CBCS SCHEME

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15CS63

Sixth Semester B.E. Degree Examination, July/August 2021
System Software and Compiler Design

Time: 3 hrs. Max. Marks: 80

Note: ***Answer any FIVE full questions.***

1 a. Explain SIC/XE machine architecture in detail. **(10 Marks)**

b. What are the various data structures used in the design of macro processor? **(06 Marks)**

2 a. Distinguish system software and application software. **(04 Marks)**

b. Construct the complete object code for the following assembly level program with the symbol table.
Assume: LDA = 00, TIX = 2C, LDX = 04, JLT = 38, STA = 0C, RSUB = 4C, ADD = 18.
Source program:

```
SUM     START   4000
FIRST   LDX     ZERO
        LDA     ZERO
LOOP    ADD     TABLE, X
        TIX     COUNT
        JLT     LOOP
        STA     TOTAL
        RSUB
TABLE   RESW    2000
COUNT   RESW    1
ZERO    WORD    0
TOTAL   RESW    1
        END     FIRST
```

(10 Marks)

c. What is ORG? **(02 Marks)**

3 a. Construct an algorithm for pass 1 of an linking loader. **(10 Marks)**

b. Explain dynamic linking with suitable example. **(06 Marks)**

4 a. With a neat diagram, explain how object program can be processed in linking loader and linkage editor. **(10 Marks)**

b. Explain MS-DOS linker in detail. **(06 Marks)**

5 a. Discuss the various phases of a compiler with neat diagram. **(10 Marks)**

b. Construct the transition diagram to recognize the tokens relational operators and unsigned numbers. **(06 Marks)**

6 a. Discuss the different software productivity tools. **(06 Marks)**

b. List the algebraic laws of regular expressions. **(06 Marks)**

c. Define token and lexeme with an example. **(04 Marks)**

7 a. Construct LL(1) parsing table for the grammer given below:
$E \rightarrow E + T/T$
$T \rightarrow id + T/id$ **(10 Marks)**

b. What are the advantages of LR parsers? **(04 Marks)**

c. Define operator grammar with an example. **(02 Marks)**

8 a. Outline an algorithm to find FIRST and FOLLOW. **(06 Marks)**

b. Show that the following grammar $S \rightarrow AaAb/BbBa$, $A \rightarrow \in$, $B \rightarrow \in$ is not SLR(1). Clearly mention the reasons. **(10 Marks)**

9 a. Construct annotated parse tree for $3 * 5 + 4n$ using top down approach. Write semantic rules for each step. **(06 Marks)**

b. Discuss the issues in the design of a code generator. **(10 Marks)**

10 a. Define inherited and synthesized attributes. **(04 Marks)**

b. What are three address codes? Explain different ways of representing three address code. **(10 Marks)**

c. Construct DAG for the following $a = a + 5$. **(02 Marks)**

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