Code No: R2031421 **R20** SET - 1

III B. Tech I Semester Supplementary Examinations, May/June -2024
COMPILER DESIGN
(Com to CSE(AIML),CSE(AI),CSE(DS),CSE(AIDS),AIDS,AIML,CSD)

Time: 3 hours Max. Marks: 70

Answer any **FIVE** Questions **ONE** Question from **Each unit**
All Questions Carry Equal Marks
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UNIT-I

1. a) Demonstrate the diagrammatic representation of a language processing system. [7M]
   b) Classify the phases of Compiler? Outline the output of each phase for the expression position := initial + rate * 60; [7M]

(OR)

2. a) Elaborate specification and recognition of tokens. [7M]
   b) Translate the following regular expression (((00)*(11)) +01)* into an NFA. [7M]

UNIT-II

3. a) Apply the FIRST and FOLLOW function rules for the following grammar: [7M]
   E→TE'
   E'→+TE' | ε
   T→FT'
   T'→*FT' | ε
   F→(E) | id
   b) Create the LL (1) parsing table for the following grammar. [7M]
   S→F
   S → (S+F)
   F →a

(OR)

4. a) Illustrate the various actions performed by shift-reduce parsers with an example. [7M]
   b) Justify the following grammar is LR (1) but not LALR (1). [7M]
   S→Aa|bAc|Bc|bBa
   A→d
   B→d

UNIT-III

5. a) Explain about bottom-up evaluation S-Attributed definitions with an example. [7M]
   b) Evaluate the expressions for the SDD annotated parse tree for the follow expressions. [7M]
      i. 3 * 5 + 4n
      ii. 3 * 5 using

(OR)

6. a) List the rules for constructing a syntax tree? Construct a syntax tree for the following expression: **a * (b + c) – d /2.** [7M]
   b) Explain the specification of simple type checker for statements, expressions and functions. [7M]

UNIT-IV

7. a) Compare and contrast of static, stack and heap storage allocation strategies. [7M]
   b) Explain the data structure used for implementing Symbol Table. [7M]

(OR)

8. a) Importance of a flow graph? Build a flow graph for the following code. [7M]

```
i=1; sum=0;
while (i<=10)
{
sum+=i;
i++;
}
```

b) Categorize the objectives of peephole optimization? Explain the different techniques used in peephole optimization. [7M]

UNIT-V

9. a) Illustrate the machine dependent code optimization. [7M]

b) Create the three-address code for the following program fragment? [7M]

```
while (A<C and B>D) do
if A=1 then C=C+1
else
while A<=D do
A=A+B
```

(OR)

10. a) Demonstratethe register descriptor and address descriptor with examples. [7M]

b) Explain how do you calculate the cost of an instruction? Measure the total cost of the following target code. [7M]

```
MOV a, R0
ADD b, R0
MOV C, R0
ADD R0,R1
MOV R1,X
```