Roll No											

PRESIDENCY UNIVERSITY
BENGALURU

SET B

SCHOOL OF ENGINEERING
END TERM EXAMINATION - JAN 2024

Semester : Semester VII - 2020
Course Code : CSE3167
Course Name : Compiler Design
Program : B.Tech. Computer Science and Engineering

Date : 03-JAN-2024
Time : 9:30AM - 12:30 PM
Max Marks : 100
Weightage : 50%

Instructions:
(i) Read all questions carefully and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific and non-programmable calculator are permitted.
(iv) Do not write any information on the question paper other than Roll Number.

PART A

ANSWER ALL THE QUESTIONS **4 X 5M = 20M**

1. Sktech the transition diagram to recognize the integer and floating-point number

(CO1) [Knowledge]

2. Apply FIRST and FOLLOW for the following grammar
S → aBDh
B → cC
C → bC | Ɛ
D → EF
E → g | Ɛ
F → f | Ɛ

(CO2) [Knowledge]

3. Describe attributes? List the types of attributes? Make use of an example to explain each type of attribute.

(CO3) [Knowledge]

4. What are the properties of peephole optimization?

(CO4) [Knowledge]

PART B

ANSWER ALL THE QUESTIONS **5 X 10M = 50M**

5. Consider the grammar
S -> (S) S | Ɛ
Construct the SLR (1) parser and parse the input string ( ) ( )

(CO2) [Comprehension]

6. Consider the context free grammar given below
S->AA
A->aA | b
i. compute LR(0) items
ii. compute FIRST & FOLLOW
iii. Obtain SLR Parsing Table
iv. Check whether grammar is in SLR or not

(CO2) [Comprehension]

7. Construct a syntax directed definition (i.e. semantic rules) for the given grammar and show the annotated parse tree for expression (3 + 4) * (5 + 6).
L->E
E->E+T
E->T
T->T*F
T->F
F->(E)
F->digit

(CO3) [Comprehension]

8. As a compiler engineer working on a cutting-edge project, you come across a unique set of challenges related to representing arithmetic expressions using Quadruples, Triples, and Indirect Triples. Describe a scenario where the expression "a + - (b + c)" needs to be translated into Quadruples, Triples, and Indirect Triples. Outline the specific considerations and decisions you would make in this scenario to ensure accurate representation and efficient execution of the generated code.

(CO3) [Comprehension]

9. Imagine you are a lead software architect working on a critical project where code generation plays a pivotal role. Your team has encountered several challenges in the design of code generation. Describe a specific scenario where these issues manifest and discuss the strategies you would employ to address and overcome them, ensuring the robustness and efficiency of the generated code.

(CO4) [Comprehension]

PART C

ANSWER ALL THE QUESTIONS **2 X 15M = 30M**

10. Consider the grammar
S->P+R | R
P->*R | id
R->P
Verify the grammar is in SLR (1) or NOT?

(CO2) [Application]

11. Write the three address code, Basic blocks and flow graph for the following code:

```
for ( i =0; i < m; i ++ )
{
    z = 4
    x = m + i
    y = 2 * 3 * i
    y = z * ( m + i )
}
```

Also, Showcase sub-expression elimination, constant propogation, dead code elimination

(CO4) [Application]