



CBCS SCHEME

18CS61

Sixth Semester B.E. Degree Examination, July/August 2022 System Software and Compilers

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Explain in detail SIC/XE Machine Architecture. (10 Marks)
- b. List the various machine independent assembler features. Explain the control sections how the assembler convert them into object code. (10 Marks)

OR

- 2 a. Write an algorithm for One Pass Assembler and give sample object program from One Pass Assembler. (10 Marks)
- b. What are the basic functions of loader? Explain two ways of program relocation in loaders. (10 Marks)

Module-2

- 3 a. Explain various phases of Compiler. Show the translations for an Assignment statement.
Position = Initial + rate * 60.
Clearly indicate the output of each phase. (12 Marks)
- b. What are the applications of Compiler? Explain. (08 Marks)

OR

- 4 a. Write a brief note on Language Processing System. (06 Marks)
- b. Explain the concept of input buffering in the Lexical analysis with its implementation. (10 Marks)
- c. Define Token, Lexeme and Pattern with example. (04 Marks)

Module-3

- 5 a. Define Context Free Grammar. Obtain CFG to generate strings of a's and b's having substring "ab". (10 Marks)
- b. Consider grammar given below from which any arithmetic expressions can be obtained.
 $E \rightarrow E + E$ $E \rightarrow E - E$ $E \rightarrow E * E$ $E \rightarrow E | E$ $E \rightarrow id$
Show that the grammar is ambiguous for the sentence $id + id * id$. (10 Marks)

OR

- 6 a. Write an algorithm to eliminate left recursion from a grammar. Eliminate left recursion from the given grammar. $S \rightarrow Aa | b$ $A \rightarrow Ac | Sd | \epsilon$. (10 Marks)
- b. Define Shift – Reduce Parser and Handle. What are conflicts in shift – reduce parse, explain with example. (06 Marks)
- c. List and explain different actions of shift – reducer parser (04 Marks)

Module-4

- 7 a. Explain the three basic section of LEX program with example. (10 Marks)
- b. Write LEX program to count word, character and line count in a given file. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg. 42+8 = 50, will be treated as malpractice.

OR

- 8 a. What is YACC? Explain the different sections used in writing the YACC specification. Explain with example program. (10 Marks)
- b. Define Regular Expression. What is the use of following Meta characters : (07 Marks)
- i) \cdot ii) $*$ iii) \wedge iv) $\$$ v) $\{ \}$ vi) $?$ (03 Marks)
- c. Discuss how Lexes and Parser communicate. (03 Marks)

Module-5

- 9 a. Define S – Attribute and I – Attribute with respect to SDD and construct Syntax tree, Parse tree and annotated tree for string $5 + 6 + 7$ by using given grammar. (10 Marks)
- $$\begin{array}{l} S \rightarrow En \\ E \rightarrow E + T \mid E - T \mid T \\ T \rightarrow T * F \\ T \rightarrow T \mid F \\ T \rightarrow F \\ F \rightarrow (E) \mid \text{digit} \mid n \rightarrow ; \end{array}$$
- b. What are the different three address code instructions? Translate the arithmetic expression $a + b - (-c)$ into quadruples, triplets and indirect triples. (10 Marks)

OR

CMRIT LIBRARY
BANGALORE - 560 037

- 10 a. Define SDD. Give SDD for simple type declaration. Construct a dependency graph for the declaration `int a, b ;` (10 Marks)
- b. Explain the issues in design of code generation. (10 Marks)
