

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
SIXTH SEMESTER B.TECH DEGREE EXAMINATION(R&S), MAY 2019

Course Code: CS304
Course Name: COMPILER DESIGN

Max. Marks: 100

Duration: 3 Hours

PART A

Answer all questions, each carries 3 marks.

Marks

- | | | |
|---|--|-----|
| 1 | Describe input buffering scheme in lexical analyzer. | (3) |
| 2 | Construct a regular expression to denote a language L over $\Sigma = \{0,1\}$ accepting all strings of 0's and 1's that do not contain substring 011 | (3) |
| 3 | Consider the context free grammar $S \rightarrow aSbS \mid bSaS \mid \epsilon$
Check whether the grammar is ambiguous or not | (3) |
| 4 | What is Recursive Descent parsing? List the problems faced in designing such a parser. | (3) |

PART B

Answer any two full questions, each carries 9 marks.

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|---|---|-----|
| 5 | a) Explain the different phases in the design of a compiler. | (5) |
| | b) Find the FIRST and FOLLOW of the non-terminals in the grammar
$S \rightarrow aABe$
$A \rightarrow Abc \mid b$
$B \rightarrow d$ | (4) |
| 6 | a) Design a recursive descent parser for the grammar
$E \rightarrow E + T \mid T$
$T \rightarrow T * F \mid F$
$F \rightarrow (E) \mid id$ | (5) |
| | b) Develop a lexical analyzer for the token identifier. | (4) |
| 7 | a) What is left recursive grammar? Give an example. What are the steps in removing left recursion? | (5) |
| | b) Explain any four compiler writing tools | (4) |

PART C

Answer all questions, each carries 3 marks.

- 8 Explain the main actions in a shift reduce parser (3)
- 9 What are different parsing conflicts in SLR parsing table? (3)
- 10 What are annotated parse trees? Give examples. (3)
- 11 What are L-attributed definitions and S-attributed definitions in a syntax directed translation scheme? (3)

PART D

Answer any two full questions, each carries 9 marks.

- 12 a) Find the LR(0) items for the grammar (4)
 $S \rightarrow SS \mid a \mid \epsilon$.
- b) Explain bottom-up evaluation of s-attributed definitions. (5)
- 13 a) Derive LALR (1) parsing algorithm for following grammar (6)
 $S \rightarrow AS/b$
 $A \rightarrow SA/a$
- b) Design a type checker for simple arithmetic operations. (3)
- 14 a) Explain the syntax directed definition of a simple desk calculator. (5)
Explain operator grammar and operator precedence parsing (4)

PART E

Answer any four full questions, each carries 10 marks.

- 15 a) Explain storage organization and storage allocation strategies (10)
- 16 a) Explain intermediate code generation of an assignment statement (10)
- 17 a) Explain quadruples, triples and dags with an example each. (10)
- 18 a) Explain the principal sources of optimization (10)
- 19 a) Explain optimization of basic blocks (5)
b) With suitable examples explain loop optimization. (5)
- 20 a) Explain issues in design of a code generator (5)
b) Explain simple code generation algorithm (5)
