

II B.Tech II Semester Regular Examinations, July 2022

COMPILER DESIGN

(Artificial Intelligence and Data Science)

Time: 3 Hours**Max. Marks: 70****Note:** Answer one question from each unit.

All questions carry equal marks.

5 × 14 = 70M**UNIT-I**

1. a) Write the grammar and transition diagram for recognizing numbers. (7M)
- b) Design a transition diagram to recognize identifiers. (7M)

(OR)

2. a) Explain overview of language processing system. (6M)
- b) What is meant by front end of a compiler? Show the output produced by it in different phases for $a=b+c*20$. (8M)

UNIT-II

3. Construct Recursive Descent Parsing procedure code for the grammar given below and parse the string $(id+id)*id$. (14M)

$$E \rightarrow E+T \mid T$$

$$T \rightarrow T*F \mid F$$

$$F \rightarrow (E) \mid id$$

(OR)

4. a) Explain algorithms to find FIRST and FOLLOW and find FIRST and FOLLOW of the following grammar: (7M)

$$S \rightarrow aBbSA \mid d$$

$$A \rightarrow eS \mid \epsilon$$

$$B \rightarrow f$$

- b) What is left factoring? Do left factoring for the given grammar. (7M)

$$S \rightarrow bAd \mid bAe \mid ed$$

$$A \rightarrow e \mid bA$$

UNIT-III

5. a) Explain different schemes for storing name attribute in symbol table. (8M)
- b) Analyze the advantages and disadvantages of heap storage allocation strategy. (6M)

(OR)

6. a) Explain S-attributed and L-attributed definition with suitable example. (7M)
- b) Explain various operations on symbol tables and write its syntax. (7M)

UNIT-IV

7. Generate basic blocks and data flow graph for the following three address code segment:

(14M)

- 1) $PROD = 0$
- 2) $I = 1$
- 3) $T2 = \text{addr}(A) - 4$
- 4) $T4 = \text{addr}(B) - 4$
- 5) $T1 = 4 \times I$
- 6) $T3 = T2[T1]$
- 7) $T5 = T4[T1]$
- 8) $T6 = T3 * T5$
- 9) $PROD = PROD + T6$
- 10) $I = I + 1$
- 11) IF $I \leq 20$ GOTO 5

(OR)

8. a) Write any four machine independent code optimization techniques with suitable examples for each. (8M)
- b) What are the applications of DAG? Explain how the following expression can be converted into a DAG. (6M)

$a + b * (a + b) + c + d$

UNIT-V

9. Generate target code from sequence of three address statements using simple code generator algorithm with an example. (14M)

(OR)

10. a) Discuss various issues in code generation. (7M)
- b) What is machine dependent code optimization? On what factors it depends? Describe about machine dependent code optimization techniques. (7M)
