CBCS SCHEME

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15CS63

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 subrountine done using dynamic linking. **(05 Marks)**

Module-3

5 a. Explain the various phases of complier 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.
$S \rightarrow aABb$
$A \rightarrow Ac/\varepsilon$
$B \rightarrow d/\varepsilon$ **(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 id_1, id_2, id_3. **(05 Marks)**

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