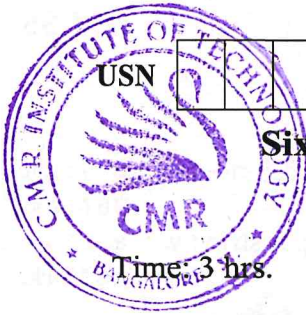


CBCS SCHEME

15CS63



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Sixth Semester B.E. Degree Examination, Jan./Feb. 2021 System Software and Compiler Design

Max. Marks: 80

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

Module-1

- 1 a. What is System Software? Compare system software with application software and give examples. (04 Marks)
- b. Explain the instruction formats and addressing modes of SIC/XE Machine Architecture. (08 Marks)
- c. Write a sequence of instructions for SIC/XE to clear a 20 byte character string to all blank. (04 Marks)

OR

- 2 a. What are the Fundamental functions that any Assembler must perform? Explain any six assembler directives with example. (08 Marks)
- b. What is MACRO? Briefly discuss various data structures required for design of MACRO PROCESSOR. (08 Marks)

Module-2

- 3 a. Explain the working of Linkage editor and Linking loader. (08 Marks)
- b. What is a Loader? Develop an algorithm for Bootstrap loader. (08 Marks)

OR

- 4 a. What is Relocation? Explain the methods for specifying relocation as a part of object program. (08 Marks)
- b. Describe the features of the Sun OS linkers for SPARC systems. (08 Marks)

Module-3

- 5 a. Explain the various phases of compiler with a neat diagram. Show the transformation made by each of these phases for the statement $a = b + c * 20$, where a, b, and c are reals. (10 Marks)
- b. Construct a transition diagram for relational operator. Write the program segment to implement it showing the first state and one final state. (06 Marks)

OR

- 6 a. What is printed by following 'C' program Fragment
define a(x + 1)
int x = 2;
void b () {int x = 1 ; printf("%d\n", a);}
void c () {printf("%d\n", a);}
void main () {b () ; c () ;}. (03 Marks)
- b. Give the reasons, why the analysis portion of a compiler is separated into lexical analysis and parsing phases. (03 Marks)
- c. Explain the structure of Lex program and write a Lex program that recognize the tokens if, then, else, id, number and relational operator. (10 Marks)

Module-4

- 7 a. Construct a predictive parsing table for the following grammar by making suitable changes to it. $E \rightarrow E + E \mid E * E \mid (E) \mid id$. (10 Marks)
- b. What is Handle Pruning? Construct Bottom up parse tree for the input string $w = aaa * a++$ using the grammar $S \rightarrow S S + \mid S S * \mid a$. (06 Marks)

OR

- 8 a. Show that following grammar is not SLR (1).
 $S \rightarrow L = R \mid R$
 $L \rightarrow * R \mid id$
 $R \rightarrow L$. (10 Marks)
- b. What is a Shift – reduce Parsing? What are the actions of Shift – reduce Parser? Explain. (06 Marks)

Module-5

- 9 a. Write the SDD for simple type declaration and construct dependency graph for a declaration $float id_1, id_2, id_3$. (08 Marks)
- b. Translate the arithmetic expression $a + - (b + c)$ into
- Syntax tree.
 - Quadruples.
 - Triples.
 - Indirect triples.

OR

- 10 a. Discuss the various issues in the design of Code generator. (10 Marks)
- b. Give SDD for simple desk calculator and construct annotated parse tree for the expression $(3 + 4) * (5 + 6)$. (06 Marks)

