Code No: R1631051 **R16** **SET - 1**

III B. Tech I Semester Supplementary Examinations, June/July-2022

COMPILER DESIGN

(Computer Science and Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

~~~~~~

PART –A (14 Marks)

1. a) Define the terms token and lexeme. [2M]
   b) Explain the role of parser in compiler model. [2M]
   c) Draw annotated parse tree for the expression: $3 * 5 + 4n$. [2M]
   d) Define Type checking and List the rules for type checking. [3M]
   e) What are the basic functions of memory manager? [3M]
   f) Explain the process of Dead Code Elimination. [2M]

PART –B (56 Marks)

2. Explain in detail the process of compilation. Illustrate the output of each phase of compilation for the input: [14M]
$$a = (b + c) * (b + c) * 2$$

3. Find whether the following grammar is LL(1) or not: [14M]
S→abSa|aaAb
A→baAb|b

4. a) Write the steps for the efficient construction of LALR parsing table. Explain with an example. [7M]
   b) State and explain the rules to compute first and follow functions with an example. [7M]

5. a) Construct 3 address code for the following: [10M]
if [(a<b) and ((c>d) or (a>b))] then
$$z = x + y * z$$
else
$$z = z + 1$$
   b) Draw Directed Acyclic Graph for the expression: [4M]
$$a + a * (b - c) + (b - c) * d$$
~~~~~~

6. a) What is an activation record? Explain the components with an example. [7M]

   b) The following C program computes Fibonacci numbers: [7M]

```
int f (int n) {
intt,s;
if (n < 2) return 1;
s = f(n-1);
t = f(n-2);
return s+t;
}
```

   Suppose that the activation record for f includes the following elements in order: return value, argument n, local s, and local t. Show the complete activation tree for the call f(5).

7. a) Explain peephole optimization with examples. [7M]

   b) Explain different principal sources of optimization technique with suitable examples. [7M]

*****