

CBCS SCHEME

USN

--	--	--	--	--	--	--	--	--	--

17CS63

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

Time: 3 hrs.

Max. Marks: 100

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

Module-1

- 1 a. Explain SIC/XE Architecture in detail. (08 Marks)
- b. Briefly discuss data structure and pass 1 algorithm of SIC/XE assembler. (08 Marks)
- c. List out the difference between system software and application software. (04 Marks)

OR

- 2 a. Discuss SIC Machine Architecture. (08 Marks)
- b. Write SIC/XE program to copy the string "Hello World" from STR1 to another string STR2. (06 Marks)
- c. Explain various instruction formats used in SIC/XE machine. (06 Marks)

Module-2

- 3 a. What are the basic functions of a loader? Explain two ways of program relocation in loaders. (08 Marks)
- b. List and discuss various machine independent loader feature. (06 Marks)
- c. Write a note on MS-DOS Linker. (06 Marks)

OR

- 4 a. Differentiate between a linking loader and linkages editor with the help of suitable diagram. (08 Marks)
- b. What is loader? What are the basic functions the loader has to perform? (04 Marks)
- c. With figure, explain dynamic linking. Discuss its advantages. (08 Marks)

Module-3

- 5 a. With a neat diagram, explain the different phases of the compiler. (08 Marks)
- b. How input-buffering is implemented? (08 Marks)
- c. Differentiate between compiler and interpreter. (04 Marks)

OR

- 6 a. Define Token, Pattern, Lexemes with examples. (04 Marks)
- b. Construct transition diagram to recognize the tokens of (i) Identifier (ii) Relational operator (iii) Unsigned number? (06 Marks)
- c. Explain different phases of compiler by taking input "Position = initial + rate + 60". (10 Marks)

Module-4

- 7 a. What is meant by handle pruning? How it helps on shift reduce parsing? With example list the action of shift-Reduce parser. (08 Marks)
- b. List the role of Parser. Explain different error recovery strategies. (06 Marks)
- c. Construct LL(1) Parsing table for the following production:

$E \rightarrow E + T|T$

$T \rightarrow T * F|F$

$F \rightarrow (E)|id$

(06 Marks)

OR

- 8 a. Define Left Recursion Grammar, eliminate Left recursion from the following:
 $S \rightarrow Aa|b$
 $A \rightarrow Ac|Sd|e$ (04 Marks)
- b. Construct canonical LR(1) items for an augmented grammar.
 $S' \rightarrow S$
 $S \rightarrow Cc$
 $C \rightarrow cC|d$ (08 Marks)
- c. What is Shift-Reduce parser? Explain the conflicts that may occur during shift reduce parsing. (04 Marks)
- d. What is left factoring? Rewrite the following grammar after removing left factoring.
 $S \rightarrow iEts | iEtSeS | a$
 $E \rightarrow b$ (04 Marks)

Module-5

- 9 a. Write annotated parse tree and its syntax directed definition to obtain $1 * 2 * 3 * (4 + 5)^n$ for the grammar.
 $L \rightarrow En$
 $E \rightarrow E + T | T$
 $T \rightarrow T * F | F$
 $F \rightarrow (E) | \text{digit}$ (08 Marks)
- b. Discuss the issue in the design of code generator. (06 Marks)
- c. Discuss S-attribute and L-attribute SDD. (06 Marks)

OR

- 10 a. Write 3-address code syntax tree of DAG for the expression $a + a * (b - c) + (b - c) * d$. (08 Marks)
- b. Explain the translation of $a = b * -c + d * -c$ into:
 (i) Quadruples
 (ii) Triples
 (iii) Indirect triple (06 Marks)
- c. Obtain the directed acyclic graph for expression $x + x * (y + z) + (y + z) * w$. (06 Marks)
