Total No. of printed pages = 5

63/2 (SEM-4) CSIT 4.2

2022

CSIT

(Theory Paper)

Paper Code : CSIT 4.2

(Compiler Design)

Full Marks – 80

Time – Three hours

The figures in the margin indicate full marks for the questions.

Question No. 1 is compulsory and answer any *five* from the rest of the questions.

1. Choose the correct option : 1×5=5

   (a) Which of the following methods is used by bottom-up parser to generate a parse tree ?

   (i) Leftmost derivation

   (ii) Rightmost derivation

   (iii) Leftmost derivation in reverse

   (iv) Rightmost derivation in reverse

(b) Handle pruning forms the basis of

(i) Bottom-up parser

(ii) Top-down parsing

(iii) Both (i) and (ii)

(iv) None of these

(c) A group of logically related characters in the source program is known as

(i) Token (ii) Lexeme

(iii) Parse Tree (iv) Buffer

(d) Which of the following is the most powerful parsing method ?

(i) LL (1) (ii) Cannonical LR

(iii) SLR (iv) LALR

(e) Which two functions are required to construct a parsing table in predictive parsing technique ?

(i) CLOSURE ( ) and GOTO ( )

(ii) FIRST ( ) and FOLLOW ( )

(iii) ACTION ( ) and GOTO ( )

(iv) None of these.

2. (a) Draw the transition diagram for unsigned number. 3

(b) Construct a minimum state automation equivalent to the finite automata from the given transition table : 8

State/Σ	0	1
q_0	q_1	q_5
q_1	q_6	q_2
q_2*	q_0	q_2
q_3	q_2	q_6
q_4	q_7	q_5
q_5	q_2	q_6
q_6	q_6	q_4
q_7	q_6	q_2

(c) Convert the given Regular Expression into DFA : 4

(a/b)* a (a/b).

3. (a) What is left factoring and left recursive grammar ? Write the definitions of ambiguous grammar ? Prove the grammar is ambiguous E→E+E/E*E/(E) / id.

2+2+1+4=9

Or

Explain the different phases of compiler with suitable examples.

(b) Eliminate Left recursion for the following grammar : 3

$S \rightarrow S+S/S-S/S*S/num.$

(c) Perform Left factoring for the following grammar : 3

$A \rightarrow aBcC/aBb/aB/a$

$B \rightarrow \varepsilon$

$C \rightarrow \varepsilon.$

4. (a) What is LEX ? Write structure of Lex programme. 3+4=7

(b) Using parsing table show that the given grammar is LL (1). 8

$E \rightarrow E+T/T$

$T \rightarrow T*F/F$

$F \rightarrow (E)/id.$

5. What is Top-down and Bottom-up parsing ? Define handle and handle pruning. Explain shift-reduce parsing with stack implementation. 5+4+6=15

6. (a) Explain LR parser with different components. 7

(b) Construct the LR (0) items and the SLR parsing table for the following grammar : 8

$E \rightarrow E+T/T$

$T \rightarrow T*F/F$

$F \rightarrow (E)/id.$

7. Write short notes on any *three* : 5×3=15

(a) LL (1) grammar

(b) Regular Expression

(c) Role of Parser

(d) Context Free Grammar (CFG)

(e) Predictive Parser.