

**B.E. (Computer Engineering)
COMPILERS**

(2015 Pattern) (Elective - III) (Semester - II)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8, Q.9 or Q.10.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Assume suitable data if necessary.

Q1) a) Write Lex Specification to count lines, spaces, tabs and words from given input. [6]

b) Explain Error recovery strategies in Parser. [4]

OR

Q2) a) Compute FIRST and FOLLOW for the following grammar [6]

$E \rightarrow E + T \mid T$

$T \rightarrow T * F \mid F$

$F \rightarrow (E) \mid id$

b) Write Syntax Directed Definition for constructing syntax tree for arithmetic expressions. [4]

Q3) a) Test whether following grammar is LL (1) [6]

$S \rightarrow i E t S S' \mid a$

$S' \rightarrow eS \mid \text{empty},$

$E \rightarrow b$

b) What is Three Address Code? Generate three address code for

$a = b * -c + d$

[4]

OR

Q4) a) Explain the need of symbol table in Compiler. List and explain any two operations carried on Symbol table. [6]

b) Explain following terms with suitable examples S-attributed Grammar, L-attributed Grammar. [4]

P.T.O.

- Q5) a) What is activation record? List and explain its fields. [6]
b) Explain any two Storage allocation strategies. [6]
c) Explain following terms
Call by Value and Call by reference [4]

OR

- Q6) a) Explain Display Mechanism. How Display is used to access non-local data. [6]
b) What are the Source Language issues? Explain any two. [6]
c) Compare Static Scope and Dynamic Scope. [4]

- Q7) a) List the issues in Code Generation. Explain any two of them. [6]
b) Explain the decisions of Code Generator function/procedure for the statement $x = y \text{ op } z$ [6]
c) Construct the DAG for following assignment statement
 $a + b * c + b * c + d$ [4]

OR

- Q8) a) What is Basic Blocks? Explain the algorithm used to partition three address code into Basic Block. [6]
b) Explain the term Register Descriptor and Address Descriptor along with suitable example. [6]
c) Explain labelling algorithm used in Code Generator. [4]

- Q9) a) Explain following optimization techniques along with suitable example. [6]
Common Sub-expression Elimination,
Dead Code Elimination
b) Write Data Flow Equations for [6]
If E then S1 else S2
Do S while E
c) Explain Following Loop Optimization Techniques [6]
Code Motion
Strength Reduction

OR

- Q10) a) Why Code Optimization is required? Differentiate Local and Global Optimization. [6]
b) Draw a Sample Flow Graph and Explain Generation and Killing of expression with respect to it. [6]
c) List and Explain loops in Flow Graph. [6]

