USN ☐☐☐☐☐☐☐☐☐☐      **15CS63**

### Sixth Semester B.E. Degree Examination, Jan./Feb. 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.   Define system software. Distinguish between system software and application software.    **(06 Marks)**
    b.   List out registers used in SIC/XE machine architecture along with their use.    **(10 Marks)**

#### OR

2   a.   Explain the data structures and pass-1 algorithm of SIC assembler.    **(08 Marks)**
    b.   Define Macro. Give the features of macro processors and explain the data structures used in macro processors.    **(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.   List and explain the various phases of a compiler and show the output of each phase for the expression $a := b + c * 25$.    **(08 marks)**
    b.   Construct transition diagram for recognizing relational operators. Sketch the program segment to implement it, showing the first state and one in final state.    **(08 marks)**

#### OR

6   a.   Explain input buffering strategy used in lexical analysis phase.    **(06 Marks)**
    b.   Write the regular definition for unsigned number, also write the transition diagram.    **(06 Marks)**
    c.   Construct the transition diagrams for a set of keywords like begin, end, if then and else and identifiers and constants along with a minimum set of relational operators.    **(04 Marks)**

#### Module-4

7   a.   What is top down parser? What are key problems in top down parsing?    **(08 Marks)**
    b.   Explain the ambiguity in arithmetic expression. What is the ambiguity in parsing $2 + 3 \times 4$? Explain the solution for it.    **(08 Marks)**

**OR**

8   a.   What is meant by handle processing? How it helps on shift reduce parsing? List the actions of a shift reduce parser? **(08 Marks)**

   b.   Form the Action/Goto table for the following grammer:

   $S \rightarrow Aa \mid bAc \mid Ba \mid bBa$

   $A \rightarrow d$

   $B \rightarrow d$

   Justify whether the grammer is LR(0) or not. **(08 Marks)**

## Module-5

9   a.   Define synthesized and inherited attributes with examples. **(04 Marks)**

   b.   Briefly explain the main issues in code generation. **(08 Marks)**

   c.   Explain in brief dead code elimination. **(04 Marks)**

**OR**

10   a.   Construct DAG for the expression,

   $a + b * (a + b) + c + d$ **(04 Marks)**

   b.   Give SDD of a simple calculator. **(04 Marks)**

   c.   Write a note on common sub expression. **(04 Marks)**

   d.   What are the steps involved in optimization of basic blocks. Explain any 2 steps in brief. **(04 Marks)**

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