

Name : .....

Roll No. : .....

Invigilator's Signature : .....

**CS/B.Tech(CSE)/SEM-7/CS-701/2010-11**

**2010-11**

**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 any *ten* of the following :

10 × 1 = 10

i) Symbol table can be used for

- a) checking type compatibility
- b) suppressing duplicate error messages
- c) storage allocation
- d) all of these.

ii) Which data structure is mainly used during shift-reduce parsing ?

- a) Pointers
- b) Arrays
- c) Stacks
- d) Queues.

- iii) Which of the following is not an intermediate code form ?
- a) Postfix notation      b) Syntax trees  
c) Three address codes      d) Quadruples.
- iv) If  $x$  is a terminal then  $FIRST(x)$  is
- a)  $\epsilon$       b)  $\{x\}$   
c)  $x$       d) none of these.
- v) Which one of the following error will not be detected by the compiler ?
- a) Lexical error      b) Syntactic error  
c) Semantic error      d) Logical error.
- vi) The grammar  $E \rightarrow E + E \mid E * E \mid a$  is
- a) ambiguous  
b) unambiguous  
c) not given sufficient information  
d) none of these.

vii) YACC builds up

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

viii) If a grammar is in LALR (1) then it is necessarily

- a) LL(1)
- b) SLR(1)
- c) LR(1)
- d) none of these.

ix) Which one of the following is not true about dynamic checking ?

- a) It increases the cost of execution
- b) Type checking is done during execution
- c) All the type error are detected /
- d) None of these.

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- x) A basic block can be analyzed by
- a) DAG
  - b) Flow graph
  - c) Graph with cycles
  - d) None of these.
- xi) The method which merges the bodies of two loops is
- a) loop unrolling
  - b) loop ramming
  - c) constant folding
  - d) none of these.
- xii) A top down parser generates
- a) leftmost-derivation
  - b) rightmost-derivation
  - c) leftmost derivation in reverse
  - d) rightmost derivation in reverse.

**GROUP - B**

**( Short Answer Type Questions )**

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

2. How the following statement is translated via the different phases of compilation ?

position := initial + rate \* 70.

3. Convert the following NFA into its equivalent DFA :

The set of all strings with 0 and 1, beginning with 1 & ending with 00.

4. Explain inherited attribute and synthesized attribute for Syntax directed translation with suitable example.

5. What is type checking ? Differentiate between Dynamic and Static Type checking.
6. Differentiate Quadruple, Triples and Indirect triples with example.

**GROUP - C**

**( Long Answer Type Questions )**

Answer any *three* of the following.  $3 \times 15 = 45$

7. a) What are the analysis phase and synthesis phase of an assembler ?
- b) Suppose a robot can be instructed to move one step east, north, west or south from its current position. A sequence of such instruction is generated by the following grammar :

$Seq \rightarrow Seq_1 \text{ instr } | \text{ begin}$

$Instr \rightarrow \text{ east } | \text{ north } | \text{ west } | \text{ south}$

- i) Construct a syntax directed definition to translate an instruction sequence into a robot position.
- ii) Draw a parse tree for : begin west south.

$4 + 7 + 4$

8. Construct a predictive parsing table for the grammar :

$S \rightarrow iEtSS' | a$

$S' \rightarrow eS | \epsilon$

$E \rightarrow b$

Here S is star symbol & S' are non-terminals & i, t, a, e, b are terminals.

Explain the steps in brief.

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

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

10. Translate the expression  $a = -( a + b ) * ( c + d ) + ( a + b + c )$  into

- a) Quadruple
- b) Triple
- c) Indirect Triple

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) .....

What do you understand by terminal table and literal table ?

6 + 6 + 3

11. Write short notes on any *three* of the following :  $3 \times 5$

- a) LEX and YAAC
  - b) Activation record
  - c) Symbol Table
  - d) Peephole optimization
  - e) Cross compiler.
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