Code No: 156CP **R18**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year II Semester Examinations, August/September - 2021
PRINCIPLES OF COMPILER CONSTRUCTION
(Information Technology)

Time: 3 Hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks
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1.a) Discuss various phases of compiler in detail. Give the output of each phase of the compiler for the statement $a = b * (c - d) * 10.0$

b) Write briefly about the specification of tokens. [8+7]

2.a) Briefly explain about compiler construction tools.

b) Convert the following regular expression to DFA. [7+8]
[0|1]*010

3.a) Check whether the following grammar is LALR(1) or not?
$E \rightarrow E + T \mid T$
$T \rightarrow T * F \mid F$
$F \rightarrow (E) \mid id$

b) What is FIRST and FOLLOW? Specify the steps to compute FIRST and FOLLOW with an example. [7+8]

4.a) What are the difficulties in top down parsing? And give solutions to overcome these difficulties.

b) Construct LR (0) parser for the following grammar. [7+8]
$S \rightarrow cA \mid ccB$
$A \rightarrow cA \mid a$
$B \rightarrow ccB \mid b$

5.a) Create three address codes for the statements
while a < b do
    if c < d then
        x := y + z
    else
        x := y - z

b) Construct the syntax directed definition for desk calculator. [7+8]

6.a) Explain what are semantic errors and how semantic analysis is performed?

b) Apply the S-attributed definition and construct syntax tree for a simple expression, grammar involving only the binary operators + and -. As usual, these operators are at the same precedence level and are jointly left associative. All non-terminals have one synthesized attribute node, which represents a node of the syntax tree. [7+8]
$E \rightarrow E + T \mid E - T \mid T$
$T \rightarrow (E) \mid id \mid num$

7.a) Distinguish the static and dynamic storage allocation.

b) For the following expression obtain optimal code using [7+8]

i) Only two registers

ii) Only one register

$(a+b)-(c-(d+e))$

8.a) Compare local optimization with global optimization. Give suitable examples.

b) Explain global data flow analysis with necessary equations. [7+8]

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