

JK Lakshmipat University, Jaipur
INSTITUTE OF ENGINEERING AND TECHNOLOGY

End-Term Examination, December 2025

B. Tech. in CSE, Semester VII

Roll No.....

CS1112: Compiler Design

Time: 2 hours

Max. Marks: 30

Instructions to students:

1. Do not write anything other than your roll number on question paper.
2. Assume suitable data wherever required and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.
4. COs refers to the course outcomes of the course structure.

- | | Marks | COs |
|--|--------------|---------------|
| 1. Generate the intermediate code for the following code segment along with the required syntax directed translation scheme.
<pre>int a, b; float c; a=10; switch(a) { case 10: c=1; case 20: c=2; }</pre> | 6 | CO4 |
| 2. Consider the following grammar for list structures and solve the given questions:
$S \rightarrow a \mid ^ \mid (T)$
$T \rightarrow T, S \mid S$
a. Eliminate the left recursion from the grammar by reversing the first alternate for T.
b. Write a recursive routine for the non-terminals in (a) and show the steps of top down parser with backtrack on the string (a, (a, a)).
c. Left factor the grammar for part (b)
d. Repeat part (b) for the grammar obtained in part (c). Compare the speed of two parsers.
e. Grammar in part (c) is LL (1) or not? | 10 | CO2, 3 |
| 3. Convert the below program into its equivalent three address code. Optimize the code and generate flow graph as per the given instructions.
<pre>while A < C and B < D do if A = 1 then C = C+1 else while A <= D do A = A+2</pre>
a) Partition the program into the basic blocks.
b) Find the loops in the flow graph.
c) Move the loop invariant computations out of the loops.
d) Find and eliminate the induction variables of each loop wherever is possible. | 8 | CO4, 5 |
| 4. Design LALR parsing table by defining the canonical items for the grammar
$G = \{V = \{S, L, R\}, \Sigma = \{=, *, id\}, P, S\}$. Where productions are defined below:
$P = \{S \rightarrow L=R \mid R, \quad L \rightarrow *R \mid id, \quad R \rightarrow L\}$ | 6 | CO3 |