisting of the following productions. $S \rightarrow id = E$ $E \rightarrow E + P$ $E \rightarrow P$ $P \rightarrow id$ $P \rightarrow ( E )$ $P \rightarrow id ( E )$			

	a) Write out the complete SLR parsing table for Grammar G.	(4)	L3	CO2
	b) Parse the following string " $id_4 = id_3(id_1 + id_2)$ " using the parsing table above, showing all the steps and underlining the handles used.	(2)	L3	CO2
Q5	a) Consider the statement $C = a + b * 23$ . Apply each phase of the compiler on the above statement to generate the target code.	(4)	L2	CO1
	b) Using Panic Mode Error Recovery, explain how a compiler would detect and handle the syntax error in the code snippet below. Describe the steps the compiler would take to recover from the error and resume parsing the rest of the code. <pre> #1.    itn main() #2.    { #3.        int a = 5; #4.        if (a &gt; 10 { #5.            print("Value is greater               than 10"); #6.        } #7.        print("End of program"); #8.    }</pre>	(2)	L4	CO2

\*\*\*\*\* All The Best \*\*\*\*\*

