



Name :

Roll No. :

Invigilator's Signature :

CS/B.Tech(CSE)/SEM-7/CS-701/2011-12

2011

LANGUAGE PROCESSOR

Time Allotted : 3 Hours

Full Marks : 70

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

(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following :

$$10 \times 1 = 10$$

i) Firstpos of a.(dot) node with leaves c1 and c2 is

a) $\text{firstpos}(c1) \cup \text{firstpos}(c2)$

b) $\text{firstpos}(c1) \cap \text{firstpos}(c2)$

c) if (nullable(c1))

$\text{firstpos}(c1) \cup \text{firstpos}(c2)$

else $\text{firstpos}(c1)$

d) if (nullable(c2))

$\text{firstpos}(c1) \cup \text{firstpos}(c2)$

else $\text{firstpos}(c1)$.



- ii) Parse tree is generated in the phase of
- a) Syntax Analysis
 - b) Semantic Analysis
 - c) Code Optimization
 - d) Intermediate Code Generation.
- iii) $\text{FIRST}(\alpha\beta)$ is
- a) $\text{FIRST}(\alpha)$
 - b) $\text{FIRST}(\alpha) \cup \text{FIRST}(\beta)$
 - c) $\text{FIRST}(\alpha) \cup \text{FIRST}(\beta)$ if $\text{FIRST}(\alpha)$ contains ϵ
else $\text{FIRST}(\alpha)$
 - d) none of these.
- iv) A given grammar is not LL(1) if the parsing table of a grammar may contain
- a) any blank field
 - b) any ϵ -entry
 - c) duplicate entry of same production
 - d) more than one production rule.
- v) White spaces and tabs are removed in
- a) Lexical analysis
 - b) Syntax analysis
 - c) Semantic analysis
 - d) all of these.



- vi) Left factoring guarantees
- a) not occurring of backtracking
 - b) cycle free parse tree
 - c) error free target code
 - d) correct LL(1) parsing table.
- vii) A parse tree showing the values of attributes at each node is called in particular
- a) Syntax tree
 - b) Annotated parse tree
 - c) Syntax Direct parse tree
 - d) Direct Acyclic graph.
- viii) Which of the following is not true for Dynamic Type Checking ?
- a) It increases the cost of execution
 - b) Type checking is done during the execution
 - c) All the type errors are detected
 - d) None of these.



ix) Which of the following is not a loop optimization ?

- a) Induction variable elimination
- b) Loop jamming
- c) Loop unrolling
- d) Loop heading.

x) YACC builds up

- a) SLR parsing table
- b) LALR parsing table
- c) canonical LR parsing table
- d) none of these.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. Describe analysis phase of a compiler in respect of the following example.

Position = initial + rate * 60. 1 + 4

3. Describe with diagram the working process of Lexical Analyzer.

4. What is error handling ? Describe the Panic Mode and Phrase level error recovery technique with example. 1 + 4



5. What do you understand by L-attributed definitions ?
Illustrate with an example. 2 + 3

6. What is recursive descent parsing ? Describe the drawbacks of recursive descent parsing for generating the string 'abc' from the grammar :

$$S \rightarrow aBc$$

$$B \rightarrow bc \mid b$$

$$1 + 4$$

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

7. Describe with a block diagram the parsing technique of LL(1) parser. Parse the string 'abba' using LL(1) parser where the parsing table is given below :

	a	b	$\$$
S	$S \rightarrow aBa$		
B	$B \rightarrow \epsilon$	$B \rightarrow bB$	

Check whether the following grammar is LL(1) or not.

$$S \rightarrow i C t S E \mid a$$

$$E \rightarrow e S \mid \epsilon$$

$$C \rightarrow b .$$

$$4 + 4 + 7$$



8. Describe LR parsing with block diagram. What are the main advantages of LR parsing ? Construct SLR parsing table for the grammar given below :

$$S \rightarrow Cb$$

$$C \rightarrow bC / d .$$

$$4 + 3 + 8$$

9. Construct DFA directly from [Not by generating NFA] the regular expression $L = (a \mid b)^* ab$

What are the main contributions of Syntax Directed Translation in Compiler ? Design a Dependency Graph and Direct Acyclic Graph for the string :

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

$$7 + 3 + 5$$

10. a) Translate the expression

$$a = - (a + b) * (c + d) + (a + b + c) \text{ into}$$

- i) Quadruple
- ii) Triple
- iii) Indirect Triple
- iv) 3-address code.

- b) Draw the flow graph for the following code :

- i) location = - 1
- ii) $i = 0$
- iii) $i < 100$ goto 5
- iv) goto 13
- v) $t_1 = 4i$



vi) $t_2 = A[t_1]$

vii) if $t_2 = x$ goto 9

viii) goto 10

ix) location = i

x) $t_3 = i + 1$

xi) $i = t_3$

xii) goto 3

xiii)

c) What do you understand by terminal table and literal table ? 8 + 5 + 2

11. Write short notes on any *three* of the following : 3 × 5

- a) LEX and YACC
- b) Activation Record
- c) Symbol Table
- d) Peephole optimization
- e) Input Buffering.

