

**III B. Tech I Semester Supplementary Examinations, February-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. Answering the question in **Part-A** is compulsory  
 3. Answer any **THREE** Questions from **Part-B**

\*\*\*\*\*

**PART -A**

**(22 Marks)**

1. a) Draw the diagram for the language processing system. [3M]
- b) List out the rules for FIRST and FOLLOW. [4M]
- c) What are the actions performed by Shift reduce parser? [4M]
- d) Compare synthesis and inherited translation. [4M]
- e) How the Garbage collection works through reference counting? [4M]
- f) Explain the advantage of inter procedural optimization. [3M]

**PART -B**

**(48 Marks)**

2. a) Draw a block diagram of phases of a compiler and Identify the main functions of each phase. [8M]
- b) Explain various notational short hands for representing regular expressions. [8M]
3. a) List the classification of top down parsing? Discuss the difficulties in top down parsing? [8M]
- b) Find FIRST and FOLLOW sets for the following grammar: [8M]

$$\begin{aligned}
 E &\rightarrow TE' \\
 E' &\rightarrow +TE' \mid \epsilon \\
 T &\rightarrow FT' \\
 T' &\rightarrow *FT' \mid \epsilon \\
 F &\rightarrow (E) \mid id
 \end{aligned}$$

4. a) Use of shift reduces parser? Explain conflicts that may occur during shift-reduce parsing. [8M]
- b) Construct the CLR parsing table for the following grammar: [8M]
 
$$\begin{aligned}
 S &\rightarrow L=R \mid R \\
 L &\rightarrow *R \mid id \\
 R &\rightarrow L
 \end{aligned}$$
5. a) What is syntax directed translation? How it is different from translation schemes? Explain with an example. [8M]
- b) Draw syntax tree for the arithmetic expression  $a * (b + c) - \frac{d}{2}$ . Write the given expression in postfix notation. [8M]

6. a) What is meant by activation of procedure? How it can be represented with activation tree and record? Explain with quick sort example. [8M]
- b) Formulate steps to identify the loops in the basic block. [8M]
7. a) Discuss the following in detail [8M]
- i) Semantic preserving transformation
  - ii) Global Common sub expression elimination
- b) Explain three techniques for loop optimization with examples. [8M]

\*\*\*\*\*