

Total No. of Questions : 10]

SEAT No. :

**P3986**

**[5561]-691**

[Total No. of Pages : 2

**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  
 If E then S1 else S2 [6]  
 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]

