

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 × 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)  $FIRST(\alpha\beta)$  is
- a)  $FIRST(\alpha)$
  - b)  $FIRST(\alpha) \cup FIRST(\beta)$
  - c)  $FIRST(\alpha) \cup FIRST(\beta)$  if  $FIRST(\alpha)$  contains  $\epsilon$   
else  $FIRST(\alpha)$
  - 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  $\epsilon$ -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 Directed 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 :

$$S \in aBc$$

$$B \in bc \mid b \qquad \qquad \qquad 1 + 4$$

**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 :

	<i>a</i>	<i>b</i>	<i>\$</i>
<i>S</i>	$S \in aBa$		
<i>B</i>	$B \in \epsilon$	$B \in bB$	

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

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

$$E \in e S \mid \epsilon$$

$$C \in b . \qquad \qquad \qquad 4 + 4 + 7$$

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

$$S \rightarrow Cb$$

$$C \rightarrow bC / d . \quad 4 + 3 + 8$$

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

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

$$a + a * ( b - c ) + ( b - c ) * d . \quad 7 + 3 + 5$$

10. a) Translate the expression

$$a - ( a + b ) * ( c + d + ( a + b + c )$$
 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 YAAC
- b) Activation Record
- c) Symbol Table
- d) Pe phole optimization
- e) Input Buffering.

