2025

M.Sc. 1st Semester Examination

COMPUTER SCIENCE

Paper : COSC402X1

(Compiler Design)

Full Marks : 35 Time : One Hour Thirty Minutes

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable.

Group - A

Answer any *five* questions : 2×5=10

1. What is an LL(1) grammar? [CO1]
2. Define lexeme. [CO1]
3. What is left recursion? [CO2]
4. Define token with example. [CO1]
5. What is an annotated parse tree? Draw any one hypothetical diagram of it. 1+1 [CO4]
6. What is three-address code? Give suitable example. 1+1 [CO3]

P.T.O.

7. Define peephole optimization. Give reason why is it used. 1+1 [CO3]

8. What is a symbol table? Give example. 1+1 [CO4]

Group - B

Answer any ***three*** questions : 4×3=12

9. Explain the role of a lexical analyzer of compiler. [CO1]

10. Compute the FIRST and FOLLOW sets for the grammar :

$$S \rightarrow AC$$

$$A \rightarrow aA \mid \varepsilon$$

$$C \rightarrow b$$ [CO2]

11. Differentiate between Top-Down parsing and Bottom-Up parsing with suitable examples. 2+2 [CO2]

12. Explain syntax-directed definition (SDD). Distinguish between S-attributed and L-attributed definitions. 2+2 [CO4]

13. Generate three-address code for the expression :

$$(a + b) * (c - d)$$ [CO3]

Group - C

Answer any ***one*** question : 8×1=8

14. Construct an LL(1) parsing table for the following grammar :

$S \rightarrow aBDh$

$B \rightarrow Cc$

$C \rightarrow Bc \mid \varepsilon$

$D \rightarrow EF$

$E \rightarrow g \mid \varepsilon$

$F \rightarrow f \mid \varepsilon$

Clearly show the FIRST and FOLLOW sets and justify whether the grammar is LL(1). [CO2]

15. Construct the LALR(1) parsing table for the grammar :

$S \rightarrow L = R \mid R$

$L \rightarrow *R \mid id \quad R \rightarrow L$ [CO2]

Internal Assessment : 5 marks