5. (a) Consider the following grammar :

$E \rightarrow (L) \mid a$

$L \rightarrow L, E \mid E$

(i) Construct the DFA for the LR(0) items for this grammar.

(ii) Construct SLR(1) parsing table.

10 Marks (CO2)

OR

(b) Define Predictive parsing. Explain why predictive parsing doesn't include backtracking.

Given the CFG G = {S, {S, U, V, W}, {a, b, c, d}, P} with P given as shown below :

S –> UVW

U –> (S) | aSb | d

V –> aV | ε

W –> cW | ε

Find FIRST( ) and FOLLOW( ) of the variables S, U, V, W. 10 Marks (CO2)



H Roll No. .....

# TCS–601

## B. TECH. (SIXTH SEMESTER)

## MID SEMESTER EXAMINATION,

## April/May, 2022

## COMPILER DESIGN

**Time : $1\frac{1}{2}$ Hours**

**Maximum Marks : 50**

**Note :** (i) Answer all the questions by choosing any ***one*** of the sub-questions.

(ii) Each sub-question carries 10 marks.

1. (a) Explain different stages of compiler and discuss their role in compilation process with a suitable example. Also discuss why is it needed to break the compilation process into front end and back end ?

10 Marks (CO1)

*P. T. O.*

OR

(b) Explain the concept of the symbol table in context of its handling of scopes within a computer program. Design an abstract symbol table with a hashtable and linked lists. 10 Marks (CO1)

2. (a) Explain left-recursion elimination with an example. Eliminate left-recursion from the following grammar : 10 Marks (CO2)

$L \rightarrow L + T$

$L \rightarrow L - T$

$L \rightarrow T$

$T \rightarrow T*F$

$T \rightarrow T/F$

$T \rightarrow F$

$F \rightarrow D \mid (L)$

$D \rightarrow 0 \mid 1 \mid 2 \mid 3 \mid 4 \mid 5 \mid 6 \mid 7 \mid 8 \mid 9$

OR

(b) Explain the working principle of operator precedence parsing algorithm. Explain the parshing action for the input string id-id/id*id-id with reference to the following grammar : 10 Marks (CO2)

$E \rightarrow E - E \mid E/E \mid E * E \mid id$



3. (a) Define syntax directed definition. Explain the role of semantic rules and semantic actions in syntax directed translation with examples. 10 Marks (CO3)

OR

(b) What are S-attributed and L-attributed SDT definitions ? Explain S-attributed translation definition of infix to postfix conversion with an example considering only {+, –} operators. 10 Marks (CO3)

4. (a) Why do we use finite automata for recognizing tokens in the lexical analyzer phase of the compiler design ? Create an FA for recognizing a floating point integer. 10 Marks (CO1)

OR

(b) What is the use of 'lex' as a tool in compiler design ? Discuss the structure of a lex program in detail and write a lex code to recognize an identifier in an input string. 10 Marks (CO1)