

CBCS SCHEME

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15CS63

Sixth Semester B.E. Degree Examination, June/July 2023 System Software and Compiler Design

Time: 3 hrs.

Max. Marks: 80

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

Module-1

- 1 a. Explain the various instruction formats used in SIC/XE machine. (04 Marks)
- b. Write a SIC/XE program to copy the string "COMPUTER SCIENCE ENGINEERING" from STR1 to another string STR2. (06 Marks)
- c. List the functions of Pass-1 and Pass-2 of a two pass assembler. (06 Marks)

OR

- 2 a. Write an algorithm of the Pass-1 of a two pass assembler. (08 Marks)
- b. List the various machine independent assembler features. Explain the control-sections, how the assembler converter them into object code. (08 Marks)

Module-2

- 3 a. What is loader? What are the basic functions the loader has to perform? (04 marks)
- b. Develop an algorithm for bootstrap loader. (07 marks)
- c. Explain dynamic linking with suitable diagram. (05 Marks)

OR

- 4 a. Differentiate between a linking loader and linkage editor, with the help of suitable diagram. (08 marks)
- b. Explain different loader option commands with examples. (04 marks)
- c. Illustrate MS – DOS object module with its record types. (04 Marks)

Module-3

- 5 a. What is compiler? Explain various phases of compiler with help of neat diagram. (10 Marks)
- b. Explain the concept of input buffering in the lexical analysis. (06 Marks)

OR

- 6 a. Construct the transition diagram to recognize the tokens given below:
i) Identifier ii) Relational operator iii) Unsigned number. (08 Marks)
- b. Create a lexical analyzer with Lex and explain the structure of Lex programs. (08 Marks)

Module-4

- 7 a. What is the role of parser? Explain the different error recovery strategies. (08 Marks)
- b. Construct the LL(1) parsing table for the following productions:
 $E \rightarrow E + T/T$; $T \rightarrow T * F/F$; $F \rightarrow (E)/id$ (08 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. Using operator-precedence parsing algorithm, construct the table and parse the input string $id + id * id$. (12 Marks)
- b. Define Handle, viable prefixes. (04 Marks)

Module-5

- 9 a. Consider the context free grammar given below :
- $S \rightarrow EN$
- $E \rightarrow E + T \mid E - T \mid T$
- $T \rightarrow T * F \mid T / F \mid F$
- $F \rightarrow (E) \mid \text{digit}$
- $N \rightarrow ;$
- i) Obtain the SDD for the above grammar
- ii) Construct annotated parse tree for the input string $5 * 6 + 7$. (08 Marks)
- b. Obtain the DAG for the expression, show the steps $a + a * (b - c) + (b - c) * d$. (04 Marks)
- c. Translate the assignment $a = b * - c + b * - c$ into
- i) Three address code
- ii) Quadruples. (04 Marks)

OR

- 10 a. Explain the issues in the design of a code generator. (11 marks)
- b. Write the machine instructions for the following three address instructions :
- i) $b = a[i]$
- ii) $a[j] = c$
- iii) $x = *p$
- iv) $*p = y$
- v) if $x < y$ got L. (05 Marks)
