

Sixth Semester B.E. Degree Examination, July/August 2022 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 instruction formats and addressing modes of SIC/XE machine architecture. (08 Marks)
- b. Write the algorithm for pass – 1 of two –pass assemblers. (08 Marks)

OR

- 2 a. Define Macro. Briefly explain the various data structures used in the design of macro processor. (06 Marks)
- b. Generate the object code for each statements write the object program for the following SIC/XE. Given that : CLEAR = B4 : LDA = 00, LDB = 68, ADD = 18, TIX = 2C, JLT = 38, STA = 0C.

SUM	START	0000
FIRST	CLEAR	X
	LDA	#0
	+LDB	#TOTAL
	BASE	TOTAL
LOOP	ADD	TABLE, X
	TIX	COUNT
	JLT	LOOP
	STA	TOTAL
COUNT	RESW	1
TABLE	RESW	2000
	TOTL	RESW 1
	END	FIRST

(10 Marks)

Module-2

- 3 a. Define loader? Write an algorithm for absolute loader. (05 Marks)
- b. Write SIC/XE source code for a simple bootstrap loader. (06 Marks)
- c. Explain the facilities available in MS-DOS linker for program linking. (05 Marks)

OR

- 4 a. Define program relocation? Explain the different ways of doing program relocation. (05 Marks)
- b. With an algorithm, explain Pass – 1 of linking loader. (06 Marks)
- c. Explain how loading and calling of a subroutine done using dynamic linking. (05 Marks)

Module-3

- 5 a. Explain the various phases of compiler with the help of neat diagram. (08 Marks)
- b. List and explain reasons for separating analysis portion of a compiler into lexical analysis and syntax analysis phases. (04 Marks)
- c. Construct a transition diagram for recognizing unsigned numbers. (04 Marks)

OR

- 6 a. Write look ahead with sentinels for input buffering strategy used in lexical analysis phase. (06 Marks)
 b. How to handle reserved words and identifiers during recognition of tokens? Explain. (05 Marks)
 c. Enlist the algebraic laws for regular expression. (05 Marks)

Module-4

- 7 a. Give the rules for constructing FIRST and FOLLOW sets. (06 Marks)
 b. Construct predictive parsing table for the following grammar.
 $S \rightarrow aABb$
 $A \rightarrow Ac/\epsilon$
 $B \rightarrow d/\epsilon$ (08 Marks)
 c. Enlist the conditions to test whether a given grammar is LL(1). (02 Marks)

OR

- 8 a. Define shift reduce parser? Explain its actions and conflicts by taking on example. (06 Marks)
 b. Write an algorithm for computation of CLOSURE of LR(0). (02 Marks)
 c. Consider the grammar $A \rightarrow (A)/a$ construct the DFA of sets of LR(0) items. Show the parsing actions for i/p string ((a)). Clearly show states and symbols on the stack. (08 Marks)

Module-5

- 9 a. Define inherited and synthesized attributes. Give examples. (05 Marks)
 b. Give SDD for simple Desk calculator. (05 Marks)
 c. Which are the common 3-address forms? Explain. (06 Marks)

OR

- 10 a. Construct and DAG and a 3-address code for the expression.
 $a + a * (b - c) + (b - c) * d$ (05 Marks)
 b. Discuss various issues in the design of a code generator. (06 Marks)
 c. Construct a dependency graph for the declaration float id₁, id₂, id₃. (05 Marks)
