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CSE304 Enrol. No. A2305220659

[ET]

END SEMESTER EXAMINATION : April-May, 2023

COMPILER CONSTRUCTION

Time : 3 Hrs. *Maximum Marks : 60*

Note: ***Attempt questions from all sections as directed.***

SECTION – A (24 Marks)

Attempt any **four** *questions out of* **five**.
Each question carries **06** *marks.*

1. For a source language statement a = b*c – 2, where a, b and c are float variables, * and – represents multiplication and subtraction on same data types, show the input and output at each of the compiler phases.

2. What is handle pruning? Indicate the handles in the reduction of the right sentential form S S+ a * to the start symbol using the grammar below :

S -> S S + | S S * | a

P.T.O.

3. Construct canonical collection of LR(1) items for the following grammar :

$$S \rightarrow AA,\ A \rightarrow Aa \mid b$$

4. Write the SDD for a simple type declaration and draw the annotated parse tree for the declaration float a, b, c.

5. Explain storage organization and storage allocation strategies.

SECTION – B (20 Marks)

Attempt any **two** *questions out of* **three**.
Each question carries **10** *marks.*

6. Consider the following grammar

$E \rightarrow E$ or $T \mid T$

$T \rightarrow T$ and $F \mid F$

$F \rightarrow$ not $F \mid (E) \mid$ true $\mid$ false

(a) Remove left recursion from the grammar. (3)

(b) Construct a predictive parsing table. (4)

(c) Justify the statement "The grammar is LL (1)". (3)

7. (a) Design a recursive descent parser for the grammar E ->E + T | T T -> T*F | F F -> (E) | id (5)

(b) Find out context free language for the grammar given below :

S -> abB A -> aaBb | ε B -> bbAa (5)

8. Explain different code optimization techniques available in local and global optimizations.

SECTION – C (16 Marks)

(Compulsory)

9. (a) Construct DAG for the expression (a/10 + (b-10))*(a/10 + (b-10)). Also write the sequence of instructions used for the DAG construction. (8)

(b) Write the code generation algorithm. Using this algorithm generate code sequence for the expression x = (a – b) + (a + c). (4)

P.T.O.

(c) Write SDD to produce three-address code for Boolean expressions and obtain the three-address code for the statement given below :

while $a < b$ do if $c < d$ then $x = y + z$ else $x = y - z$

(4)